QUESTION # 1

**Question Worksheet**

| **Examination Outline Cross-reference:** | Level | RO |
|---|---|---|
| | Tier # | 1 |
| | Group # | 1 |

K/A # 4.1 007 EK 3.01 - Knowledge of the reasons for the following as they apply to a reactor trip: Actions contained in EOP for reactor trip.
Importance 4.0

**Proposed Question:**

The following conditions exist:

- Reactor has tripped following a low feedwater flow condition.
- All systems have operated as designed following the trip.
- The crew has transitioned to EMG ES-02, REACTOR TRIP RESPONSE.

Which condition would require that you close the Main Steam Isolation Valves (MSIVs)?

A. Main Condenser is unavailable due to a loss of vacuum.

B. RCS Cold Leg Temperatures are stable at 562 °F using ARVs.

C. AFW flow has been reduced to below the minimum allowable

D. A steam leak is apparent on the secondary side of the plant.

**Proposed Answer:** D, A steam leak is apparent on the secondary side of the plant.

**Explanation:** The background document specifies that the MSIVs are only closed due to cooldown from excessive steam flow after reducing feedwater flow to 270 Klbm/hr. Answer A is incorrect because ARVs could now be used and closing MSIVs makes no difference. Answer B is incorrect because this is normal post trip indications. Answer C is incorrect since this would limit the cooldown. Answer D is correct as the excessive steam flow on the secondary is causing the cooldown and requires MSIVs to be closed.

**Technical References:** EMG ES-02 step 1 and BD-EMG ES-02 page 11 & 12

**Learning Objective:** LO1732315, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (5) (10)

**Comments:** Need to understand actions contained in EOPs following a reactor trip.

QUESTION # 2

**Question Worksheet**

**Examination Outline Cross-reference:**

| | |
|---|---|
| Level | RO |
| Tier # | 1 |
| Group # | 1 |

K/A # 4.2 008 AK1.01 – Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident: Thermodynamics and flow characteristics of open or leaking valves.
Importance 3.2

**Proposed Question:**

The following plant conditions exist:

- The reactor was tripped due to an RCP seal failure.
- Hot Leg temperature is 420°F
- Cold Leg temperature is 390°F
- Pressurizer pressure is 450 psig
- Natural circulation is in progress
- Containment pressure is 1 psig
- PRT pressure is 55 psig

If a Pressurizer Safety Valve is found open at 10%, what would the temperature indicate on the tailpipe?

A. 216 °F

B. 288 °F

C. 302 °F

D. 458 °F

**Proposed Answer:** C, 302 °F

**Explanation:** Answer A is the saturation temperature for the containment at 1 psig (16 psia). Answer B is saturation temperature for 55 psia which would be calculated if no correction was made to PRT stated pressure. Answer C is PRT saturation temperature with a containment pressure of 1 psig added along with atmosphere. Answer D is Pressurizer saturation temperature using normal atmospheric added to the gauge pressure given. The candidate must know to use PRT pressure absolute adjusting PSIG to PSIA to obtain correct value.

**Technical References:** Steam Tables (provided)

**Learning Objective:** LO1610722, Objective 8

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (8)

QUESTION # 2

**Comments:** This question requires the candidate to select the correct parameter, convert it to PSIA and then to use the steam tables to select the correct answer. Any misunderstanding of the enthalpy across the valve will lead to an incorrect answer and the most likely incorrect answers are provided.

QUESTION # 3

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.1 009 EA 2.39 – Ability to determine or interpret the following as they apply to a small break LOCA: Adequate core cooling.
Importance 4.3

**Proposed Question:**

The Wolf Creek operating crew has taken all actions required for a small break LOCA. The crew has transitioned to EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT and is evaluating whether ECCS flow should be reduced.

Which of the following is used to determine if adequate core cooling exists?

A. ECCS Injection flow rate

B. RCS Narrow Range temperature

C. RCS Subcooling

D. RVLIS indication

**Proposed Answer:** C, RCS Subcooling

**Explanation:** Per the background document, RCS subcooling is the most direct indication that core cooling is being adequately maintained which is Answer C. Ans. A & D are wrong, because these two are indications of RCS inventory, not necessarily adequate core cooling. Ans. B is wrong since CETs or wide range temperatures are used to determine subcooled margin.

**Technical References:** EMG E-1, step 10, BD-EMG E-1, page 36

**Learning Objective:** LO1732320, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.43 (5)

**Comments:** Candidate needs to be able determine and interpret which parameter represents adequate core cooling.

QUESTION # 4

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.1 011 EK2.02 – Knowledge of the interrelations between the Large Break LOCA and the following: Pumps
Importance 2.6

**Proposed Question:**

The following plant conditions exist:

- A Loss of Coolant Accident is in progress with all ECCS pumps in operation.
- The RWST LEV LOLO 1 AUTO XFR alarm has actuated.
- The first 10 steps of EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, have been completed.

The "B" RHR pump has just tripped.

Which of the following actions should you take?

A. Stop the "B" Train SI pump to prevent runout of the "A" RHR pump.

B. Transition to EMG C-11, LOSS OF EMERGENCY COOLANT RECIRCULATION.

C. Closely monitor system parameters to ensure NPSH is maintained on running pumps.

D. Close EJ HV-8809A, RHR to Accumulator Injection Loops 1 & 2 valve, to reduce flow.

**Proposed Answer:** C, Closely monitor system parameters to ensure NPSH is maintained on running pumps.

**Explanation:** Answer A is incorrect because one RHR pump should be adequate to supply all SI/CCPs during the recirculation phase. Answer B is incorrect since this procedure would only be entered on a loss of all recirc flow, not just one pump. Answer C is correct as this alignment puts the RHR pump close to its design flow curve and the SRO should be informed if it looks like the flow rate is too much for the pump. Answer D is incorrect as this valve is only closed in Hot Leg Recirculation mode and has a power lockout switch to prevent inadvertent closing.

**Technical References:** BD EMG ES-12 for step 7

**Learning Objective:** LO1732322, Objective 1

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (7)

QUESTION # 4

**Comments:** Question tests candidates understanding of ECCS system functions as it apples to the EMG background documents.

QUESTION # 5

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.2 015 AK2.10 – Knowledge of the interrelations between the Reactor Coolant Pumps Malfunctions(Loss of RC Flow) and the following: RCP indicators and controls.
Importance 3.3

**Proposed Question:**

The plant is in the process of starting up following a refueling outage. The "D" RCP was started with the plant in Mode 5 at 195 °F.

10 seconds after starting the pump you note the current is still high and there is no flow indicated.

This indicates:

A. Locked Rotor

B. Pressurizer is solid

C. Pump Runout

D. Low Flow Cavitation

**Proposed Answer:** A, Locked Rotor

**Explanation:** Ans. A is correct since this is the only option that would give you a high current reading along with a low flow. Ans. B is a possibility due to heating up the RCS and filling the pressurizer, but would not be reason for low flow. Ans. C would have low current indicated and high flow indicated. Ans. D would indicate oscillating amps and would be due to operating at such a low temperature.

**Technical References:** General Physics, PWR Motors and Generators

**Learning Objective:** LO1732201, Objective 3

**Question Source:** WCNOC 2001 Exam – Question #49

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Operators are expected to observe pump parameters when starting a pump to look for various failures and analyze the indications, such as a locked rotor.

QUESTION # 6

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.2 022 / 2.4.35 – Emergency Procedure/ Plan: Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.
Importance 2.9

**Proposed Question:**

The plant has tripped from 100% due to a LOCA and subsequent Loss of Offsite Power.

Operators are working through procedure EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT to address the malfunction.

How will the operations staff address restoring Instrument Air?

A. Locally restore cooling water to the air compressors from the Aux Building and available air compressors will be started from the control room.

B. Locally restore cooling water to the air compressors from the Turbine Building and available air compressors will be started locally at the compressor.

C. Control room operators will manually restore cooling water to air compressors and then available air compressors will be started from the control room.

D. Locally restore cooling water to the air compressors from the Turbine Building and available air compressors will be started from the control room.

**Proposed Answer:** A, Aux Building operator will locally restore cooling water to air compressors and available air compressors will be started from the control room.

**Explanation:** Answer A is correct since the valves must be locally opened due to the loss of offsite power, Inst Air Compressors are class powered and can be restarted following the load shed. The valves to be operated are EF HV-43 and EF HV 44 and are located in the Aux Building. All other answers have either the wrong operator/location of operating the valves or the wrong location in starting the air compressors.

**Technical References:** EMG E-1, step 9; M-12EF01 &M-12EF02

**Learning Objective:** LO1732320, Objective 1

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.43 (5)

**Comments:** Operator needs to analyze what is required to restore cooling water to the air compressors for the given conditions and where this will be performed.

QUESTION # 6

QUESTION # 7

**Question Worksheet**

| **Examination Outline Cross-reference:** | Level | RO |
|---|---|---|
| | Tier # | 1 |
| | Group # | 1 |

K/A # 4.2 025 AA 2.04 – Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Location and isolability of leaks.
Importance 3.3

**Proposed Question:**

The following plant conditions exist:

- Unit is in Mode 4.
- RCS temperature is 250°F.
- Direction is to maintain RCS pressure between 325 and 350 psig.
- The "A" RHR pump failed causing a loss of RHR and the "B" pump has been placed in service in accordance with OFN EJ-015, LOSS OF RHR COOLING.
- PRT level has started to increase.

You note that RCS pressure indicates 450 psig and Pressurizer level has started to decrease in an uncontrolled manner.

What is causing the loss of inventory and how will it be isolated?

A. One PZR PORV has opened on high pressure and is now leaking, but will be isolated by closing the associated block valve.

B. The RHR suction relief valve on the "A" loop has opened due to high pressure and will be isolated by reducing RCS pressure.

C. The letdown relief valve has lifted due to high pressure and failed to reseat, but will be isolated by initiating a CISA.

D. The RHR discharge relief valve on the "B" loop has opened due to high pressure and will be isolated by stopping "B" RHR pump.

**Proposed Answer:** B, The RHR suction relief valve on the "A" loop has opened due to high pressure and will be isolated by reducing RCS pressure.

**Explanation:** Answer A is incorrect as the pressure did not get high enough to open the PORV and PZR level will increase not decrease. Answer B is correct as described in the background document and as seen in the plant, pressure would have to be reduced to reseat the relief. Answer C is incorrect as the pressure is not high enough to open the valve and even if it were, a CISA would not isolate the valve as is directed in OFN BB-031. Answer D is incorrect because pressure was not high enough and this valve does not discharge to the PRT.

**Technical References:** OFN EJ-015 step 16 & 17 and associated background document

**Learning Objective:** LO1732425, Objective 3

QUESTION # 7

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.43 (5)

**Comments:** This loss of inventory is possible following a loss of one RHR pump and placing the second in service if the cross connect valves in the discharge to letdown are both open. This would allow RHR discharge pressure on the idle loop suction piping and would exceed the lift setpoint on the relief valve if RCS pressure exceeds 360 psig. This condition is most likely during off normal swapping of pumps (as described in the background document). The operator needs to know the relief valve setpoints, discharge locations and the affect of off normal conditions to answer this question and then analyze plant conditions to come up with the right combination.

QUESTION # 8

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.2 026 AA2.03 – Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The valve lineups necessary to restart CCWS while bypassing the portion of the system causing the abnormal condition.
Importance 2.6

**Proposed Question:**

The plant is at 100% power.

- Annunciator 00-053D, CCW SRG TK B LEV HILO has just come into alarm.
- "B" Component Cooling Water (CCW) train is running supplying the service loop.
- The Operators now observe the "B" CCW surge tank decreasing slowly with Normal Makeup in service.

What action is needed first from OFN EG-004, CCW SYSTEM MALFUNCTIONS, while attempting to identify and isolate the leak?

A. Align ESW makeup to the CCW surge tank, then direct personnel to locate the leak.

B. Start a CCW pump in the alternate train, then shift service loop to that train.

C. Trip the reactor, then isolate CCW service loop supply and return valves.

D. Isolate CCW to the Spent Fuel Pool Cooling Heat Exchanger.

**Proposed Answer:** A, Align ESW makeup to the CCW surge tank, then direct personnel to locate the leak.

**Explanation:** Answer A is correct in that inventory is maintained to the system so that time is available to isolate the leak. Answer B is incorrect because the service loop is not shifted. Answer C is incorrect as it is only required if both CCW trains are unavailable. Answer D is incorrect, since isolating this component is not addressed until the end of the procedure.

**Technical References:** OFN EG-004, Step 3 RNO

**Learning Objective:** LO1732414, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.43 (5)

**Comments:** The operators need to know what part of the system can be isolated/bypassed in order to keep CCW in service in order find the leak without having to shut down the system. The

QUESTION # 8

Operators have to analyze the plant condition and realize that without the time afforded by the additional makeup the surge tank would go low and the Unit would have to be tripped.

QUESTION # 9

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.2 027 AK2.03 – Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Controllers and positioners.
Importance 2.6

**Proposed Question:**

The following plant conditions exist:

- 50% Reactor power
- Pressurizer Pressure control is in automatic
- One set of Backup heaters are ON
- Actual Pressurizer Pressure is 2250 psia

The Pressurizer Pressure Master Controller malfunctions and the SETPOINT drifts to 2100 psia over a 10-minute period.

Which ONE of the following describes the INITIAL automatic responses of the control elements of the Pressurizer Pressure Control System as a result of this failure?

A. PORV PCV-456A opens; spray valves throttle open, variable heaters go to minimum output.

B. PORV PCV-455A opens; spray valves throttle open, variable heaters go to minimum output.

C. Spray valves throttle open and variable heaters go to minimum output.

D. Spray valves throttle closed and variable heaters go to maximum output.

**Proposed Answer:** C, Spray valves throttle open and variable heaters go to minimum output.

**Explanation:** Answer C, The setpoint failing lower will cause the master controller output to increase causing the spray valves to open and heaters to go to minimum. Answers A & B address PORV operation and neither would be correct unless master controller output were to fail completely high, not just higher as was caused by the setpoint drop. . Answer D is wrong since this is just the opposite, but plausible if candidate mixes up setpoint with output.

