

2013 MNGP INITIAL LICENSE EXAM Written Exam

QUESTION # 001.

The plant was operating at 85% reactor power with all equipment operable when a trip of #12 Recirc Pump occurred. Three minutes later the following plant conditions exist:

- RPV level is 35 inches and stable
- Recirc Loop A indicates a total jet pump flow of 25 Mlbm/hr
- Recirc Loop B indicates a total jet pump flow of 5 Mlbm/hr
- APRM recorders are fluctuating between 56% and 57% reactor power
- C.2-06 Figure 1 (MNGP P-F Operating Map) is provided on the following page

Given the above information; which one of the following identifies a correct action to take for the given conditions?

- a. Raise recirculation flow to exit the OPRM Enabled region.
- b. Control rods need to be inserted to exit ONLY Stability Region I.
- c. Control rods need to be inserted to exit Stability Regions I AND II.
- d. A manual scram needs to be inserted due to neutron flux oscillations.

ANSWER: c.

REFERENCE:

C.4-B.05.01.02.A

BANK

HIGHER

REFERENCE PROVIDED DURING EXAM: Figure 1 – Monticello Nuclear Generating Plant Power-Flow Operating Map

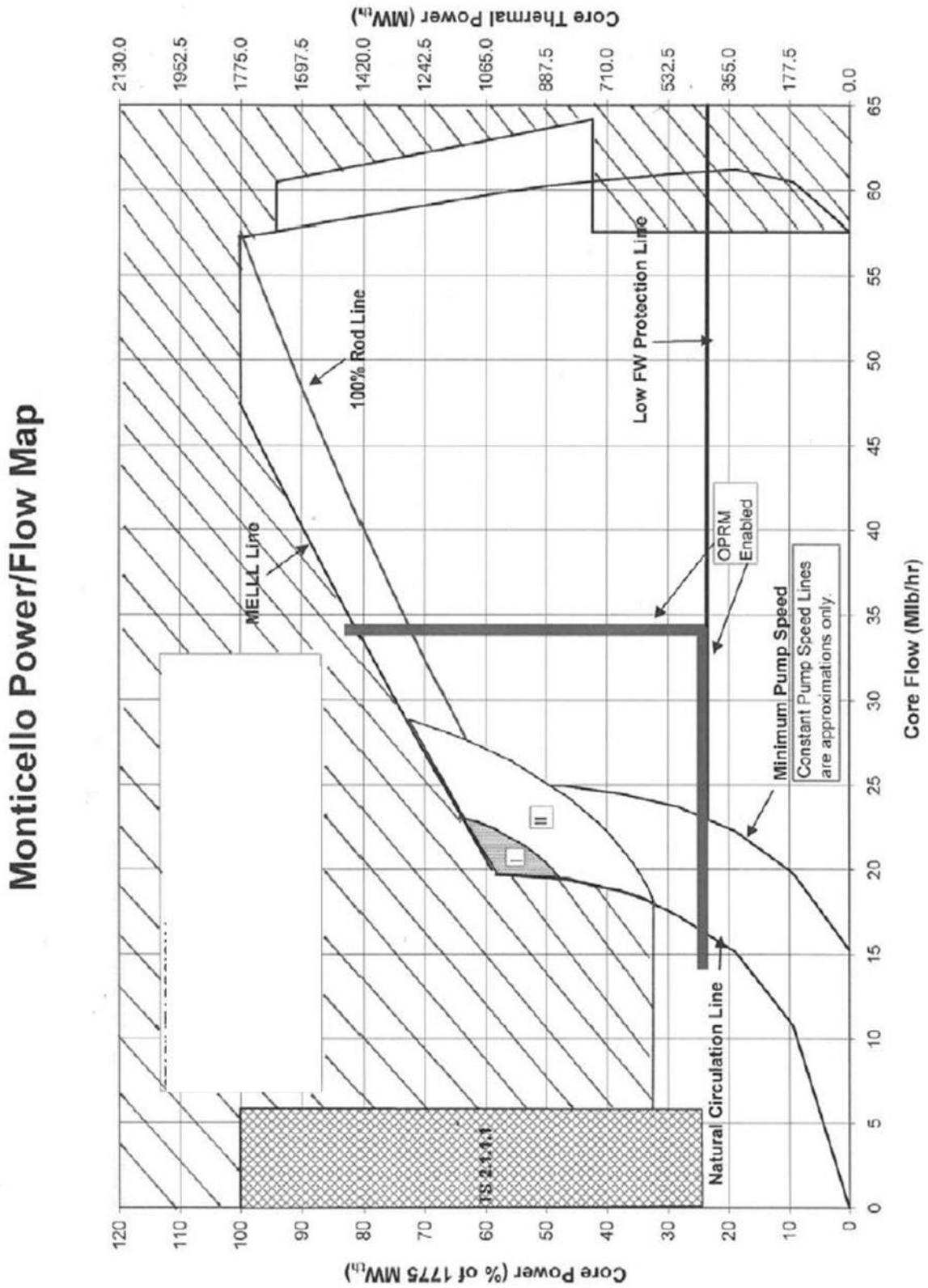
K/A: 2.1.25 Ability to interpret reference material, such as graphs, curves, tables, etc.