**Technical References:** OFN SB-008, attachment V, background document

**Learning Objective:** LO1732418, Objective 3

**Question Source:** INPO BANK - Byron 10/29/01

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (5) (10)

QUESTION # 9

**Comments:** Need to be able to analyze potential PZR pressure controller malfunctions.

QUESTION # 10

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.1 029 / 2.2.2 - ATWS/ Equipment Control: Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.
Importance 4.0

**Proposed Question:**

The following plant conditions exist:

- Reactor is stable at 6% power with a plant startup in progress.
- All systems are properly aligned for the current plant conditions.

Intermediate range channel N-35 has just failed causing an Intermediate Range High Flux trip, but no trip occurred. The plant remains stable.

Which of the following actions should the Reactor Operator take?

A. Manually trip the reactor and if that does not work, drive rods in to take the reactor subcritical.

B. Manually trip the reactor and if that does not work, enter EMG FR-S1, Response to Nuclear Power Generation ATWS.

C. Maintain stable plant conditions and remove the failed Intermediate Range channel from service.

D. Commence a normal reactor shutdown using GEN 00-005, Minimum Load to Hot Standby.

**Proposed Answer:** B, Manually trip the reactor and if that does not work, enter EMG FR-S1, Response to Nuclear Power Generation ATWS.

**Explanation:** Ans. A is incorrect, but you will drive rods once you enter EMG FR-S1 and attempt the trip again. Ans. B. is correct as a reactor trip has been generated and not trip has occurred. Once E-0 is entered, if the trip still won't work and power is greater than 5%, you transition to EMG FR-S1. Ans. C is incorrect although you will remove the failed channel from service after the plant is stabilized. Ans. D is incorrect as the trip has failed and a trip has been demanded.

**Technical References:** EMG E-0 entry and step 1

**Learning Objective:** LO1732313, Objectives 1 & 2

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.45 (5)

QUESTION # 10

**Comments:** The operator needs to know all immediate actions and the conditions when they apply. The fact that the plant is stable at low power does not allow the operator to ignore a valid ATWS condition and take appropriate actions.

QUESTION # 11

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.2 054 / 2.1.25 Loss of Feedwater / Conduct of Operations: Ability to obtain and interpret station reference materials such as graphs, monographs, and tables, which contain performance data.
Importance 2.8

**Proposed Question:**

The current plant conditions exist:

- Unit power has been reduced for maintenance on the 5B feedwater heater.
- A leak has developed on the 2B feedwater heater.
- The 2B heater will have to be opened for maintenance.

What is the maximum unit power while this maintenance is in progress?
(OFN AF-025, Attachment A, page 3 of 5, provided)

A. 48%

B. 62%

C. 65%

D. 91%

**Proposed Answer:** C, 65%

**Explanation:** Answer A would be correct for two strings of 7 heaters out of service, only one string is out in this case. Answer B would be correct for two strings of 4 heaters out of service, only one string is out of service. Answer D would be correct for the current conditions if any heater except #2 was worked on. Answer C is correct for one string out of service and heater #2 being worked on.

**Technical References:** OFN AF-025 attachment A (reference provided)

**Learning Objective:** LO1732435, Objective 4

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (10)

**Comments:** Requires operator to correctly read charts and apply system knowledge to conditions requiring load reduction due to loss of feedwater heater string.

QUESTION # 12

**Question Worksheet**

**Examination Outline Cross-reference:**

| | |
|---|---|
| Level | RO |
| Tier # | 1 |
| Group # | 1 |

K/A # 4.2 056 AK1.03 Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Definition of subcooling: use of steam tables to determine it.
Importance 3.1

**Proposed Question:**

The following plant conditions exist:

- Reactor trip from 10% of full power due to loss of Off-site power.
- Natural circulation is being established in accordance with EMG ES-04, NATURAL CIRCULATION COOLDOWN.
- RCS pressure 1880 psig
- Tavg 560°F
- Thot 580°F
- Tcold 540°F
- Core Exit TC 575°F

Using the indications that most accurately reflect core conditions, calculate subcooling of the reactor.

A. 48°F

B. 53°F

C. 68°F

D. 88°F

**Proposed Answer:** B, 53°F

**Explanation:** The best indication of subcooling and the "preferred" indicator from the EMGs is to use Core exit temperature. The Off site power loss renders the normal computer display inoperable and requires the operator to go into the back panels to read the TC's manually. Each of the temperatures above provide a calculated subcooling based on a provided temperature. Answer B is the subcooling for the Core exit temperature and is the correct answer. The other subcooling temperatures can be used but do not accurately reflect the core conditions as well as core exit temperature. The reactor is in natural circulation and the loop temperatures may not provide current core conditions.

**Technical References:** BD-EMG ES-04 page 33, EMG ES-04 step 14 (steam tables provided)

**Learning Objective:** LO1732317, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A4

QUESTION # 12

**10 CFR Part 55 Content:** 55.41 (8) (10)

**Comments:** Question requires proper use of steam tables and selection of the correct temperature indication to obtain the correct answer. In addition the Power loss renders one of the main displays for the CETs inoperable and the operator has to know that they are also available in the back panel area of the control room.

QUESTION #13

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.2 057 AA1.02 - Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Manual control of PZR level.
Importance 3.8

**Proposed Question:**

Pressurizer level controller BB LS-459D is selected to the BB L459/460 position.
An I&C Surveillance Test has de-energized BB LT-461 and testing is in progress.
Vital Instrument bus NN02 now fails.

What actions are required to be taken to control pressurizer level?

A. Select the alternate channel BB LS-459D.

B. Go to manual on PZR level controller, BB LK-459.

C. Take MANUAL control of BG FIC-121 and restore normal letdown.

D. Reduce charging flow to seals only and establish excess letdown.

**Proposed Answer:** D, Reduce charging flow to seals only and establish excess letdown.

**Explanation:** With the given conditions PZR level will fail low and Isolate Letdown due to the failure LOW of BB LT-460. Since BB-LT-461 is already out of service, there is no other channel available to select. However, if no action is taken, the reactor will trip on high level. Ans. D is correct since this is the only available manual control to take to reduce pressurizer level. Ans. A is incorrect since no other channel is available without a failed input level instrument. Ans. B is incorrect since going to manual will do no good, because the letdown isolation comes of the failed instrument and not the master controller. Ans. C is incorrect, since normal letdown is interlocked closed.

**Technical References:** OFN NN-021, Step 4, OFN SB-008 Attachment J

**Learning Objective:** LO1732431, Objective 4

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** The operator must know which PZR level outputs are affected by loss of NN power and how the charging and letdown systems must be operated to compensate for the loss.

QUESTION # 14

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.2 058 AK3.01 – 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
Importance 3.4

**Proposed Question:**

Diesel Generator NE01 is running unloaded when 125 VDC Bus NK01 becomes de-energized. How will this affect the Emergency Diesel Generator (EDG)?

A. The EDG will trip due to the loss of DC control power.

B. The EDG will overspeed as it tries to increase voltage to no load.

C. The EDG will continue to run but output voltage will indicate zero.

D. The EDG will stop as the fuel racks close due to loss of control power.

**Proposed Answer:** C, The EDG will continue to run but output voltage will indicate zero.

**Explanation:** Answer A is incorrect because all trips are disabled on loss of control power except mechanical overspeed. Answer B is incorrect as voltage is not changed by speed but by excitation, which has been lost. Answer C is correct and the procedure requires an operator to locally shutdown the EDG due to the loss of control power. Answer D is incorrect as the fuel racks are not affected by loss of control power but can be manually closed to stop the EDG.

**Technical References:** OFN NK-020, Attachment “A” step 1 and preceding caution.

**Learning Objective:** LO1732430, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (10)

**Comments:** None

QUESTION # 15

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.2 062 AK3.02 – Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: The automatic actions (alignments) within the nuclear service water resulting from the actuation of the ESFAS.
Importance 3.6

**Proposed Question:**

The plant was at 100% when a trip occurred following an earthquake that exceeded the Safe Shutdown Earthquake (SSE) analysis. All systems responded normally and the only major damage to the plant was a rupture in the Condensate Storage Tank (CST). The transient progresses after the trip until a Low Suction Pressure (LSP) signal is received from ESFAS, indicating an imminent loss of suction to the Aux Feedwater (AFW) System.

What are the automatic actions of the Essential Service Water (ESW) system in response to the LSP signal?

A. Starts both ESW pumps and isolates all Service Water crossties, opens ESW to AFW supply valves and closes CST to AFW supply valves.

B. Starts only one ESW pump if only an AFAS-M signal has actuated, opens ESW to AFW supply valves and closes CST to AFW supply valves.

C. Starts only one ESW pump, opens ESW to AFW supply valves and closes CST to AFW supply valves.

D. Starts both ESW pumps, opens ESW to AFW supply valves and closes CST to AFW supply valves.

**Proposed Answer:** D. Starts both ESW pumps, opens ESW to AFW supply valves and closes CST to AFW supply valves.

**Explanation:** Answer A is incorrect as only the Service Water to ESW supply crossties close. Answer B is incorrect as the LSP is train specific however on a trip from 100% AFAS-T would also actuate affecting both trains. Answer C is incorrect as both pumps start. Answer D is correct.

**Technical References:** USAR

**Learning Objective:** SY1408900, Objective 5

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (4) (8)

**Comments:** Operator knowledge of the response of ESW to an LSP.

QUESTION # 15

QUESTION # 16

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 1

K/A # 4.5 E04 EA1.2, Ability to operate and / or monitor the following as they apply to the (LOCA Outside Containment): Operating behavior characteristics of the facility.
Importance 3.6

**Proposed Question:**

Which of the following locations is the primary concern when addressing a LOCA Outside of Containment.

A. The RHR Hot Leg Recirc line.

B. The CVCS Low Pressure Letdown Line.

C. The Loop Hot Leg to RHR pump suction lines.

D. The SI pump discharge to the Hot Leg Injection lines.

**Proposed Answer:** C. The Loop Hot Leg to RHR pump suction lines.

**Explanation:** Answer A, B and D are incorrect but are checked in the procedure prior to checking the RHR suction lines to give time for the operator to energize the RHR suction valves at the breakers. Answer D is correct as identified in the Background document for EMG C-12.

**Technical References:** BD EMG C-12 page 14

**Learning Objective:** LO172333, Objective 4

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** The operator should understand the sequence of procedure steps and the importance of which system is most likely to be the cause of a problem. The sequence of this procedure is to send someone to energize the RHR valves and then check other system alignments giving the operator time to close the breakers. Then you can check the portion of the systems that are most likely to be the cause of the LOCA outside containment.

QUESTION # 17

**Question Worksheet**

**Examination Outline Cross-reference:**

| | |
|---|---|
| Level | RO |
| Tier # | 1 |
| Group # | 1 |

K/A # 4.5 E11 EK2.2 - Knowledge of the interrelations between the (Loss of Emergency Coolant Recirculation) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.
Importance 3.9

**Proposed Question:**

A Loss of Coolant Accident (LOCA) has occurred and the plant has addressed the problem in EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT, and has now transitioned to EMG C-11, LOSS OF EMERGENCY COOLANT RECIRCULATION, due to a loss of both trains of cold leg recirculation.

Containment pressure is currently 20 psig and increasing slowly.

The crew is at the step to initiate a cooldown to Cold Shutdown conditions.

What method will the crew use to establish this cooldown?

A. Reduce RCS pressure using the Power Operated Relief Valves (PORVs).

B. Dump steam using the Atmospheric Relief Valves (ARVs).

C. Dump steam using the condenser steam dumps.

D. Feed Steam Generators at maximum rate using turbine driven AFW pump.

**Proposed Answer:** B, Dump steam using the Atmospheric Relief Valves (ARVs).

**Explanation:** Ans. A is incorrect since this is used later in procedure to lower RCS pressure to reduce break flow. Ans. B is correct since dumping steam will reduce temperature in the primary. Ans. C is incorrect since a MSLIS / CNTMT HI-2 has been generated so steam cannot be dumped to the condenser. Ans. D is incorrect, since filling S/Gs is not the method used to cooldown, but could be chosen due to the option of using Aux Feed turbine at maximum load to dump steam not feed.

**Technical References:** EMG C-11, step 9

**Learning Objective:** LO1732332, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (8) (10)

**Comments:** Availability of components to cooldown in an emergency.

QUESTION # 17

QUESTION # 18

**Question Worksheet**

| **Examination Outline Cross-reference:** | Level | RO |
|---|---|---|
| | Tier # | 1 |
| | Group # | 1 |

K/A # 4.5 E05 EK2.1, Knowledge of the interrelations between the (Loss of Secondary Heat Sink) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.
Importance 3.7

**Proposed Question:**

The Unit tripped earlier due to a relay failure caused by Switchyard maintenance. All systems responded normally. The Operators were performing EMG ES-02 Reactor Trip Response when all feed was lost. Unit operators then transitioned to EMG FR-H1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.

The following conditions exist:

- Both Main Feedwater Pumps (MFPs) are TRIPPED
- Auxiliary Feedwater Pumps are NOT AVAILABLE
- Reactor Coolant Pumps are OFF
- Offsite Power has remained available

A Feedwater Isolation Signal (FWIS) was actuated on Steam Generator LO-LO level and all components repositioned as expected. The FWIS has now been jumpered out to the Feedwater Isolation Valves in preparation to re-start “B” Main Feedwater Pump.

Which of the following actions are completed to enable starting “B” Main Feedwater Pump?