JUSTIFICATION: The examinee must determine that B jet pump flow must be subtracted from A jet pump flow. This results in a total core flow of 20 Mlbm/hr. With the current power this is an entry into Stability Region I. IF plant is operating in Stability Region I or in Stability Region II, THEN exit Stability Region by inserting rods or raising recirc flow.

- a. is incorrect: Although raising recirc flow is procedurally allowed in this condition, exiting the OPRM Enabled region is not required.
- b. is incorrect: Both Stability Region I & II must be exited.
- c. is correct:
- d. is incorrect: A reactor scram would not be required unless the OPRM was inoperable, there was difficulty inserting rods or neutron flux oscillations were occurring. By definition, neutron flux oscillations are a 10% peak-peak change in power. The fluctuations given in the stem would merely be considered normal instrument noise.

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Figure 1 Monticello Nuclear Generating Plant Power-Flow Operating Map



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QUESTION # 002

The plant was operating at rated conditions when a Main Generator over voltage condition occurred resulting in a Generator Lockout and a Station Blackout (SBO).

Which of the following strategies is used in a SBO for RPV pressure control?

- a. Rapidly depressurize the RPV with manual SRV actuation to remove decay heat.
- b. Maintain RPV pressure 800-1000 psig with manual SRV actuation.
- c. Maintain RPV pressure 900-1050 psig with turbine bypass valves.
- d. Maintain RPV pressure 900-1052 psig with Low-Low Set.

ANSWER: d.

REFERENCE:

C.4-B.09.02.A

NEW

FUNDAMENTAL

K/A: 295003K1.06 Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: Station blackout.

JUSTIFICATION: An operational implication of a station blackout is the required use of HPCI and/or RCIC for level control. This was quite evident during the Japan events in 2011. The SBO procedure directs the operator to maintain pressure with the LL-Set valves (900-1052 psig) or with manual SRV operation 900-1050 psig.

- a. is incorrect: Depressurization is not desired in this event for reasons stated above. However, it is plausible to think decay heat must be removed rapidly in this situation.
- b. is incorrect: This is the normal post scram pressure band but wrong for this situation.
- c. is incorrect: The turbine bypass valves would not be available in this situation due the loss power.
- d. is correct.

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QUESTION # 003

The plant is at rated conditions with D-20 (DIV II 125 VDC CHARGER) out of service. Given the following:

- D-10 (DIV I 125 VDC CHARGER) is in service supplying the Division I loads
- D-40 (SPARE 125 VDC CHARGER) is in service supplying the Division II loads

With the conditions above; what would be the impact if a LOCKOUT occurred on LC-103?

- a. Battery 11 would deplete, resulting in a loss of Division I 125 VDC ONLY.
- b. Battery 12 would deplete, resulting in a loss of Division II 125 VDC ONLY.
- c. Batteries 11 & 12 would deplete, resulting in a COMPLETE loss of 125 VDC.
- d. Batteries 11 & 12 would be unaffected as they BOTH would be charging from LC-104.

ANSWER: a.

REFERENCE:

B.09.10-02

B.09.10-06

NEW

HIGHER

K/A: AK2.01 Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF D.C. POWER and the following: Battery chargers

JUSTIFICATION: LC-103 supplies power to MCC-133 which supplies power to D-10 (DIV I 125 VDC CHARGER). A loss of LC-103 would eventually result in the depletion of Battery 11 and a loss of Div I 125 VDC because the spare charger is not allowed to be connected to both divisions. The examinee must recognize that D-40 is powered from LC-104 and not affected by the given power loss.

- a. correct.
- b. incorrect: The spare charger (D-40) will not lose power. It receives power from MCC-142 which is fed from LC-104. Therefore Battery 12 will remain charging.
- c. incorrect – see (b.) above.
- d. incorrect: Plausible misconception if examinee believes the spare charger is powered from LC-103.

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QUESTION # 004

The plant was operating at rated conditions when Moisture Separator high level caused annunciator 7-B-25 (TURBINE LOCKOUT) and a reactor scram. Given the following:

- RPV Pressure is 1025 psig and rising
- RPV Water Level is 20 inches and stable
- The lowest RPV Water Level was -12 inches
- The Main Generator Field Breaker is CLOSED
- The Main Turbine Stop Valves are all CLOSED
- Main Generator Output Breakers 8N7 and 8N8 are OPEN

Based on the given conditions above and assuming NO operator actions have been taken; has the plant responded correctly and why?

- a. Yes; the Main Generator Field Breaker remains CLOSED on a turbine lockout.
- b. Yes; the LL-SET System is expected to control RPV pressure 900-1056 psig.
- c. No; the Main Generator Output Breakers should have remained CLOSED.
- d. No; the EPR should be maintaining RPV pressure 800-1000 psig.

ANSWER: d.

REFERENCE:

C.6-007-B-25

C.4-A

B.05.09-02

NEW

HIGHER

K/A: 295005K3.07 Knowledge of the reasons for the following responses as they apply to MAIN TURBINE GENERATOR TRIP: Bypass valve operation

JUSTIFICATION: The examinee must realize that given the above conditions, the MSIVs will remain open since a Group 1 isolation has not occurred. Since all of the Turbine Stop Valves are closed, pressure should be controlled via the Bypass Valves on the Electronic Pressure Regulator (EPR) at its previous setpoint. This value is typically around 900 psig following a reactor scram from full power.

- a. incorrect: The Main Generator Field Breaker will open on a turbine lockout.
- b. incorrect: Low-Low Set System would maintain pressure 900-1056 psig but it is not expected since the MSIVs have not closed and bypass valve operation will maintain pressure.
- c. incorrect: The Main Generator Output Breakers should open and remain open on a Turbine Lockout.
- d. correct

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QUESTION # 005

The plant was operating at rated conditions when a scram occurred due to an RPS fault. The following conditions now exist:

- RPV Pressure is 900 psig and stable
- RPV water level lowered to -20 inches
- RPV water level is now +4 inches and slowly rising
- The DFWLC System status is shown pictorially on the next page

Using the given conditions, approximately where will RPV water level stabilize out at? (Assume the Reactor Feed Pumps remain running)

- 5 inches.
- 15 inches.
- 35 inches.
- 38 inches.

ANSWER: b.

REFERENCE:

B.05.07-02

BANK

HIGHER

REFERENCE PROVIDED DURING EXAM: Controller Picture

K/A: 259006A1.02 Ability to operate and/or monitor the following as they apply to SCRAM: Reactor water level control system.

JUSTIFICATION: The picture shows both Main Feedwater Regulating valves (MFRV) in manual and closed which is a required action IAW the scram procedure. The Low Flow Regulating valve (LFRV) is in AUTO set at 5 inches. However, when the LFRV is in AUTO the setpoint is clamped between 15-40 inches. Therefore RPV water level should stabilize out at approximately 15 inches.

- incorrect: Plausible for the current setting of the LFRV.
- correct
- incorrect: Plausible for the current setting of the Master controller plus taking into account DFWLC programming which automatically lowers the setting by 3 inches. This programming is only in effect at high power.
- incorrect: Plausible for the current setting of the Master controller.

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QUESTION # 006

The plant was operating at rated conditions when a Control Room evacuation was required. An emergency depressurization was performed to restore RPV water level. RPV pressure is 70 psig and lowering with the ASDS Fuel Zone RPV level indicator reading as shown:



Based on the given conditions, complete the following statement concerning RPV water level and why?

Actual RPV water level is...

- a. **lower** than indicated because this instrument is calibrated at 0 psig.
- b. **lower** than indicated because this instrument is calibrated at 1000 psig.
- c. **higher** than indicated because this instrument is calibrated at 0 psig.
- d. **higher** than indicated because this instrument is calibrated at 1000 psig.

ANSWER: b.

REFERENCE:

B.01.01-06 Figure 29

Generic Fundamentals

NEW

HIGHER

K/A: 295016A2.02 Ability to determine and/or interpret the following as they apply to CONTROL ROOM ABANDONMENT: Reactor water level.

JUSTIFICATION: The examinee must determine that the fuel zone level indicator on the ASDS panel is calibrated for 1000 psig (HOT). With RPV pressure at 70 psig cold conditions are established. The colder water requires less inventory to provide the same level indication. Therefore, actual water level is lower. As plotted on Figure 29 actual water level is approximately -65 inches.

a, c and d are incorrect: Plausible misconceptions of water level indications during off normal calibration conditions.

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QUESTION # 007

The plant is operating at rated conditions with the following RBCCW system status:



With the conditions above; If the running RBCCW pump trips on overload, which of the following actions must be taken in the control room?