A. Close all Reactor Trip breakers.

B. Place both MFP FWIS Trip Block switch in Block position.

C. Depress both SIS reset pushbuttons to reset the active SIS signal.

D. Depress both FWIS reset pushbuttons to reset the FWIS signal.

**Proposed Answer:** B, Place both MFP FWIS Trip Block switches in Block position.

**Explanation:** The FWIS will not clear due to the LO S/G level condition. Ans. A is incorrect, but is a misconception that the Rx trip breakers must be closed in order to reset FWIS which in turn would allow running of the Main Feed pump. Ans. B is correct that the FWIS block must be selected in order to run the MFP since the FWIS is still active. Ans. C is incorrect since an SIS signal is not present, but is listed in the procedure to ensure reset of FWIS since SIS will actuate a FWIS. Ans D is incorrect since the Lo-Lo S/G level is still active.

**Technical References:** EMG FR-H1, Step 8 through 12

**Learning Objective:** LO1732246, Objective 1

QUESTION # 18

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** How automatic actuations affect restoration of Loss of Heat Sink malfunction. The Operator must analyze the current condition of the plant and realize that an SI signal has not bee intitiated and that the SG Low Level will nto allow the FWIS signal to be reset.

QUESTION # 19

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 2

K/A # 4.2 001 AA2.03 – Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Proper actions to be taken if auto matic safety functions have not taken place.
Importance 4.5

**Proposed Question:**

The following plant conditions exist:

- Beginning of life (BOL)
- Reactor Power is at 100% with rod control in AUTOMATIC
- Control Bank "D" is at 218 steps
- A failure in rod control causes to step OUT continuously

Which rod control interlock is expected to be the FIRST to stop outward rod movement assuming NO operator action?

A. Power Range Rod Stop (C-2)

B. Overtemperature ΔT Rod Stop (C-3)

C. Overpower ΔT Rod Stop (C-4)

D. Control Bank "D" Position Rod Stop (C-11)

**Proposed Answer:** D, Control Bank "D" Position Rod Stop (C-11)

**Explanation:** All answers are valid rod stop interlocks to stop outward rod motion, however C-11 will be the first when rods get to 232 steps.

**Technical References:** USAR, Table 7.7-1

**Learning Objective:** SY1301200, Objective 4

**Question Source:** Bank #Q26812

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:**

QUESTION # 20

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 2

K/A # 4.2 024/ 2.4.22 – (Emergency Boration) Emergency Procedures / Plan: Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations.
Importance 3.0

**Proposed Question:**

A Reactor Trip with a Loss of Secondary Heat Sink has occurred.

- Two rods are stuck out on the trip
- Reactor power is decreasing

Upon Transition to EMG ES-02, REACTOR TRIP RESPONSE, a Red Path is identified for EMG FR-H1, LOSS OF SECONDARY HEAT SINK.

What is the procedural priority on how to deal with the two stuck rods in this situation?

A. Enter OFN BG-009, EMERGENCY BORATION and perform in parallel with EMG FR-H1.

B. Immediately transition to EMG FR-H1 since the actions contained in it have the higher priority.

C. Immediately transition to EMG FR-S1, RESPONSE TO NUCLEAR POWER GENERATION / ATWT to establish required shutdown margin.

D. Enter EMG FR-H1 and perform EMG ES-02 in parallel to deal with the two stuck rods.

**Proposed Answer:** B, Immediately transition to EMG FR-H1 since the actions contained in it have the higher priority.

**Explanation:** As stated in AP 15C-003 “EMG FR-H1 actions have the higher priority.” Therefore, no other choice would be correct in this case other than answer “B”.

**Technical References:** AP 15C-003, Attachment C

**Learning Objective:** LO1733203, Objective 13

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.43 (5)

**Comments:** Procedure prioritization.

QUESTION # 21

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 2

K/A # 4.2 036 AA1.02 - Ability to operate and / or monitor the following as they apply to the Fuel Handling Incidents: ARM system
Importance 3.1

**Proposed Question:**

The following plant conditions exist:

Plant is in Mode 6, Reactor vessel head removed, control rod unlatching in progress.

Which of the following Radiation Monitors would alert control room personnel to a loss of refueling pool level if it was the only alarm to actuate? (Assume all monitors are operable.)

A. SD RE-41, 2047' CNTMT BLDG., RX. MANIPULATOR BRIDGE CRANE AREA

B. SD RE-39, 2026' CNTMT BLDG., REACTOR SEAL TABLE AREA

C. GT RE-60, CNTMT HIGH RANGE AREA, 2047' CNT, 180 DEGREES FROM NORTH

D. GT RE-22, CNTMT PURGE EXHAUST 2047' AUX. BLDG., BY THE PERSONNEL ENTRY HATCH

**Proposed Answer:** A, SD RE-41, 2047' CNT. BLDG., RX. MANIPULATOR BRIDGE CRANE AREA

**Explanation:** Answer A is correct as this is a low range rad monitor at the manipulator crane, above the pool and would see high radiation first. Answer B is incorrect as this monitor is not used during refueling. Answer C is incorrect as this is a high range monitor (CHARMS) and would not alarm until well after RE-41. Answer D is incorrect as this is a PIG monitor and area radiation will increase before the core is uncovered allowing airborne levels to increase.

**Technical References:** OFN KE-018

**Learning Objective:** LO1732428, Objective 2

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Entry conditions for OFN KE-018 and Area Radiation Monitors response to lowering refueling pool level. The Operator must know what type of detector is in each area and the expected response from this type of accident to correctly answer the question.

QUESTION # 22

**Question Worksheet**

| **Examination Outline Cross-reference:** | Level | RO |
|---|---|---|
| | Tier # | 1 |
| | Group # | 2 |

K/A # 4.2 037 AK3.03, Knowledge of the reasons for the following responses as they apply to the Steam Generator Tube Leak: Comparison of makeup flow and letdown flow for various modes of operation
Importance 3.1

**Proposed Question:**

The following plant conditions exist:

- Unit shutdown has started from 100% due to a S/G tube leak greater than 150 gpd.
- Charging flow prior to the shutdown was 132 gpm.
- Letdown flow prior to the shutdown was 120 gpm.
- Seal injection and return flows were at design flow rates.
- Pressurizer level is being maintained at program level.
- GE RE-92, Condenser Air Removal is showing the corresponding activity.

Conditions after the shutdown has commenced:

- Unit power 35% and decreasing due to the controlled shutdown.
- Charging flow is 140 gpm.
- Letdown flow is 120 gpm.
- Seal injection and return flows remain unchanged.
- Pressurizer level is being maintained at program level.
- GE RE-92 activity level is constant.

What action should you take based on the above indications?

A. Continue the unit shutdown as planned.

B. Increase the rate of load decrease due to the increased S/G leakrate.

C. Stop the load decrease and perform STS BB-004, RCS Water Inventory Balance.

D. Trip the Reactor and enter EMG E-0, Reactor Trip of Safety Injection.

**Proposed Answer:** A, Continue the unit shutdown as planned.

**Explanation:**. Answer A is correct. As the unit changes load, charging flow will mismatch with letdown as pressurizer level change is not perfect as load changes. Answer B is incorrect as you cannot determine an increase in S/G leakrate with power changing and small changes in charging flow. Answer C is incorrect as you are ordered to shutdown due to SGTL and stopping the load reduction to see if things are worse is an incorrect action. Answer D is incorrect as things have not degraded to the point that a unit trip is required based on the provided indications.

**Technical References:** OFN BB-07A, steps 1-10 and attachment “C”

QUESTION # 22

**Learning Objective:** LO1732436, Objective 4

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (5) (10)

**Comments:** Actions taken on a S/G tube leak within the capacity of the charging pumps.

QUESTION # 23

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 2

K/A # 4.2 051 AA2.02 Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip.
Importance 3.9

**Proposed Question:**

Annunciator 00-116B, COND A VAC LO, has just come into alarm.

Based on OFN AF-025, UNIT LIMITATIONS, Figure 2 (provided), which of the following conditions would require that you manually trip the turbine?

A. LP Turbine A exhaust pressure is 5 inches HgA for greater than 15 minutes and turbine power is 90%.

B. LP Turbine A exhaust pressure is 5 inches HgA and decreasing slowly and turbine power is 25%.

C. LP Turbine B exhaust pressure is 5 inches HgA and increasing slowly and turbine power is 70%.

D. LP Turbine C exhaust pressure is 5 inches HgA for greater than 15 minutes and turbine power is 50%.

**Proposed Answer:** B, LP Turbine A exhaust pressure is 5 inches HGA decreasing slowly and turbine power is 25%.

**Explanation:** Answer A & D are incorrect as no time limits are mentioned for tripping the turbine within the procedure and neither value is within the limits on Figure 2. Answer B is correct per the ALR and OFN due to damage to the LP turbine. Answer C is incorrect as a load reduction is required if pressure exceeds 5.5" HGA but not a trip.

**Technical References:** OFN AF-025 and Figure 2(provided to examinee)

**Learning Objective:** LO1732435, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.43 (5)

**Comments:** Ability to use the procedures and graph to determine if trip is required on degrading vacuum conditions.

QUESTION # 24

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 2

K/A # 4.2 060 AK1.04, Knowledge of the operational implications of the following concepts as they apply to Accidental Gaseous Radwaste Release: Calculation of offsite doses due to a release from the power plant
Importance 2.5

**Proposed Question:**

You have entered OFN SP-010, Accidental Radioactive Release, due to a high radiation alarm.

Which of the following radiation monitors in alarm would require that you "Direct Chemistry to perform dose calculations to determine if 10CFR20 release limits have been exceeded"?

A. BM RE-025, Steam Generator Blowdown

B. GE RE-92, Condenser Air Removal

C. GG RE-27, Fuel Bldg. Exhaust

D. GH RE-10, Radwaste Building

**Proposed Answer:** D. GH RE-10, Radwaste Building

**Explanation:** Answer A, B and C do not require off-site Dose calculations per OFN SP-010. Step 17 and 18 require this action for alarms on GH RE-10 Radwaste Building (not real obvious) and/or GT RE-21 Unit Vent (obvious) because either of these monitors in alarm indicates an off-site release in progress.

**Technical References:** OFN SP-010

**Learning Objective:** LO1732420, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (10)

**Comments:** Requires the Operator to understand that only a direct release to the environment requires this action and then they must know which process monitor releases to outside the plant.

QUESTION # 25

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 1
Group # 2

K/A # 4.2 067 AA2.13 - Ability to determine and interpret the following as they apply to the Plant Fire on Site: Need for emergency plant shutdown
Importance 3.3

**Proposed Question:**

The following plant conditions exist:

- Unit is at 100% power in a steady state condition.
- All systems aligned properly.
- Annunciator 00-134E, MN XFMR TROUBLE has come into alarm.
- KC-008, Control Room fire protection panel, has alarmed

The Nuclear Station Operator (NSO) dispatched to investigate reports that the fire protection water deluge system for the "B" Main Transformer has actuated. The NSO reports apparent damage and the fire is still in progress.

Which of the following actions should you now take?

A. Have the NSO isolate control power to trip the transformer, preventing further damage.

B. Trip the reactor and turbine and enter EMG E-0, Reactor Trip or Safety Injection.

C. Commence a rapid unit shutdown using OFN MA-038 Rapid Plant Shutdown.

D. Start both EDGs in anticipation of a loss of all AC power when the transformer trips.

**Proposed Answer:** B, Trip the reactor and turbine and enter EMG E-0, Reactor Trip or Safety Injection.

**Explanation:** Answer A is incorrect because loss of control power will not trip the transformer. Answer B is correct because the Main Turbine should already have electrically isolated resulting in a reactor trip, which means that the system is not functioning as designed. Answer C is incorrect because a trip is needed. Answer D is incorrect because EDGs would not be started in "anticipation" of a loss of all AC power.

**Technical References:** ALR KC-888, attachment "A"

**Learning Objective:** SY1408600, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (5)

**Comments:** None

QUESTION # 26

**Question Worksheet**

**Examination Outline Cross-reference:**

| | |
|---|---|
| Level | RO |
| Tier # | 1 |
| Group # | 2 |

K/A # 4.2 076 AK3.05 - Knowledge of the reasons for the following responses as they apply to the High Reactor Coolant Activity: Corrective actions as a result of high fission-product radioactivity level in the RCS.
Importance 2.9

**Proposed Question:**

If RCS gross specific activity exceeds the limits established by Technical Specification 3.4.16, "RCS Specific Activity", the plant must be placed in Mode 3 with Tavg less than 500 degrees F within 6 hours.

Which of the following is the reason for this cooldown to less than 500 degrees F?

A. To maintain doses to the public within limits following a steam generator tube rupture.

B. To minimize containment hydrogen production in the event of a LOCA.

C. To limit containment radiation levels in the event of a LOCA.

D. To reduce the radiological consequences of a faulted steam generator.

**Proposed Answer:** A, To maintain doses to the public within limits following a steam generator tube rupture.

**Explanation:** Per the Tech Spec bases answer A is correct and all others incorrect. Distracters are plausible since high activity would cause the problems listed, but are not the reason for reducing the plant to Mode 3.

**Technical References:** Tech Spec 3.4.16 and associated bases

**Learning Objective:** SY1300200, Objective 9

**Question Source:** INPO Bank - Harris 1997

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.43 (5)

**Comments:** Reasons for shutting the plant down due to high activity.

QUESTION # 27

**Question Worksheet**

| **Examination Outline Cross-reference:** | Level | RO |
|---|---|---|
| | Tier # | 1 |
| | Group # | 2 |

K/A # 4.5 E02 EK2.2 - Knowledge of the interrelations between the (SI Termination) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.
Importance 3.5

**Proposed Question:**

A steam line break has occurred in the plant. Given the following plant conditions at the transition from EMG E-2, FAULTED STEAM GENERATOR ISOLATION:

- Pressurizer pressure – 1800 psig and stable
- Pressurizer level – 24%
- RCS temperature (Tave) – 538 °F
- Containment pressure – 0.1 psig
- Steam Generator levels: “A” - 32%NR; “B” – 23%NR; “C” 30%NR; “D” 30% NR
- Steam Generator pressures: “A” – 970 psig; “B” 885 psig; “C” 960 psig; “D” 960 psig and ALL stable
- The leak has been isolated
- ALL ECCS pumps are running in the injection mode

The control room staff has entered EMG ES-03, SI TERMINATION from EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT.