- Trip the Recirc pumps and close the RBCCW drywell isolation valves.
- Verify the standby RBCCW pump automatically starts.
- Attempt to manually restart the tripped RBCCW pump.
- Attempt to manually start the standby RBCCW pump.

ANSWER: d.

REFERENCE:

C.4-B.02.05.A

B.02.05-02

HIGH

NEW

K/A: 295018A1.01 Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPETE LOSS OF COMPONENT COOLING WATER: Backup systems

JUSTIFICATION: The provided picture shows that the backup (standby) RBCCW pump is not setup to automatically start. This can be determined because its white standby light is not on. The first immediate operator actions for a loss of RBCCW is to verify a pump is running. In this case that would mean to manually start the standby pump.

- incorrect: These are immediate actions to perform on a loss of RBCCW but the operator should attempt to start a pump first.
- incorrect: The examinee must recognize that the standby pump will not start because it is not in standby setup.
- incorrect: This could be an attempted immediate action but since it has tripped on overload the operators should know not to attempt a restart.
- correct

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QUESTION # 008

On a complete loss of Instrument Air, which of the following components will fail **CLOSED**?

- a. SBGT valves.
- b. CRD flow control valves.
- c. EDG ventilation supply dampers.
- d. RHR pump minimum flow valves.

ANSWER: b.

REFERENCE:

C.4-B.08.04.01.A

BANK

FUNDAMENTAL

K/A: 295019A2.02 Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Status of safety-related instrument air system loads.

JUSTIFICATION: The CRD flow control valves fail closed.

- a. incorrect: All valves on SBGT fail open to permit system operation.
- b. correct
- c. incorrect: The EDG room ventilation dampers fail open on a loss of air.
- d. incorrect: The RHR pump min flow valves will fail open.

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QUESTION # 009

The reactor is shutdown for a scheduled refueling outage. The following conditions exist:

- RPV water level is 57 inches
- Reactor Coolant Temperature is 149°F
- The Reactor Mode switch is in SHUTDOWN
- ALL Reactor Vessel Head closure bolts are fully tensioned
- Division 2 RHR/RHR SW pumps are in Shutdown Cooling (SDC)
- Division 1 AC Busses are de-energized for a scheduled maintenance window

Electricians wish to perform maintenance on the Bus 16 voltmeter. The clearance order requires the Bus 16 POT drawer to be tagged opened in order for this work to commence.

Which of the following SDC Technical Specification LCOs, if any, would be NOT MET if this clearance order is implemented?

- a. NONE; this maintenance will NOT affect SDC.
- b. LCO 3.4.7 (RHR Shutdown Cooling System – Hot Shutdown).
- c. LCO 3.4.8 (RHR Shutdown Cooling System – Cold Shutdown).
- d. LCO 3.9.8 (RHR – Low Water Level).

ANSWER: c.

REFERENCE:

TS 3.4.8

TS Table 1.1-1

Steam Tables

NEW

HIGHER

K/A: 295021 2.2.36: Ability to analyze the effects of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.

JUSTIFICATION: Opening a Bus POT causes metering and relaying for the associated Bus to become de-energized. This will cause the main feeder breaker for Bus 16 to open resulting in loss of Bus 16 and all related loads. With this loss of power along with the Division 1 maintenance window, the examinee must determine that both shutdown cooling subsystems are inoperable. Then the examinee must determine that the plant is in Mode 4 and LCO 3.4.8 will be not met. This event occurred during the MNGP Loss of Bus 16 event during RFO-24.

- a. incorrect: The examinee must recognize that bus pot removal will result in the loss of Bus 16 and a loss of SDC.
- b. incorrect: This would be the correct answer if the plant was in Mode 3.
- c. correct
- d. incorrect: 3.9.8 requires RHR SDC Mode to be operable and could be correct answers if the plant was in Mode 5 since water level is below 21'7" above the RPV flange. The water level given is normal level during shutdown cooling operations in Mode 4.

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QUESTION # 010

The plant is in Mode 5 with a full core off-load in progress. A refueling error occurs resulting in inadvertent criticality in the Fuel Pool and the following conditions:

- 4-A-1 (REFUELING FL AREA HI RADIATION) is in alarm
- ARM A-1 (1027 RB NORTH EAST LOW) is alarming at 21 mrem/hr
- ALL other radiation monitors are reading below their alarm setpoints

Which one of the following is the correct response to these conditions?

- Evacuate the Refuel Floor ONLY.
- Verify that SBGT has automatically initiated.
- Evacuate the Reactor Building AND the Refuel Floor.
- Refueling personnel should monitor and evaluate local ARM readings.