What is the sequence for stopping the ECCS pumps?

A. Stop all running charging pumps, SI pumps and RHR pumps

B. Stop one charging pump, both SI pumps, and both RHR pumps

C. Stop both RHR pumps and one charging pump, but keep both SI pumps running

D. Stop both RHR pumps, but keep all charging pumps and both SI pumps running

**Proposed Answer:** B, Stop one charging pump, both SI pumps, and both RHR pumps

**Explanation:** SI is terminated sequentially and will be performed as stated in answer B. The whole point of SI termination is to prevent an overfill of the RCS and therefore after each set of pumps is stopped we check for stability.

**Technical References:** EMG ES-03, SI Termination

**Learning Objective:** LO1732316, Objective 4

**Question Source:** INPO Bank – DC Cook 5/21/01

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

QUESTION # 27

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** General knowledge of EMG ES-03

QUESTION # 28

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 076 K2.01 - Service Water System: Knowledge of bus power supplies to the following: Service Water.
Importance 2.7

**Proposed Question:**

The following plant conditions exist:

- Unit is in Mode 5
- 4160 volt bus SL41 was de-energized momentarily and has been re-energized.
- Service Water (SW) Pumps "A" and "C" were running when the bus was de-energized.

What action is required to restore the normal service water alignment?

A. Dispatch an operator to reset the lockout for "A" SW pump and then restart pump from the control board.

B. Dispatch an operator to reset the lockout for "C" SW pump and then restart pump from the control board.

C. Re-start the "A" SW pump from the control board.

D. Re-start the "C" SW pump from the control board.

**Proposed Answer:** C, Re-start the "A" SW pump from the control board.

**Explanation:** The loss of the bus tripped the "A" SW pump, but did not actuate the lockout device. The "C" SW pump was unaffected by the loss of voltage as it is off of the SL31 bus. Answer A and B are incorrect as no lockout device tripped. Answer C is correct. Answer D is incorrect as this pump did not trip.

**Technical References:** Service water pump electrical diagram

**Learning Objective:** SY1407600, Objective 6

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** The operator needs to know which bus supplies which pump and that loss of the bus will trip the pump but will not actuate the lockout device. Once the bus is restored the pump can be started without any local action.

QUESTION # 29

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.4 003 A2.03 – Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCPS controls including: RCP vibration
Importance 2.9

**Proposed Question:**

The following plant conditions exist:

- Reactor power is currently 10%
- "A" Reactor Coolant Pump (RCP) motor readings are as follows:

| Time | 1700 | 1800 | 1900 |
|---|---|---|---|
| Shaft vibration | 5 mils | 7 mils | 10 mils |
| Frame vibration | 3.0 mils | 3.1 mils | 3.4 mils |
| Upper motor bearing | 175°F | 180°F | 190°F |
| Stator temperature | 195°F | 220°F | 250°F |

What action(s) are required at 1900 based on the above parameters?

A. Immediately trip the reactor and trip RCP "A" due to upper motor bearing temperature.

B. Reduce reactor power to < 5%, and then trip RCP "A" due to excessive stator temperature.

C. A controlled shutdown of RCP "A" due to excessive motor frame vibration.

D. No action is required at this time, continue monitoring RCP "A".

**Proposed Answer:** C, Shutdown RCP "A" due to excessive motor frame vibration.

**Explanation:** Ans. A & B are incorrect since the parameters listed are not yet above the trip criteria. Ans C is correct since frame vibration is > 3 mils and has increased > 0.2 mils in an hour and power is < than 48%, so the pump can be shutdown. Ans. D is incorrect since frame vibration is high enough to warrant some action.

**Technical References:** OFN BB-005, RCP MALFUNCTIONS

**Learning Objective:** SY1300300, Objective 6

**Question Source:** Bank #Q25606 (Modified)

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (5)

**Comments:** Need to analyze and understand the RCP data as to when the RCP must be tripped as well as when the RCP must be shutdown in a controlled manner.

QUESTION # 30

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.1 004/ 2.1.28 – CVCS, Conduct of Operations: Knowledge of the purpose and function of major system components and controls.
Importance 3.2

**Proposed Question:**

While in Mode 3, the operator is restoring letdown following maintenance, with the following conditions present:

- Pressurizer level channels LT-459 and LT-460 selected for control.
- Letdown isolation valves BG LCV-459 and 460 are **closed.**
- Letdown orifice isolation valves BG HV-8149 A/B/C **closed.**
- Pressurizer level channels indicate as follows:
  BB LI-459 20%
  BB LI-460 18%
  BB LI-461 19%

The Operator depresses the OPEN pushbutton for BG HV-8149A and it does not open, why?

A. Interlock from LCV-459 and 460 are preventing it from opening.

B. No motive force to open the valve without upstream pressure.

C. Interlock from level channel LT-460 is preventing it from opening.

D. Hydraulic lock between the orifice isolation and letdown isolation valves.

**Proposed Answer:** A, Interlock from LCV-459 and 460 are preventing it from opening.

**Explanation:** Ans. A is correct since BG HV-8149A will not open unless LCV 459 and 460 are open. Ans B is incorrect since a motive force is not required to open these valves. Ans C is incorrect since Pzr level is not < 17 % which is the level required to hold valve closed. Ans D is incorrect, since the hydraulic lock may occur downstream of the orifice, not at the valve.

**Technical References:** M-12BG01, P& ID Chemical and Volume Control System

**Learning Objective:** SY1300400, Objective 3

**Question Source:** Bank #Q12607 (Modified)

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Functions of interlocks in the Chemical and Volume Control System (CVCS)

QUESTION # 31

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.4 005 K3.06 – Knowledge of the effect that a loss or malfunction of the RHRS will have on the following: CSS
Importance 3.0

**Proposed Question:**

Given the following:

- Containment pressure 30 psig
- RWST Level 30%
- All Automatic actions have occurred as required
- One Containment Spray Pump running

Using the table in Step 12 (provided) from EMG C-11, "Loss of Emergency Coolant Recirculation," which actions are needed?

A. Secure four (4) containment fan coolers and secure NO containment spray pumps.

B. Secure two (2) containment fan coolers and start (1) containment spray pump.

C. Secure two (2) containment fan coolers and secure one (1) containment spray pump.

D. Secure NO containment fan coolers and secure one (1) containment spray pump.

**Proposed Answer:** D, Secure NO containment fan coolers and secure one (1) containment spray pump. Reference provided shows other selections wrong.

**Explanation:** The initial conditions show that CNTMT pressure has increased to the point where an SI occurred and therefore the containment coolers will all be running in slow speed. Then using the table provided one can see that no containment spray pumps should be running.

**Technical References:** EMG C-11 Step 12 (provided)

**Learning Objective:** LO1732332, Objective 3

**Question Source:** Bank #Q20307

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Containment spray requirements following a loss of RHR.

QUESTION # 32

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.3 006 K2.01 – Knowledge of bus power supplies to the following: ECCS pumps
Importance 3.6

**Proposed Question:**

The following has occurred at the plant:

- LOCA in progress resulting in a Safety Injection on Containment High Pressure
- All ECCS equipment and loads have operated and sequenced on properly
- Safety Injection signal has just been reset in accordance with step 4 of EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT

What will be the status of ECCS components in the event the Startup Transformer is NOW lost?

A. NE01 will continue to run unloaded, NE02 will re-energize NB02, and the Shutdown Sequencer will actuate all "B" train ECCS components

B. NE01 will continue to run unloaded, NE02 will re-energize NB02, and the crew will have to manually restart Train B ECCS components as necessary.

C. NE01 will NOW automatically start and the Shutdown Sequencer will actuate all "A" train ECCS components.

D. NE02 will NOW automatically start and the Shutdown Sequencer will actuate all "B" train ECCS components.

**Proposed Answer:** B, NE01 will continue to run unloaded, NE02 will re-energize NB02, and the crew will have to manually restart Train B ECCS components as necessary.

**Explanation:** The Startup transformer normally feeds NB02. After the SI was actuated and then RESET, both NE01 and NE02 are running but not loaded on their respective 4160 kv bus. Therefore, when power was lost to NB02, NE02 started feeding the bus. The crew will have to start SI Pumps and/or RHR Pumps as necessary because they are not restarted by the shutdown sequencer.

**Technical References:** KD-7496 and EMG E-1, Loss of Reactor or Secondary Coolant

**Learning Objective:** SY1406401, Objective 4

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Need to know that only NB02 affected and that Diesels started on SI and kept running. So when the Startup Transformer is lost NB01 stays powered.

QUESTION # 33

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.3 006 A4.02 – ECCS, Ability to manually operate and/or monitor in the control room: Valves.
Importance 4.0

**Proposed Question:**

During normal full power operation, what is the condition of the Safety Injection Accumulator Discharge Isolation valves?

A. Valves are fully closed with power removed.

B. Valves are fully closed with power available.

C. Valves are fully open with power available.

D. Valves are fully open with power removed.

**Proposed Answer:** D, Valves are fully open with power removed.

**Explanation:** Accumulator Outlet Valves are OPEN with power removed due to single failure criteria. Even though the power is removed from the valves, the indicating lights are still lit in the control room.

**Technical References:** GEN 00-002

**Learning Objective:** SY1300600, Objective 6

**Question Source:** Bank #Q15030

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Accumulator Isolation valves are always open with power removed at power.

QUESTION # 34

**Question Worksheet**

| **Examination Outline Cross-reference:** | Level | RO |
|---|---|---|
| | Tier # | 2 |
| | Group # | 1 |

K/A # 3.5 007 A2.03 - 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: Overpressurization of the PZR
Importance 3.6

**Proposed Question:**

Given the following:

- The plant was operating at 100% power when the turbine tripped.
- The reactor failed to automatically trip, but was manually tripped.
- All other systems operated as expected.
- The Emergency procedures have been performed and the plant has been stabilized.
- It was noted that on the transient RCS pressure reached 2370 psig.

Which one of the following represents the expected status of the Pressurizer Relief Tank (PRT) and the actions that must be taken in accordance with SYS BB-202, PRESSURIZER RELIEF TANK OPERATIONS, to restore it to normal limits?

A. PRT Temperature – 140 °F, Level – 89%, and Pressure – 12 psig
Reduce level and recirculate water through the RCDT heat exchanger.

B. PRT Temperature – 100 °F, Level – 15%, and Pressure – 14 psig
Open the vent to depressurize and add water to cool the tank.

C. PRT Temperature – 280 °F, Level – 82%, and Pressure – 34 psig
Open the vent to depressurize and add water to cool the tank.

D. PRT Temperature – 240 °F, Level – 95%, and Pressure – 5 psig
Reduce level and recirculate water through the RCDT heat exchanger.

**Proposed Answer:** A, PRT Temperature – 140 °F, Level – 89%, and Pressure – 12 psig
Reduce level and recirculate water through the RCDT heat exchanger.

**Explanation:** Normal PRT parameters are 100 °F, 70% and 5 psig. Following a trip and subsequent PZR high pressure, as in this case, will cause momentary opening of the PORVs to sending steam to the PRT. This will in turn cause an increase in pressure, level and temperature. But since the stem states that there is no excessive leakage or PORV opening, then the final PRT conditions would be based on momentary PORV opening. Answer A is correct since the given conditions will cause these results and the PRT will be cooled via the RCDT heat exchanger. Answer B is wrong since level is normally > 64%. Answer C is wrong since the tank would be cooled via the RCDT heat exchanger. Answer D is wrong since pressure is normally around 5 psig and the PORV opening would increase PRT pressure, also temperature is high for this condition.

**Technical References:** M-12BB02, P&ID for Reactor Coolant System; ALR 00-34D, E, & F; SYS BB-202 applicable steps

QUESTION # 34

**Learning Objective:** SY1300200, Objective 4

**Question Source:** INPO Bank – DC Cook 12/09/02

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (5)

**Comments:** Knowledge of system interrelations between the PZR and PRT and how they are affected by briefly overpressurizing the PZR.

QUESTION # 35

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.8 008 A3.03 – Ability to monitor automatic operation of the CCWS, including: All flow rate indications and the ability to evaluate the performance of this closed-cycle system.
Importance 3.0

**Proposed Question:**

Which of the following lists the control interlock signals that will cause Radwaste Component Cooling Water Isolation Valves EG HV-70A and 70B to automatically close?

A. SIS, low-low level in CCW Train "A" surge tank, or High flow

B. SIS, low-low level in CCW Train "B" surge tank, or High flow

C. CISA, low-low level in CCW Train "B" surge tank, or High flow

D. CISA, low-low level in CCW Train "A" surge tank, or Low flow

**Proposed Answer:** B., SIS, low-low level in CCW Train "B" surge tank, or High flow

**Explanation:** Answer B is correct, because these are the 3 things that will close the Radwaste building Isolation Valves 70A and 70B. CISA will close other components within the CCW system., but not these two valves. Low-low surge tank A level will close 69A and 69B, but not 70A and 70B. Low flow will close FB PV-29 via FSL-107 , but has no effect on 70A and B.

**Technical References:** M-12EG03, simplified diagram for CCW Radwaste header isolations

**Learning Objective:** SY1400800, Objective 8

**Question Source:** Bank #Q15699

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Tests operator's ability to analyze automatic operation of the CCW system, including flow rates and leakage.

QUESTION # 36

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.3 010 K3.03 – Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following: ESFAS
Importance 3.0

**Proposed Question:**

Given the following:

- BB PT-456, PZR Pressure, has failed High
- Bistables have been tripped per OFN SB-008, INSTRUMENT MALFUNCTIONS

Which one of the following automatic actions will occur if power is lost to NN03?

A. A safety injection signal is initiated by the LOW PZR pressure bistables.

B. The OP delta T turbine runback is bypassed.

C. A reactor trip is initiated by the OP delta T bistables.

D. A HIGH PZR level reactor trip actuates if letdown is NOT restored.

**Proposed Answer:** A, A safety injection signal is initiated by the LOW PZR pressure bistables.

**Explanation:** When power is lost to NN03 the LOW PZR press bistables that input to the pressurizer pressure control system OPEN, thus causing a 2 of 4 logic actuation for a Safety Injection, since one train of PZR pressure bistables were previously tripped.

**Technical References:** OFN SB-008 and associated background document

**Learning Objective:** LO1732418, Objective 4

**Question Source:** Bank #Q20548

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** The Operator must analyze plant conditions and determine from that what the protective response would be appropriate.

QUESTION # 37

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.7 012 K5.01 – Knowledge of the operational implications of the following concepts as they apply to the RPS: DNB
Importance 3.3

**Proposed Question:**

Which of the following reactor trip signals provides protection against a Departure from Nucleate Boiling (DNB) event only as long as RCS pressure is between the high and low pressure reactor trip setpoints?

A. Overtemperature ΔT

B. Overpower ΔT

C. Power range neutron flux high setpoint trip

D. Power range neutron flux high negative trip

**Proposed Answer:** A, Overtemperature ΔT

**Explanation:** A is correct. Answer B is incorrect as this protects from overpower in the fuel (ks/ft). Answer C is incorrect although this trip does provide DNB protection as well as kw/ft, it does not look at pressure to mitigate the trip. Answer D does provide localized DNB protection, but again does not take pressure into consideration.

**Technical References:** Lesson Plan SY1301200 pages 12-20

**Learning Objective:** SY1301200, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** RPS System knowledge

QUESTION # 38

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.7 012 K6.01 – Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Bistables and bistable test equipment
Importance 2.8

**Proposed Question:**

The unit is in MODE 3 preparing to withdraw rods to enter MODE 2.

If the control power fuses blow on a source range channel, the source range high flux trip will:

A. Not actuate; the trip will not be able to be bypassed at the source range drawer.

B. Actuate; the trip will be able to be bypassed at the source range drawer.

C. Actuate; the trip will not be able to be bypassed at the source range drawer.

D. Not actuate; the trip will be able to be bypassed at the source range drawer.

**Proposed Answer:** C, Actuate; the trip will not be able to be bypassed at the source range drawer.

**Explanation:** On a loss of the control power the bistable will trip. This is a widely misunderstood concept. There is much confusion over whether a loss of control power or instrument power trip the bistable. It doesn't make any difference whether the channel is bypassed or not, loss of control power trips the bistable.

**Technical References:** Bistable Relay Driver simplified diagram

**Learning Objective:** SY1301501, Objective 10

**Question Source:** Bank #Q13129

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** None

QUESTION # 39

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.2 013 K4.06 – Knowledge of ESFAS design feature(s) and/or interlock(s) which provide for the following: Recirculation actuation system reset
Importance 3.0

**Proposed Question:**

You have entered EMG E-1, following a Loss of Coolant Accident.

- Safety Injection has been reset and off-site power has been lost.
- Both Emergency Diesel Generators have assumed their load.

How will the above actions affect the automatic switch over from the RWST to the Containment Recirculation Sump suction?

A. The automatic signal will still work unless it has been manually reset.

B. The automatic signal will not work and switch over will be done manually.

C. The automatic signal should be reset to prevent inadvertent operation.

D. SI will have to be initiated and reset to restore the automatic signal.

**Proposed Answer:** A, The automatic signal will still work unless it has been manually reset.

**Explanation:** Answer A is correct. Answer B is incorrect as the shiftover has not been affected by these conditions. Answer C is incorrect as nothing has happened to cause an inadvertent operation. Answer D is incorrect as the signal has not been defeated.

**Technical References:** EMG ES-12; USAR Fig. 7.6.3

**Learning Objective:** LO1732322, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Operators need to understand the logic of each ESFAS signal and when they can be expected to not work. SI reset is addressed in detail in the EOPs and the need for manual action if power is lost after reset. Other automatic ESFAS signal may or may not be affected.

QUESTION # 40

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.5 022 A3.01– Ability to monitor automatic operation of the CCS, including: Initiation of safeguards mode of operation
Importance 4.1

**Proposed Question:**

Given the following plant conditions:

- The plant is at 100% power.
- Two Containment Cooling Fan Coolers are operating in fast speed.
- Two Containment Cooling Fan Coolers are operating in slow speed.
- A Loss of Offsite Power occurs.
- Emergency Diesels Generators have started and are supplying the ESF buses.
- A Safety Injection signal is received.

What is the response of the Containment Fan Cooling units?

A. All fans remain running in speed originally selected.

B. All fans started in slow speed by the Sequencer.

C. All fans stop and must be manually started.

D. All fans shifted to fast speed by the Sequencer.

**Proposed Answer:** B, All fans started in slow speed by the Sequencer.

**Explanation:** Answer A is the only correct answer, since Containment Cooling fans will be load shed and then restarted in slow speed by the sequencer following receipt of a safety injection.

**Technical References:** M-12GN01, P&ID for CTMT fan coolers; E-13GN02 & E-13GN02A, Elect schematic for CTMT fan coolers

**Learning Objective:** SY1302600, Objective 9

**Question Source:** Bank #Q26577 (modified)

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Sequence of events following an SI complicated by the Loss of Offsite power.

QUESTION # 41

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.5 022 A4.01– Ability to manually operate and/or monitor in the control room: CCS fans
Importance 3.6

**Proposed Question:**

The plant is being restarted following a refueling outage.

Current plant conditions are as follows:

- Mode 3
- Normal Operating Pressure of 2250 psia
- Normal Operating Temperature of 557°F
- Containment Cooling Fans "A" and "B" are running in SLOW speed
- Containment Temperature is currently at 102°F

How many cooling fans inside containment should be running at this time?

A. Four containment coolers and four hydrogen mixing fans running in slow speed.

B. Four containment coolers running in fast speed and three CRDM cooling fans running.

C. Four containment coolers and four hydrogen mixing fans running in fast speed.

D. Three containment coolers and four hydrogen mixing fans running in fast speed.

**Proposed Answer:** C, Four containment coolers and four hydrogen mixing fans running in fast speed.

**Explanation:** At NOP/NOT conditions and in Mode 3 with containment temperature >95°F, 4 containment coolers, 4 H2 mixing and 2 CRDM fans should be running in fast speed to keep the containment cool. Ans A is incorrect, need to be running in fast. Ans B incorrect since 3 CRDM fans are not allowed. Ans. D incorrect, but is lineup at < 95 degrees.

**Technical References:** GEN 00-002 and GEN 00-003

**Learning Objective:** SY1302600, Objective 8

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Candidate required to know minimum CNTMT fan requirements

QUESTION # 42

**Question Worksheet**

| **Examination Outline Cross-reference:** | Level | RO |
|---|---|---|
| | Tier # | 2 |
| | Group # | 1 |

K/A # 3.5 026 A2.03– Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of ESF
Importance 4.1

**Proposed Question:**

The plant has tripped from 100% from an apparent Main Steam Line Break.

EMG E-0, REACTOR TRIP OR SAFETY INJECTION has been entered and a Safety Injection has been manually actuated due to lowering Reactor Coolant System pressure. No other manual actions have been performed at this time.

You have been given Attachment F of EMG E-0 and have completed steps F1 through F10 satisfactorily. At step F11 you discover containment pressure is currently reading 32 psig the following annunciators indicate as shown:

- 00-059A, CSAS – NOT LIT
- 00-059B, CISB – NOT LIT

What action should be performed in accordance with the procedure?

A. Immediately actuate CSAS and CISB

B. Stop all RCPs then manually actuate CSAS

C. Manually isolate CISA and CISB valves

D. Manually align and/or start CSAS components

**Proposed Answer:** B, Stop all RCPs then manually actuate CSAS

**Explanation:** Ans A is incorrect since RCPs must be stopped first to prevent damage due to loss of CCW. Ans. B is correct since stopping RCPs is correct and actuating CSAS will actuate CISB. Ans. C is incorrect, since CISA has already actuated and manual isolated CISB components will isolate CCW to RCPs. Ans. D is incorrect, since CSAS components should not be started until an actuation has been attempted.

**Technical References:** EMG E-0, Attachment F step F11

**Learning Objective:** LO1732313, Objective 2

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (5)

QUESTION # 42

**Comments:** Operators should know the impact of an ESF actuation not occurring and the potential impact of manual component actuation.

QUESTION # 43

**Question Worksheet**

**Examination Outline Cross-reference:**

| | |
|---|---|
| Level | RO |
| Tier # | 2 |
| Group # | 1 |

K/A # 3.4 039 / 2.1.7 – Main and Reheat Steam / Conduct of Operations: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.
Importance 3.7

**Proposed Question:**

A Reactor Trip and Safety Injection has occurred from 100% power.

The following conditions exist:

| | S/G Levels | S/G Pressures |
|---|---|---|
| **A** | 27% NR | 1050 psig |
| **B** | 28% NR | 1040 psig |
| **C** | 19% NR | 1040 psig |
| **D** | 17% NR | 1055 psig |

- All Main Steam Isolation Valves (MSIVs) are closed.
- RCS temperature ≅ 555°F and slowly increasing.
- All systems have responded normally during the transient.

The Balance of Plant Operator notices some steam flow exists on "B" & "C" steam lines.

Which of the following explains the reason for the steam flow on the "B" & "C" steam lines?

A. Steam Dumps are cycling open.

B. The RCS temperature $T_{cold}$ Loops "B" & "C" are lower than the other RCS Loops.

C. The Turbine Driven Auxiliary Feedwater Pump is running and supplying all S/Gs.

D. The Atmospheric Relief Valves for "B" & "C" S/Gs are cycling open due to normal operation.

**Proposed Answer:** C, The Turbine Driven Auxiliary Feedwater Pump is running and supplying all S/Gs.

**Explanation:** Ans. A is incorrect, because MSIVs are closed, therefore Steam Dumps would have no effect. Ans. B is incorrect since this would have no effect on steam flow. Ans. C is correct since the “B” and “C” S/Gs supply steam to the Aux feed pumps. ARV’s would not be cycling since the secondary pressure given is below ARV setpoint.

**Technical References:** M-12AB01 & M-12AB02, P&ID Main Steam System

**Learning Objective:** SY1503900, Objective 1

**Question Source:** Bank #Q26660

QUESTION # 43

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.43 (5)

**Comments:** Standard post trip indications for the given conditions

QUESTION # 44

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.4 056 K1.03 - Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems: MFW.
Importance 2.6

**Proposed Question:**

The following plant conditions exist:

- 60% reactor power
- All 3 condensate pumps running
- All controls are in automatic
- Condensate pump 'B' trips

What automatic action occurs due to 'B' condensate pump tripping?

A. Both Main Feedwater Pumps will speed up to restore feed flow.

B. Both Main Feedwater Pumps will trip on Low Suction pressure.

C. Condensate Polishing Demineralizer Bypass Valve opens on High D/P.

D. Feedwater Regulating Valves will close down to maintain required pump D/P.

**Proposed Answer:** A, Both Main Feedwater Pumps will speed up to restore feed flow.

**Explanation:** Ans. A is correct, because this is what the MFW pumps are designed to do. Ans. B is incorrect, because the MFW do not have a low suction pressure trip, but will not be able to be reset on low pressure making it a plausible distractor. Ans. C is incorrect since a high D/P will not be seen across the demins in this case, but AD HV-28 will open if a high D/P were to occur. Ans. D is incorrect, since the FRV would be opening rather than closing based on lowering S/G level.

**Technical References:** Steam Generator Water Level Control program simplified diagram

**Learning Objective:** SY1505902, Objective 2

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (4) (5) (7)

**Comments:** Knowledge of condensate, feedwater, and steam generator water level control. The Operator must analyze the plant conditions and determine its affect on the Main Feed Pumps.

QUESTION # 45

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.4 059 A1.07 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW controls including: Feed Pump speed, including normal control speed for ICS (ICS N/A for Wolf Creek)
Importance 2.5

**Proposed Question:**

The plant is at 100% power when the "B" S/G controlling steam flow channel FAILS TO ZERO.

ASSUMING NO operator action and all controllers selected in automatic, which of the following will be the immediate plant system(s) response to this failure?

A. "B" S/G level increases, Main Feedwater Pump speed increases.

B. "B" S/G level increases, Main Feedwater Pump speed decreases.

C. "B" S/G level decreases, Main Feedwater Pump speed increases.

D. "B" S/G level decreases, Main Feedwater Pump speed decreases.

**Proposed Answer:** D, "B" S/G level decreases, Main Feedwater Pump speed decreases.

**Explanation:** Feed flow for “B” S/G will decrease to match steam flow. MFP speed controller uses the average of all four S/Gs steam flow, with one channel failed the average will decrease and MFP speed will follow.

**Technical References:** OFN SB-008, Instrument Malfunctions and associated Background document for Attachment A.

**Learning Objective:** LO1732418, Objective 4

**Question Source:** Bank #Q20527

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (5)

**Comments:** SGWLC system malfunction. The Operators must analyze the failure and then determine correct system response.

QUESTION # 46

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.4 059 A3.06 - Ability to monitor automatic operation of the MFW, including: Feedwater isolation.
Importance 3.2

**Proposed Question:**

A spurious reactor trip with no Safety Injection has just occurred from 30% power.
The following conditions exist:

- Steam Generator "A" is 60% NR
- Steam Generator "B" is 44% NR
- Steam Generator "C" is 75% NR
- Steam Generator "D" is 50% NR
- Tavg has stabilized at 560 °F

What is the expected status of the Main Feedwater Regulating Valves and the Main Feedwater Regulating Bypass Valves?

| | Main FW Reg Valves | Main FW Reg Bypass |
|---|---|---|
| A. | CLOSED | OPEN |
| B. | OPEN | CLOSED |
| C. | CLOSED | CLOSED |
| D. | OPEN | OPEN |

**Proposed Answer:** C, CLOSED, CLOSED

**Explanation:** A FWIS has occurred, due to the reactor trip breakers being open and low Tavg less than 564 degrees. A FWIS closes all Feed Reg and Feed Reg bypass valves. Therefore, the only correct answer is C. All other answers are incorrect.