ANSWER: c.

REFERENCE:

D.2-05

BANK

FUNDAMENTAL

K/A: 295023K1.03 Knowledge of the operational implications of the following concepts as they apply to REFUELING ACCIDENTS: Inadvertent criticality.

JUSTIFICATION: If a loading error occurred causing criticality in the fuel pool, radiation alarms would be expected. ARM A-1 is the closest to the refuel floor and alarms at 20 mrem/hr. If a high radiation alarm or a high airborne alarm is sounded, all personnel in the Reactor Building will leave at once.

- incorrect: IAW 4-A-1 this would be a minimum requirement during any plant condition. However, during refueling operations D.2-05 states that the entire Reactor Building should be evacuated.
- incorrect: SBGT would not be initiated automatically unless the RBV process radiation reading reached 26 mrem/hr or if the Refuel floor process radiation monitor reached 50 mrem/hr.
- correct
- incorrect: This would only be the case if only the Refuel Bridge ARM alarmed. In this case the cause of the alarm would be investigated.

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QUESTION # 011

The plant was operating at rated conditions when a Bus 14 Lockout resulted in the following:

- RPV water level is 20" and stable
- RPV pressure is 900 psig and stable
- Drywell pressure is 2.3 psig and rising
- 15 Bus is being supplied from 13 Bus
- 16 Bus is being supplied from 12 EDG

Which one of the following correctly describes the load sheds received by 15 & 16 Busses?

15 BUS

16 BUS

- | | |
|-------------------------|----------------------|
| a. ECCS Load Shed ONLY | ECCS Load Shed ONLY |
| b. ECCS Load Shed ONLY | EBT Load Shed ONLY |
| c. ECCS Load Shed ONLY | ECCS & EBT Load Shed |
| d. ECCS & EBT Load Shed | ECCS & EBT Load Shed |

ANSWER: C

REFERENCE:

B.09.06-01

BANK

FUNDAMENTAL

K/A: 295024K2.10: Knowledge of the interrelationships between HIGH DRYWELL PRESSURE and the following: A.C. distribution.

JUSTIFICATION: There are two independent ECCS Load Sheds, one for each essential bus. The conditions required for an ECCS Load Shed to occur are:

- 1) **ECCS Signal - Drywell High Pressure** (1.84 psig) OR
- 2) ECCS Signal - Reactor Low Low Level (-47"), AND Reactor pressure \leq 420 psig OR
- 3) ECCS Signal - Reactor Low Low Level (-47") for 20 minutes.

With the conditions above both 15 and 16 busses would have an ECCS load shed. 16 Bus would also have an EBT (Essential Bus Transfer) load shed but 15 bus would not because it's still being supplied from its normal source (13 Bus).

- a. incorrect: Plausible since only 15 bus remains on its normal power source.
- b. incorrect: Plausible since 16 bus is on its alternate source and ONLY it would have an Essential Bus Transfer load shed.
- c. correct
- d. incorrect: Plausible if examinee thinks that the EBT logic work similar to the ECCS logic in that one signal sheds both bussed of the EBT loads.

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QUESTION # 012

The plant was at rated conditions with the RCIC Pump Flow Test in progress. Annunciator 4-A-5 (RCIC STEAM LINE HI DIFF PRESSURE) was received and conditions are now as follows:

- All Control Rods are fully inserted
- Steam chase temperature is 210° F
- RPV pressure is 1045 psig and slowly rising
- RPV water level is +10 inches and slowly rising

Which of the following can be used to control RPV pressure under these conditions?

- a. HPCI
- b. RCIC
- c. Main Steam Line Drains
- d. Main Turbine Bypass Valves

ANSWER: a.

REFERENCE:

C.6-004-A-05

B.05.06-02

B.02.03-01

NEW

HIGHER

K/A: 295025K3.03 Knowledge of the reasons for the following responses as they apply to HIGH REACTOR PRESSURE: HPCI operation.