**Technical References:** Engineereed Safety Features Actuation and FWIS simplified diagram

**Learning Objective:** SY1301301, Objective 3

**Question Source:** INPO Bank - Point Beach 8/16/02

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** ESFAS actuation which results in a FWIS and expected indications. The Operator msut understand the control system and the flow characteristics to correctly answer this question.

QUESTION # 47

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.4 061 K5.01 – Knowledge of the operational implications of the following concepts as they apply to AFW: Relationship between AFW flow and RCS heat transfer.
Importance 3.6

**Proposed Question:**

A reactor trip occurs from 100% power due to a loss of main feedwater.

The following conditions exist:

- All Reactor Coolant Pumps are running
- Plant is at 551°F
- Main Steam Isolation Valves and ARVs are closed
- The turbine driven Auxiliary Feedwater pump is in service feeding all 4 Steam Generators
- Both motor driven Auxiliary Feedwater pumps tripped upon startup and remain unavailable.
- The BOP operator lowers turbine driven Auxiliary Feedwater pump speed.

What effect will this have on the unit?

A. Pressurizer level rises due to decreased primary to secondary heat transfer.

B. Pressurizer level rises due to increased primary to secondary heat transfer.

C. Steam Generator levels begin decreasing due to the decrease in steam flow.

D. Steam Generator levels begin decreasing due to the decrease in feed flow.

**Proposed Answer:** A, Pressurizer level rises due to decreased primary to secondary heat transfer.

**Explanation:** The TDAFW pump capacity is directly proportional to pump speed; therefore, as speed is decreased, feed flow to all 4 S/Gs will decrease. With a decrease in the cooler AFW flow into the S/Gs the temperature of the inventory on the secondary side of all of the S/Gs will rise resulting in a decreased primary to secondary heat transfer rate, and an RCS temperature increase, causing pressurizer level and pressure to rise. Answer B is incorrect since heat transfer is reduced with lower feed flow. Answer C and D are incorrect since the steam generators are not being steamed through the dumps/ARVs.

**Technical References:** GFES, General Dynamics, Basic Heat Transfer Theory

**Learning Objective:** SY1406100, Objective 1

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (5)

QUESTION # 47

**Comments:** Consequences of lowering Aux Feed flow following a trip.

QUESTION # 48

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.6 062 K3.01 – Knowledge of the effect that a loss or malfunction of the ac distribution system will have on the following: Major loads
Importance 3.5

**Proposed Question:**

Given the following conditions:

- The plant is at steady state 100% power.
- Thunderstorms are currently moving through the Wolf Creek area.
- 13.8 KV bus PA02 trips on a bus fault due to a lightening strike.

Which of the following plant equipment is affected by this power loss?

A. Reactor Coolant Pump "B", Circulating Water Pump "B"

B. Circulating Water Pump "C", Service Water Pump "A"

C. Reactor Coolant Pump "A", Service Water Pump "C"

D. Essential Service Water Pump "B", Service Water Pump "B"

**Proposed Answer:** B, Circulating Water Pump "C", Service Water Pump "A"

**Explanation:** Of all the choices given only Circ Water pump "C" and Service Water pump "A" are powered via PA02. All other choices are powered via PA01 or NB02. This power arrangement can be confusing such that PA02 supplies components with designators other than "B" and "D" which is a typical convention, but not used here.

**Technical References:** KD-7496, Plant AC distribution One Line Diagram

**Learning Objective:** SY1506201, Objective 3; SY1506205, Objective 1

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Power supplies to large plant loads

QUESTION # 49

**Question Worksheet**

**Examination Outline Cross-reference:**

| | |
|---|---|
| Level | RO |
| Tier # | 2 |
| Group # | 1 |

K/A # 063 K4.02 - DC Electrical Distribution: Knowledge of DC electrical system design feature(s) and/or interlock(s) which provide for the following: Breaker interlocks, permissives, bypasses and cross-ties.
Importance 2.9

**Proposed Question:**

Which of the following actions would be required to connect Swing Charger NK 25, powered from PG19, to Vital DC Bus NK01?

A. Obtain transfer key from Security, NG0109 breaker to NK 25 must be open.

B. Obtain transfer key from Security, NG0411 breaker to NK 25 must be open.

C. Obtain transfer key from Shift Manager, NG0109 breaker to NK 25 must be open.

D. Obtain transfer key from Shift Manager, NG0411 breaker to NK 25 must be open.

**Proposed Answer:** C, Obtain transfer key from Shift Manager, NG0109 breaker to NK 25 must be open.

**Explanation:** Supply breakers to the Swing Chargers for the vital DC buses are electrically interlocked to prevent crossties between safety and non-safety related power supplies. The keys to allow transferring sources are administratively controlled by the Shift Manager. Answers A and B are incorrect because Security does not have the associated keys. Answer D is incorrect as the swing chargers are train specific and NG0411 is the opposite train.

**Technical References:** SYS NK-131, Precautions and Limitations.

**Learning Objective:** SY1506300 Objective 2

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:**

QUESTION # 50

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.6 064 K1.05 – Knowledge of the physical connections and/or cause-effect relationships between the ED/G system and the following systems: Starting air system
Importance 3.4

**Proposed Question:**

The Turbine Building Watch, while performing his rounds, finds the following conditions at the "B" Emergency Diesel Generator (EDG):

- Starting Air Receiver Tank, TKJ02C, indicates 620 psig
- Starting Air Receiver Tank. TKJ02D, indicates 260 psig

What is the condition of the "B" Emergency Diesel Generator (EDG) and why?

A. Inoperable, because one Starting Air Receiver Tank is < 300 psig.

B. Operable, because one Starting Air Receiver Tanks is > 610 psig.

C. Inoperable, because the average pressure between the two Starting Air Receiver Tanks is < 450 psig.

D. Operable, because the Starting Air Compressors are capable of increasing the tank to > 610 psig.

**Proposed Answer:** B, Operable, because one Starting Air Receiver Tanks is > 610 psig.

**Explanation:** Ans. A is incorrect since one tank > 610 is required, doesn't make any difference if the other tank is low.. Ans. B is correct since only one tank greater than is 610 psig is required. Ans. C is incorrect since the requirement is having two tanks less than 435 psig not the average pressure of two tanks. Ans. D is incorrect, since the compressors are not required by Tech Specs but the tanks must be above the minimum pressures.

**Technical References:** Tech Spec 3.8.3 and associated background document

**Learning Objective:** SY1406400, Objective 5

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (8)

**Comments:** Knowledge of subsystems that make the EDG operable.

QUESTION # 51

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.6 064 K6.08 Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: Fuel oil storage tanks.
Importance 3.2

**Proposed Question:**

The plant has tripped due to a Loss of Offsite Power.

The "B" Emergency Diesel Generator (EDG) is running supplying its emergency loads, when alarm window 00-090A, DG FUEL TK B LEV LOLO, comes into alarm and Emergency Fuel Oil Transfer Pump "B" trips.

If the "B" EDG Day Tank was at 90% prior to the trip, approximately how long will the "B" EDG remain running without operator action?

A. Trips immediately

B. 1 hour

C. 4 hours

D. 7 days

**Proposed Answer:** B, 1 hour

**Explanation:** Ans. A is incorrect, since the day tank still has about 500 gal available and there is no automatic trip on low fuel tank level. Ans. B is correct. Ans.C is incorrect, but plausible if the candidate does not know tank capacity. Ans D is incorrect, but is the answer if the Fuel Oil Storage Tank were available.

**Technical References:** USAR section 9.5.4

**Learning Objective:** SY1406400, Objective 2

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Operators need to have a feel for the design and capacity of the DG Fuel Oil Day Tanks.

QUESTION # 52

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 073 / 2.3.6 - Process Radiation Monitoring / Radiation Control: Knowledge of the process for performing a containment purge.
Importance 2.5

**Proposed Question:**

While performing a containment purge, GT RE-22, Containment Purge Exhaust Monitor, high level alarms, causing a Containment Purge Isolation Signal. When you check the monitor reading on a NPIS time trend, you see that an instantaneous large increase in the monitor reading had occurred followed by an immediate return to previous levels due to an electronic spike.

What actions are taken concerning the Containment Purge?

A. Chemistry must sample and recalculate the release permit before restarting the purge.

B. Terminate the purge permit and refer to OFN SP-010, Accidental Radioactive Release.

C. The purge may be re-started on the current permit without re-sampling the waste gas stream.

D. Declare GT RE-22 inoperable and restart the release after removing it from service.

**Proposed Answer:** C, The purge may be re-started on the current permit without re-sampling the waste gas stream.

**Explanation:** AP 07B-001, “Radioactive Releases”, specifically addresses obvious electronic spikes on the radiation monitors. The description in the stem describes an electronic spike, therefore answer C is correct, as the purge may be re-started.

**Technical References:** AP 07B-001, Section 6.2.7

**Learning Objective:** LO1733204, Objective 10

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.43 (4)

**Comments:** The operator must be aware of indications that could be received during a radioactive release and conditions that warrant terminating the release.

QUESTION # 53

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 076 K3.01 - Service Water: Knowledge of the effect that a loss or malfunction of the SWS will have on the following: Closed cooling water.
Importance 3.4

**Proposed Question:**

The following plant conditions exist:

- "B" CCP is running providing charging and RCP seal injection.
- "B" ESW pump is out of service in a 36 hour Tech Spec Equipment Outage.
- A loss of transformer XNB01 occurs, "A" ESW pump starts and then trips on high current.
- The pressure transient causes a rupture in the Service Water header at the Circ Water Screenhouse resulting in a loss of all service water.

What actions would be taken to compensate for the loss of cooling to "B" CCP?

A. Align fire protection system to "B" CCP if CCW temperatures increase.

B. No actions required, CCW would continue to cool the "B" CCP.

C. Secure "B" CCP and start the NCP, which is cooled by the chilled water system

D. All charging pumps will have to be secured.

**Proposed Answer:** A, Align fire protection system to "B" CCP if CCW temperatures increase.

**Explanation:** OFN EF-033 provides guidance for a loss of all service water systems. CCW temperatures must be monitored and once they start increasing the fire protection system is aligned to charging and safety injection pumps. The Normal Charging Pump (NCP) is cooled by chilled water however the heat sink for the chilled water system is service water.

**Technical References:** OFN EF-033, Attach. F.

**Learning Objective:** LO1732443, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (5)

**Comments:** The Operator must diagnose the plant status and condition and then apply the correct line up for cooling.

QUESTION # 54

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 078 A4.01 - Instrument Air: Ability to manually operate and/or monitor in the control room: Pressure gauges.
Importance 3.1

**Proposed Question:**

With the unit at 100% power a loss of Instrument Air pressure occurs.

As Instrument Air pressure decreases which of the following is expected to happen?

A. At pressure of 85 - 90 psig, Pressurizer spray valves fail closed.

B. At pressure of 80 - 85 psig, Condenser steam dump valves fail closed.

C. At pressure of 75 - 80 psig, the main feed regulating valves fail closed.

D. At pressure of 65 - 70 psig, Letdown orifice isolation valves fail closed.

**Proposed Answer:** D, At pressure of 65 - 70 psig, Letdown orifice isolation valves fail closed.

**Explanation:** Answer C is incorrect as the MFRVs have backup Nitrogen supply. Answer B is incorrect as the valves fail closed but not until below 70 psig. Answer A is incorrect as the valves fail closed below 70 psig. Answer D is correct per OFN KA-019.

**Technical References:** OFN KA-019, Note prior to step 2.

**Learning Objective:** LO1732429, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** None

QUESTION # 55

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 3.5.103 A3.01 Containment: Ability to monitor automatic operation of the containment system, including: Containment isolation
Importance 3.9

**Proposed Question:**

A reactor trip and a safety injection signal (SIS) from low RCS pressure occurs at 100% power. After the required time delay, safety injection is reset in the Control Room and RHR pumps are placed in STANDBY. Five (5) minutes later, a steam line break occurs causing containment pressure to INCREASE to 25 psig and main steamline pressure to DECREASE to 600 psig.

Which one of the following describes the actions that now occur in response to the steam line break?

| | **MSIVs Isolate** | **CIS-A Actuates** | **Cntmt Spray Pumps Start** | **RHR Pumps Start** |
|---|---|---|---|---|
| A. | NO | NO | YES | YES |
| B. | YES | YES | NO | YES |
| C. | NO | YES | YES | YES |
| D. | YES | NO | NO | NO |

**Proposed Answer:** D, MSIVs Isolate, NO CIS-A, NO CS Pmp start, NO RHR Pmp start

**Explanation:** In this case the SIS was reset and would not re-actuate until the reactor trip breakers are re-closed, which has not yet happened. CIS-A has already actuated from the previous SIS, so will not actuate again. MSLIS will occur due to the high containment pressure indicated. RHR pumps will not start since Reactor trip breaker have not been re-closed and must be manually re-started in this situation.

**Technical References:** ESFAS Simplified Diagram

**Learning Objective:** SY1301301, Objective 3

**Question Source:** Callaway Exam Bank

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** The Operator must analyze the plant conditions and determine the correct response.

QUESTION # 56

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.1 001 A1.04 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CRDS controls including: PZR level and pressures
Importance 3.7

**Proposed Question:**

The following plant conditions exist:

- Unit is at 50% power and stable.
- All systems are properly aligned for the current plant conditions.

One Main Turbine Control valve fails closed causing an instantaneous 10% power decrease. Automatic rod control inserts control rods due to Tave/Tref mismatch.

How will this malfunction affect the pressurizer if no operator action is taken?