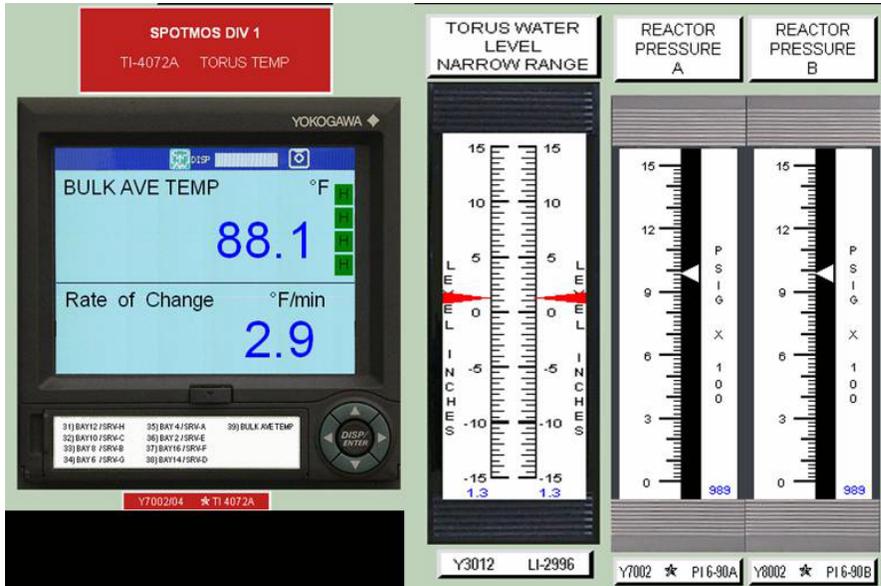
JUSTIFICATION: With reactor pressure high HPCI is needed for pressure control. The only system of the above choices available for pressure control with the reactor isolated from the main condenser is HPCI. Therefore HPCI operation is required.

- a. correct
- b. incorrect: The examinee must realize that RCIC would be isolated due to the steam line differential pressure signal (1 of 2 taken once).
- c. incorrect: The examinee must realize that Main Steam line drains would isolate because they are part of the Group 1 isolation (195-200°F Steam Chase Temp).
- d. incorrect: The examinee must realize that the Bypass valves will require the MSIVs to be opened. The MSIVs would isolate from the Group 1 isolation (195-200°F Steam Chase Temp).

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QUESTION # 013

The plant was operating at rated conditions when a severe ATWS condition occurred. The following indications were noted at **0800**?



Of the times below, when will the Torus Heat Capacity Limit (Detail M) **FIRST** be exceeded? (Assume Torus temperature rate of change, Torus water level and Reactor pressure remain constant. Detail M is on the following page).

- a. 0828
- b. 0831
- c. 0835
- d. 0838

ANSWER: c.

REFERENCE:

C-5-1200 Detail M (Provided)

NEW

HIGHER

K/A: 295026A1.03: Ability to operate and/or monitor the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Temperature monitoring

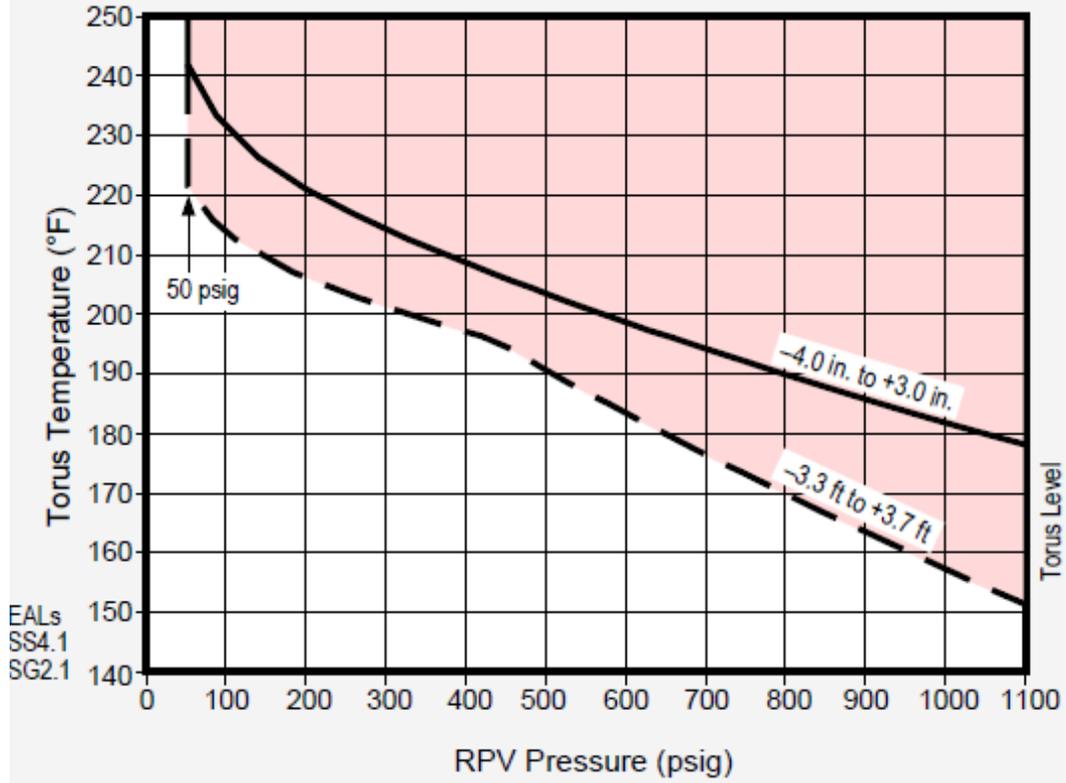
JUSTIFICATION: At 0835 Torus temperature will have risen to (35 min x 2.9F/min + 88.1F = **189.6F**) With Rx Pressure at approximately 1000 psig and using the solid (-4" to +3.5") Torus level curve, Detail M will be exceeded.

- a. incorrect: After 28 minutes Torus water temperature will be 169.3°F. This would be the first to exceed Detail M only if using the dotted Torus Water level curve.
- b. incorrect: After 31 minutes Torus water temperature will be 178°F. This would exceed Detail M only if using the dotted Torus Water level curve.
- c. correct
- d. incorrect: After 38 minutes Torus water temperature will be 198.3°F. This exceeds Detail M but wouldn't be first.

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Heat Capacity Limit (SPDS 78)



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QUESTION # 014

The plant was operating at rated conditions when an event occurred resulting in a significant rise in Drywell temperature.

Which of the following completes the statement below concerning RPV Fuel Zone Level instrumentation for the given conditions?

Reference Leg Boil-off will result in a (1) indicated level because differential pressure (d/p) across the level detector will be (2) .

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| a. | lower | lower |
| b. | higher | lower |
| c. | lower | higher |
| d. | higher | higher |

ANSWER: b.

REFERENCE:

C.5.1-1000

Generic Fundamentals

BANK

HIGHER

K/A: 295028A2.03 Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE: Reactor water level.

JUSTIFICATION: The RPV Saturation Temperature given in Figure 1 is a plot of the saturation temperature of water as a function of pressure. If the temperature of the water in an RPV water level instrument run exceeds this temperature, the water may start to boil, resulting in errors in the indicated level. Boiling is of concern in all instrument runs; horizontal and vertical, reference and variable, drywell and reactor building. Boiloff from the reference leg reduces the height of water in the leg. This decreases the pressure on the reference leg side of the differential pressure transmitter and increases the indicated level.

a., c., and d. are incorrect: Plausible variations of drywell temperature effects on indicated RPV level.

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QUESTION # 015

The plant was operating at rated conditions when a severe accident occurred. HPCI is running in the Level Control Mode when the following timeline of indications occur:

TIME	RPV Pressure	Torus Water Level	HPCI Pump Suction Pressure	HPCI Turbine Exhaust pressure
1500	850 psig	- 1.0 feet	20 psig	50 psig
1501	650 psig	- 2.0 feet	18 psig	60 psig
1502	450 psig	- 3.0 feet	16 psig	70 psig
1503	250 psig	- 4.0 feet	14 psig	20 psig
1504	50 psig	- 5.0 feet	12 psig	15 psig

If HPCI fails to automatically trip; at what time above is a procedural OR automatic trip threshold **FIRST EXCEEDED** that will require operators to manually trip HPCI?

- a. 1501
- b. 1502
- c. 1503
- d. 1504

ANSWER: c.

REFERENCE:

C.5.1-1200

NEW

HIGHER

K/A: 295030 2.2.44 Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.

JUSTIFICATION: EOPs require that HPCI be tripped if torus water level cannot be maintained above – 3.7 feet to prevent a pressurization of the torus air space. At time 1503 torus water level is – 4.0 feet and the examinee must understand that this is beyond the EOP procedural threshold and that operator action must be taken to trip HPCI in order to protect containment.

- a. incorrect: Plausible for confusion with the RCIC high exhaust trip of 50 psig for 5 seconds.
- b. incorrect: Plausible for confusion between psig and vacuum. HPCI low suction trip is 16.5 Hg Vacuum.
- c. correct
- d. incorrect: Plausible for being below the low RPV pressure Group 4 isolation trip of 100 psig but this isn't when the trip is first required.

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QUESTION # 016

The plant was operating at rated conditions when a LOCA occurred resulting in the following conditions:

- B RHR is in the Torus cooling Mode
- Torus water temperature is 145°F and rising
- A RHR pumps are maintaining adequate core cooling in LPCI injection Mode
- Both Core Spray pumps are running with their inboard injection valves throttled

Subsequently, a Loss of ALL Offsite Power occurred, 11 EDG failed to start and reactor water level is -130 inches and stable.

To ensure adequate core cooling AND continue to mitigate the Torus temperature rise; which combination of pumps must be kept in service by the operating crew?