A. Pressurizer pressure will be limited by the operation of the PORVs.

B. Pressurizer pressure will be limited by the operation of the rod control system.

C. Pressurizer level will decrease and return to normal after charging increases.

D. Pressurizer level will increase and return to initial level after the plant stabilizes.

**Proposed Answer:** B, Pressurizer pressure will be limited by the operation of the rod control system.

**Explanation:** Answer A is incorrect as the rod control system is designed to handle a 10% step change without exceeding any design limits or lifting the relief valves. Answer B is correct, since automatic rod control will assist in reducing pressure and level setpoint will be reduced by the drop in Tavg. Answer C is incorrect as the level will increase due to the initial insurge. Answer D is incorrect as the new power level and new Tavg will be lower than the initial conditions so Tavg will increase and then decrease to below pre-event levels.

**Technical References:** USAR step 5.4.10.1c

**Learning Objective:** SY1300100, Objective 1

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (5)

**Comments:** The operator needs to evaluate the plant conditions, apply knowledge of system design criteria and determine that initially Tavg, pressure and pressurizer level will increase,

QUESTION # 56

pressure will return to normal due to rod control and spray valve operation. Tavg will decrease to a new program level due to lower level and pressurizer level will follow to a new lower level.

QUESTION # 57

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.2 002 A1.04 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCS controls including: Subcooling Margin Importance 3.9

**Proposed Question:**

The plant is operating at full power when a RCS Loop 1 wide range $T_{COLD}$ Resistance Temperature Detector (RTD) fails HIGH.

What effect will this event have on indicated subcooling on the "B" Train Core Subcooling Monitor?

A. Large decrease since the Subcooling Monitor uses the highest reading wide range RTD or core exit thermocouple.

B. Small decrease since the Subcooling Monitor uses the average of the wide range RTD's and the core exit thermocouples.

C. No effect since only core exit thermocouples provide input.

D. No effect since the Subcooling Monitor is bypassed with the reactor trip breakers closed.

**Proposed Answer:** A, Large decrease since the Subcooling Monitor uses the highest reading wide range RTD or core exit thermocouple.

**Explanation:** Answer A is correct. Answer B is incorrect since the monitor uses the highest, not the average. Answer C is incorrect, since auctioneered high temperature is used. Answer D is incorrect since the meter is not bypassed, but differing alarms are associated with subcooled margin based on whether the reactor trip breaker are closed or not.

**Technical References:** SY1300202, ALR 00-0056A & 0056B

**Learning Objective:** SY1300202, Objective 4

**Question Source:** Bank #Q12419

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (5)

**Comments:** The operator must correctly interpret the direction of the failure and the result of that failure on the Subcooled Monitor.

QUESTION # 58

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.2 011 K3.01 - Knowledge of the effect that a loss or malfunction of the PZR LCS will have on the following: CVCS
Importance 3.2

**Proposed Question:**

Pressurizer (PZR) level transmitter, BB LT-459 is selected for control.

What will be the plant response if BB LT-459 develops a slow leak on its reference leg?

A. PZR level decreasing; VCT level increasing

B. PZR level decreasing; VCT level decreasing

C. PZR level increasing; VCT level decreasing

D. PZR level increasing; VCT level increasing

**Proposed Answer:** A, PZR level decreasing; VCT level increasing

**Explanation:** If a leak on the reference leg exists, indicated level will increase, actual level will decrease. This will cause charging flow to decrease with no associated decrease in letdown flow, thus filling up the VCT.

**Technical References:** Pressurizer Level Control System Simplified Diagram

**Learning Objective:** SY1301000, Objective 10

**Question Source:** Bank #Q12705 (modified)

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (5)

**Comments:** The operator must analyze the results of this failure and determine its affect on the actual level indications.

QUESTION # 59

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.1 014 A4.02 – Ability to manually operate and/or monitor in the control room: Control rod mode-select switch
Importance 3.4

**Proposed Question:**

Rod control has been selected to the Shutdown Bank A position to realign a rod in this bank using OFN SF-011, REALIGNMENT OF DROPPED, MISALIGNED ROD(S) AND ROD CONTROL MALFUNCTIONS.

How will moving the misaligned rod affect the Rod Position Indication System?

A. The Individual Rod Position Indication system will go to half accuracy.

B. The Step Counter will have to be reset after rod movement is complete.

C. The P/A Converter will have to be reset after rod movement is complete.

D. The Rod Insertion Limit computer will have to be reset after movement is complete.

**Proposed Answer:** B, The step counter will have to be reset after rod movement is complete.

**Explanation:** Answer B is correct as the step counter will count each step of the realignment, so it will need to be reset. Answer A is incorrect as this action has no effect on DRPI indication . Answer C is incorrect as the shutdown banks do not input to the P/A converter. Answer D is incorrect as the shutdown banks do not input to the rod insertion limit computer

**Technical References:** OFN SF-011

**Learning Objective:** SY1301400, Objective 5

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:** Operation of the RPI system and methods which can make various components in the system inaccurate are basic knowledge. Putting this information to work during retrieval of a dropped or misaligned rod will help the operator to not consider failures where none exist and to know which parts of the system to trust as actions are taken to restore rod height to normal.

QUESTION # 60

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.5 028 K5.02 - Knowledge of the operational implications of the following concepts as they apply to the HRPS: Flammable hydrogen concentration
Importance 3.4

**Proposed Question:**

Following a LOCA, both Hydrogen Recombiners were placed in service. For the next 4 hours, containment hydrogen concentration continued to rise, but at a slower rate.

Now, procedure EMG ES-11, POST LOCA COOLDOWN AND DEPRESSURIZATION, is being used. Containment hydrogen concentration is 0.9%, but the Train "B" hydrogen recombiner has lost power. The electricians believe there is a cable fault inside the containment such that the recombiner can NOT be returned to service.

What action, if any, is required due to this increasing hydrogen concentration trend in containment?

A. Containment Spray must be restored in order to prevent hydrogen concentration from exceeding the 6% flammability limit.

B. The hydrogen mixing fans must be placed in service when hydrogen levels exceed 4% to prevent exceeding the 6% flammability limit.

C. Hydrogen concentration will peak above the 4% level, but remain below the 6% flammability limit, using the "A" Train hydrogen recombiner.

D. Hydrogen concentration will remain below the 4% level using only the "A" Train hydrogen recombiner, never reaching the 6% flammability limit.

**Proposed Answer:** D, Hydrogen concentration will remain below the 4% level using only the "A" Train hydrogen recombiner, never reaching the 6% flammability limit.

**Explanation:** A completely redundant hydrogen recombiner system is sufficient to maintain containment hydrogen below the flammability limit of 6%. Answer D. is correct. Answer A may lower pressure, but not hydrogen, but is plausible, since a misconception is that water in the spray add tank will reduce hydrogen levels. Answer B is incorrect since the hydrogen mixing fans have no effect on the overall concentration, but are required to be running Post-LOCA. Answer C. is incorrect since hydrogen concentration will never get over 3% in this condition

**Technical References:** USAR Section 6.2.5

**Learning Objective:** SY1302800, Objective 5

**Question Source:** INPO Bank – Prairie Island 9/1/03

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (5)

QUESTION # 60

**Comments:** Basic operation and purpose of the Hydrogen control system.

QUESTION # 61

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.5 029 / 2.1.32 – Containment Purge / Conduct of Operations: Ability to explain and apply all system limits and precautions
Importance 3.4

**Proposed Question:**

The Control Room Staff is starting up the plant following a refueling outage and preparations are being made to enter Mode 4.

The Control Room Supervisor has you ensure that Containment Shutdown Purge system is shutdown and that the supply and exhaust dampers are closed and blind flanged.

What is the reason for requiring these dampers to be closed and blind flanged during power operations?

A. The connecting ductwork outside containment is not seismically qualified.

B. The valves are not seismically qualified to operate during a design basis earthquake.

C. The valves may not close against pressures generated following a LOCA.

D. The valve actuators do not have class 1E penetration conductor over current protection devices.

**Proposed Answer:** C, The valves may not close against pressures generated following a LOCA.

**Explanation:** The reason for placing blind flanges on the containment purge supply and exhaust fans is that they are so large and cannot be relied upon under DBA conditions to close. Therefore, this is a containment integrity issue and not a seismic or wiring problem. All the distractors sound good and may apply for different systems, but not for containment purge.

**Technical References:** SYS GT-121 & Tech Spec 3.6.3 with bases

**Learning Objective:** SY1302800, Objective 7

**Question Source:** Bank #Q15833

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (10), 55.43 (2)

**Comments:** Reason for precautions and limitations.

QUESTION # 62

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.4 035 / K602 – Knowledge of the effect of a loss or malfunction on the following will have on the SGs: Secondary PORV
Importance 3.1

**Proposed Question:**

The Control Room Staff has performed a full stroke valve test on AB PV-1, SG "A" Atmospheric Relief Valve (ARV). The valve will not stroke and is confirmed to be mechanically bound closed. A loss of offsite power occurs resulting in a unit trip from full power.

What is the effect on the "A" Steam Generator?

A. Pressure will stabilize at approximately 1092 psig on the steam dumps.

B. Pressure will stabilize at approximately 1125 psig on the remaining ARV's.

C. Pressure will stabilize at approximately 1185 psig on the first S/G safety.

D. Pressure will stabilize at approximately 1185 to 1234 psig on the S/G safeties.

**Proposed Answer:** B, Pressure will stabilize at approximately 1125 psig on the remaining ARV's.

**Explanation:** The given conditions cause a loss of condenser vacuum but not a Main Steam Line Isolation. Answer A is incorrect since the main condenser is not available. Answer B is correct since the main steam header is still available and the other S/G ARV's will control pressure. Answers C and D are distracters and are based on the misconception that the S/G safeties would control pressure. Answer C is the setpoint of the first safety and Answer D encompasses all of the safeties.

**Technical References:** M-12AB01, T.S 3.7.1 table 3.7.1-2.

**Learning Objective:** SY 1503900, Objective 5.

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (7)

**Comments:**

QUESTION # 63

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.4 041 K5.05 - Knowledge of the operational implications of the following concepts as the apply to the SDS: Basis for RCS design pressure limits.
Importance 2.6

**Proposed Question:**

Following a Turbine and Reactor trip from full power, which of the following prevent an RCS overpressure event, assuming that all systems work as designed?

A. Pressurizer Power Operated Relief Valves

B. Steam Generator Atmospheric Relief Valves

C. Steam Generator Safety Valves

D. Steam Dump Valves

**Proposed Answer:** D, Steam Dump Valves

**Explanation:** Answers A, B and C are incorrect because if the Steam dump system works properly, none of these valves should open. Answer D is correct for normal reactor and turbine trip.

**Technical References:** SY1504100

**Learning Objective:** SY1504100, Objective 1

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (5)

**Comments:** Basic operator knowledge of system functions

QUESTION # 64

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.9 068 K1.07 – Knowledge of the physical connections and/or cause effect relationships between the Liquid Radwaste System and the following systems: Sources of liquid wastes for LRS
Importance 2.7

**Proposed Question:**

Control room operators determine RCDT level is rising unexpectedly during operation in Mode 3. An investigation is begun to determine the source of in-leakage.

What are potential in-leakage sources?

A. Excess Letdown and Reactor Vessel flange leak-off.

B. SIS Accumulator drains and Pressurizer Relief Tank.

C. RCS Loop drains and Reactor Make-up Water.

D. Refueling Canal drains and RCP seal standpipe overflows.

**Proposed Answer:** A, Excess Letdown, PRT, Reactor Vessel flange leak-off.

**Explanation:** Ans. A, all of these items are sources to the RCDT. All distracters have a component that does not directly feed to the RCDT.

**Technical References:** P&ID M-12HB01

**Learning Objective:** SY1406902, Objective 2

**Question Source:** Bank #Q22735 (modified)

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (4) (7)

**Comments:** Need to know the inputs to the Reactor Coolant Drain Tank

QUESTION # 65

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 2

K/A # 3.8 075 K1.02 – Knowledge of the physical connections and/or cause-effect relationships between the circulating water system and the following systems: Liquid radwaste discharge.
Importance 2.9

**Proposed Question:**

The plant is currently in Mode 4.

The Radwaste Operator is releasing the contents of Waste Monitor Tank "A" to the cooling lake per SYS HB-130, "Waste Monitor Tank A Discharge to the Environs."

The only running Circulating Water Pump trips. The Radwaste Operator informs the Control Room that the release has been automatically terminated closing the discharge valve.

What is the most probable cause of valve closure given these conditions?

A. Low Circulating Water dilution flow.

B. High Radiation on HB RE-018, Liquid Radwaste Discharge Monitor.

C. Low level in Waste Monitor Tank “A”.

D. High Waste Monitor Tank Pump Discharge flow on HB FT-10858.

**Proposed Answer:** A, Low Circulating Water dilution flow.

**Explanation:** Ans. A Correct, since it takes a loss of all three Circ water pump to cause the Low Dilution flow. Ans. B could be correct but no information was given concerning Process Radiation alarms. Ans. C is incorrect since this will stop the pump, but not close the discharge valve. Ans. D is incorrect since high discharge flow has no interlock on any component, but is plausible since excessive discharge is undesirable.

**Technical References:** M-12HB03, P&ID Liquid Radwaste System

**Learning Objective:** SY1507500, Objective 2

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A2

**10 CFR Part 55 Content:** 55.41 (4) (7)

**Comments:** The Operator has to diagnose plant conditions and then apply system knowledge to come to the correct answer.

QUESTION # 66

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 3
Group # 1

K/A # 2.1.2 - Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.
Importance 3.0

**Proposed Question:**

AP 21-003, “Operations”, describes the "Departure From License Condition" which can be invoked to protect the health and safety of the public.

Which of the following conditions must ALWAYS be met when departing from a license condition or technical specification in accordance with 10 CFR 50.54 (x) and (y)?

A. The action must be necessary to prevent equipment damage.

B. The action must be approved by a licensed SRO prior to taking the action.

C. The NRC must be notified prior to the action and must concur with the action to be taken.

D. The action must be approved by the Plant Manager when the action is necessary to protect plant personnel.

**Proposed Answer:** B, The action must be approved by a licensed SRO prior to taking the action.

**Explanation:** A. is incorrect. Protection of personnel and public is a priority. B. is correct. C is incorrect since the NRC does not have to concur. D. is incorrect since Plant Manager approval is not required.

**Technical References:** AP 21-003 “OPERATIONS”

**Learning Objective:** LO1733203, Objective 4

**Question Source:** INPO Bank - Indian Point 03/10/03

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.41 (10)

**Comments:**

QUESTION # 67

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 3
Group # 1

K/A # 2.1.20 - Conduct of Operations: Ability to execute procedure steps.
Importance 4.3

**Proposed Question:**

The plant has experienced an event and entered the EMG procedure network. The Control Room Supervisor (CRS) has assigned you as the Reactor Operator two Continuous Action steps from EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT. The crew now transitions to EMG FR-C1, RESPONSE TO INADEQUATE CORE COOLING

The Continuous Actions from EMG E-1:

A. remain applicable until superceded by EMG FR-C1.

B. remain applicable throughout the EMG network.

C. are not applicable once you transition out of EMG E-1.

D. are not applicable after entering EMG FR-C1.

**Proposed Answer:** D, are not applicable after entering EMG FR-C1.

**Explanation:** Per the guidance given in AP 15C-003, Continuous actions remain applicable even after transition to another EMG procedure unless they are superceded by that procedure. The only exception is transition to a Functional Recovery (FR) procedure. Entering an FR means that a Safety Function has been lost and any previous mitigation strategies have failed.

**Technical References:** AP 15C-003, Abnormal Procedure Users Guide. Step 6.6

**Learning Objective:** LO1732312, Objective 19

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (10)

**Comments:** Application of procedure steps.

QUESTION # 68

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 3
Group # 2

K/A # 2.2.1 - Equipment Control: Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.
Importance 3.7

**Proposed Question:**

A Middle of Life plant start-up using GEN 00-003, "Hot Standby to Minimum Load", is in progress. The generator has just been synchronized to the grid.

Turbine load is increased and steam dumps are closing.

Control rods should be:

A. placed in Automatic to respond to changes in turbine load.

B. adjusted in Manual to maintain Tavg within 1.5 degrees of Tref.

C. inserted in Manual to maintain a no-load Tavg of 557 degrees.

D. adjusted in Manual to maintain steam dumps open while increasing load.

**Proposed Answer:** B, adjusted in Manual to maintain Tavg within 1.5 degrees of Tref.

**Explanation:** The RO must recognize that at Middle of Life, Moderator Temperature Co-efficient (MTC) would be negative. Per GEN 00-003, while increasing turbine load rods are adjusted to hold Tavg constant if steam dumps are open. Once the steam dumps go closed then rods are adjusted to maintain Tavg with Tref. Control Rods are not placed in automatic below C-5 interlock, 15% Turbine Power.

**Technical References:** GEN 00-003, "Hot Standby to Minimum Load", Step 6.40

**Learning Objective:** LO1732103, Objective 5

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.45 (1)

**Comments:** It is important for the RO to recognize the effects on reactor power and temperature and respond correctly during a unit start up. Different actions are required if MTC is positive.

QUESTION # 69

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 3
Group # 2

K/A # 2.2.25 - Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.
Importance 2.5

**Proposed Question:**

Greater than 23 feet of water must be maintained over the top of the reactor pressure vessel flange during movement of irradiated fuel assemblies within containment.

What is the basis for maintaining this level?

A. Maintains sufficient water above the top of the fuel assemblies to ensure that the radiation levels at the operating elevation for fuel handling equipment remains below 4 mr/hr.

B. Provides sufficient water volume to allow time for the operator to recognize the indications of a dilution accident before Keff can exceed .95 $\Delta k/k$.

C. Maintains sufficient water volume as a heat sink for core cooling in the event the operating RHR loop fails to provide long term decay heat removal.

D. Provides a sufficient water depth to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly.

**Proposed Answer:** D, Provides a sufficient water depth to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly.

**Explanation:** Answers A, B, and C are plausible in that they would be reasons to have a large amount of borated water in the refueling pool, but is not the basis shown in the Tech Specs.

**Technical References:** Technical Specification 3.9.7 Background

**Learning Objective:** SY1403300, Objective 8

**Question Source:** INPO Bank – Braidwood 07/17/02

**Question Cognitive Level:** Memory or Fundamental Knowledge K2

**10 CFR Part 55 Content:** 55.45 (1)

**Comments:** None

QUESTION # 70

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 3
Group # 3

K/A # 2.3.2 - Radiation Control: Knowledge of facility ALARA program.
Importance 2.5

**Proposed Question:**

The shift manager has directed you to determine the best way to flush a piping system in the area of a radiological hot spot that is located in a Locked High Radiation Area.

How can you determine which component is the cause of the hot spot?

A. Enter the area and locate the hot spot sign.

B. Request Health Physics to resurvey the area to confirm location.

C. The Shift Manager's log will identify the component.

D. Refer to the Hot Spot Tracking Log at Access Control.

**Proposed Answer:** D, Refer to the Hot Spot Tracking Log at Access Control.

**Explanation:** The Hot Spot Tracking Log will list all of the hot spots and is located at Access Control. Answers A and B would lead to unnecessary exposure and would not be in accordance with the ALARA program. Answer C does not contain the hot spot information.

**Technical References:** AP 25A-401

**Learning Objective:** LO1733204, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.41 (12)

**Comments:** Operators are required to know the ALARA program including all aspects of control, such as how and where hot spots are documented.

QUESTION # 71

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 3
Group # 3

K/A # 2.3.11 - Radiation Control: Ability to control radiation releases.
Importance 2.7

**Proposed Question:**

The unit was operating at 100% power when a tube rupture occurred on "B" S/G
The crew has transitioned from EMG E-3, STEAM GENERATOR TUBE RUPTURE, to a Post SGTR Cooldown procedure.

Which ONE (1) of the following describes the preferred method of cooling down the RCS?

Dump steam:

A. to the condenser using the Intact S/G's to minimize radiological releases.

B. through the Intact S/G's ARVs to minimize contamination of the secondary system for ALARA reasons.

C. through the TDAFW from "B" S/G to reduce the contamination in the secondary system.

D. to the condenser using the "B" S/G to minimize radiological releases.

**Proposed Answer:** A, Dump steam to the condenser using the Intact S/G's to minimize radiological releases.

**Explanation:** Answers A and B are the methods used to conduct the cooldown with A being the preferred method. Answer C is incorrect as the TDAFW is to remain isolated. Answer D is the least preferred method to <u>depressurize</u> the ruptured S/G and is not a choice for cooldown.

**Technical References:** EMG E-3 series background documents, EMG E-3 step 61, EMG ES-31 and 32, step 5, and EMG ES-33, step 7.

**Learning Objective:** LO1732326, Objectives 1, 5, and 9.

**Question Source:** Bank - SONGS Initial License Exam 12/03

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.45 (10)

**Comments:**

QUESTION # 72

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 3
Group # 4

K/A # 2.4.5 - Emergency Procedures/Plan: Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.
Importance 2.9

**Proposed Question:**

A Unit startup is in progress per GEN 00-003, MINIMUM LOAD TO HOT STANDBY, when a loss of instrument air occurs. The operators are performing OFN KA-019, LOSS OF INSTRUMENT AIR, when the main feedwater regulating valves close and a reactor trip occurs.

Which one of the following describes the procedure transitions for this event?

A. GEN 00-003 is suspended. OFN KA-019 is completed followed by entry to EMG E-0, REACTOR TRIP OR SAFETY INJECTION.

B. GEN 00-003 and OFN KA-019 must be exited and enter EMG E-0, REACTOR TRIP OR SAFETY INJECTION.

C. EMG E-0, REACTOR TRIP OR SAFETY INJECTION is entered and exited when directed to another specific procedure. OFN KA-019 may be performed in parallel.

D. Continue with OFN KA-019 and transition to GEN 00-005, MINIMUM LOAD TO HOT STANDBY, Attachment "A", Entry into Mode 3 due to a Reactor Trip.

**Proposed Answer:** C, EMG E-0, REACTOR TRIP OR SAFETY INJECTION, is entered and exited when directed to another specific procedure. OFN KA-019 may be performed in parallel.

**Explanation:** EMG E-0 is the entry procedure from all reactor trips. Per AP 15C-003, Abnormal Procedure Users Guide, OFN procedures may be performed in parallel with EMG's provided they do not interfere with the mitigation strategy. OFN KA-019 has specific guidance to respond with EMG E-0 and continue in OFN KA-019.

**Technical References:** AP15C-003, step 6.2.3; OFN KA-019, step 2

**Learning Objective:** LO1733203, Objective 18

**Question Source:** INPO Bank - Beaver Valley 12/01/02

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (10)

**Comments:** The operator must analyze plant conditions and determine the correct flow path through the EMG Network.

QUESTION # 73

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 3
Group # 4

K/A # 2.4.6 - Emergency Procedures/Plan: Knowledge of symptom based EOP mitigation strategies.
Importance: 3.1

**Proposed Question:**

A design bases accident has occurred. The Reactor has tripped and SI has actuated. The crew is progressing through the EMG network. The following conditions are noted:

- Narrow range S/G levels are 0% indicated
- AFW flow is currently 120,000 lbm/hr

In which of the following procedures would you transition to EMG FR-H1, LOSS OF SECONDARY HEAT SINK and perform the procedure?

A. You are currently in EMG C-21, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, at step 6.

B. You are currently in EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, at step 12.

C. You are currently in EMG FR-P1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK, at step 10.

D. You are currently in EMG E-0, REACTOR TRIP OR SAFETY INJECTION, at step 4.

**Proposed Answer:** B. You are currently in EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION, at step 12.

**Explanation:** Answer A is incorrect as the procedure requires AFW flow to be reduced. Answer B is correct as the first 10 steps have been completed and FRPs are now in effect, again. Answer C is incorrect as feed flow could have been reduced to stop the cooldown. Answer D is incorrect as you do not enter FRPs until you verify SI equipment running as it would be a potential waste of time.

**Technical References:** AP-15C003 examples after step 6.2.2

**Learning Objective:** LO1733203, Objective 18

**Question Source:** NEW

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (10)

**Comments:** The incorrect answers are all exceptions to the EOP rules and should be understood by the operator. The Operator hs to analyze plant conditions to determine his place in the EMG network then use the rules to determine where to go. If the operator understands the mitigating

strategy of the EOPs then the answer should be clear. Otherwise, each answer will look equally acceptable.

QUESTION # 74

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 2
Group # 1

K/A # 2.4.9 - Emergency Procedures/Plan: Knowledge of low power/shutdown implications in accident (e.g. LOCA or Loss of RHR) mitigation strategies.
Importance 3.3

**Proposed Question:**

The plant is shutdown in a forced outage. A loss of off-site power occurs and all equipment operates as required. The following conditions exist at the time power was lost:

- RCS temp – 225 degrees F
- RCS pressure - 300 psig
- RHR Train A - IN service
- RHR Train B - IN service
- S/G pressures - 5 psig (ALL)
- S/G NR level - 55% - 60%

What procedure should the crew use to stabilize the plant?

A. OFN EJ-015, LOSS OF RHR COOLING

B. OFN NB-030, LOSS OF AC EMERGENCY BUS NB01 (NB02)

C. OFN NB-034, LOSS OF ALL AC POWER - SHUTDOWN CONDITIONS

D. OFN BB-031, SHUTDOWN LOCA

**Proposed Answer:** A, OFN EJ-015, LOSS OF RHR COOLING

**Explanation:** Plant status is currently Mode 4. Answer A is correct since both RHR pumps stop and do not restart. Answers B and D are not applicable in Mode 4. Answer C is incorrect since initial conditions do not result in a Loss of All AC to the Emergency Buses.

**Technical References:** OFN EJ-015 and OFN BB-031

**Learning Objective:** LO1732425, Objective 2

**Question Source:** Bank #Q25090

**Question Cognitive Level:** Comprehension or Analysis A3

**10 CFR Part 55 Content:** 55.41 (10)

**Comments:** The operator must analyze the plant conditions and then determine the correct mitigation strategy.

QUESTION # 75

**Question Worksheet**

**Examination Outline Cross-reference:** Level RO
Tier # 3
Group # 4

K/A # 2.4.34 - Emergency Procedures/Plan: Knowledge of RO tasks performed outside the main control room during emergency operations including system geography and system implications.
Importance 3.8

**Proposed Question:**

You are the Reactor Operator. OFN RP-017, "Control Room Evacuation", is in progress and you are on station at the NB02 switchgear room. All phase A through C actions have been completed. The "B" AFW pump was stopped momentarily and now needs to be restarted.

How will AFW "B" be started?

A. At the Aux S/D Panel by using the "B" AFW Hand Indicating Switch.

B. At the Main Control Boards since access would be regained by now.

C. At the NB02 Switchgear Room using the pushbutton on the AFW pump breaker, after manually charging the closing springs.

D. At the NB02 Switchgear Room using the Handswitch on the front of the AFW pump breaker door, after manually charging the closing springs.

**Proposed Answer:** C, At the NB02 Switchgear Room using the pushbutton on the AFW pump breaker, after manually charging the closing springs.

**Explanation:** Following entry into OFN RP-017 all control power is removed from "B" Train components. Answers A,B and D would not function without control power. The operator must also realize that without control power the closing springs would have to manually charged.

**Technical References:** OFN RP-017, Attachment C

**Learning Objective:** LO1732427, Objective 3

**Question Source:** NEW

**Question Cognitive Level:** Memory or Fundamental Knowledge K3

**10 CFR Part 55 Content:** 55.43 (5)

**Comments:** Performance and locations for Off Normal Actions.