- A. 1 RHR Pump, 1 RHRSW Pump and 1 Core Spray Pump.
- B. 2 RHR Pumps, 1 RHRSW pump, and 1 Core Spray Pump.
- C. 1 RHR Pumps, 2 RHRSW pumps, and 1 Core Spray Pump.
- D. 1 RHR Pump, 2 RHRSW pumps, and NO Core Spray Pump.

ANSWER: a.

REFERENCE:

C.5.1-1000

B.03.04-05

BANK

FUNDAMENTAL

K/A: 295031K1.01 Knowledge of the operational implications of the following concepts as they apply to REACTOR LOW WATER LEVEL: Adequate core cooling.

JUSTIFICATION: With the loss of all offsite power and 11 EDG failing to start LPCI injection is lost and only 12 EDG is available to provide power to the division 2 ECCS pumps. For proper EDG loading only 3 large pumps should be loaded on the EDG. One Core spray pump at 2800 gpm is sufficient for adequate core cooling and in order to mitigate the torus temperature rise an RHRSW pump should be in service along with an RHR pump.

- a. correct
- b. incorrect: These are each 4 large pumps which is too much for one EDG.
- c. incorrect – see distractor b.
- d. incorrect: The Core Spray pump would be required to ensure adequate core cooling.

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QUESTION # 017

The plant was operating at rated conditions when a scram condition occurred and reactor power remained above 3.5%. The ATWS RPV level instruments sensed the following levels for 10 seconds:

- LT-2-3-180A: - 46 inches
- LT-2-3-180B: - 48 inches
- LT-2-3-180C: - 48 inches
- LT-2-3-180D: - 49 inches

Which of the following represents the ATWS system response for the above conditions?

- a. BOTH Recirc MG field breakers open **AND** BOTH ARI valves vent.
- b. BOTH Recirc MG field breakers open **BUT ONLY** 'B' ARI valve vents.
- c. ONLY the 12 Recirc MG field breaker opens **AND** BOTH ARI valves vent.
- d. **NO** ATWS system actuations occur because the 'A' ATWS channel is NOT tripped.

ANSWER: b.

REFERENCE:

B.05.06-01

B.05.06-02

BANK

HIGHER

K/A: 295037K2.09 Knowledge of the interrelations between SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN and the following: Reactor water level.

JUSTIFICATION: A trip occurring in both sub-channels of logic channel A (A & C) or channel B (B & D) will cause an ATWS trip which opens both Recirc MG set generator field breakers and causes control rod insertion by venting the scram air header. LT-2-3-180B and D sensing ≤ -47 " for greater than 7.3 seconds satisfies the B ATWS logic. Each field breaker is equipped with two trip coils, one connected to logic channel A and the other to channel B. Either trip coil can trip the breaker. Two solenoid valves, SV-3-142A(B), are installed in the scram air header. A trip of the B ATWS will only energize the B solenoid valve.

- a. incorrect: Both ARI valves will not vent in this case, only the B solenoid valve will vent.
- b. correct
- c. incorrect: Both Recirc MG field breakers will open and only the B solenoid valve will vent.
- d. incorrect: The logic is a two-out-of-two-once type. Plausible for confusion between channels and subchannels.

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QUESTION # 018

The plant is in a refueling outage with spent fuel being moved in the fuel pool. A spent fuel bundle is dropped resulting in the following radiation readings:

- Refueling Floor Radiation Monitors – 60 mrem/hr
- RB Exhaust Plenum Radiation Monitors – 21 mrem/hr
- Control Room Air Intake Radiation Monitors – 0.5 mrem/hr

Complete the following statement that describes the CRV/EFT system response to the above conditions and why?

The CRV/EFT system will...

- remain in Normal Mode because CRV/EFT is **NOT** affected by the above conditions.
- shift to Recirculation Mode **isolating** outside contaminated air from entering the Control Room atmosphere.
- shift to High Radiation Mode providing HVAC and **pressurizing** the Control Room with filtered air to prevent contamination.
- shift to High Radiation Mode **isolating** the Control Room and requiring the crew to utilize the Control Room Breathing Air Supply.

ANSWER: c.

REFERENCE:

B.08.13-01

B.08.13-02

NEW

HIGHER

K/A: 295038K3.03 Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE: Control room ventilation isolation.

JUSTIFICATION: CRV/EFT will shift to the High Rad mode when either Refueling Floor Radiation Monitors reach 50 mrem/hr or RB Exhaust Plenum Radiation Monitors reach 26 mrem/hr or Control Room Air Intake Radiation Monitors reach 1 mrem/hr. The CRV-EFT System will automatically shift into the High Radiation Mode to provide HEPA/charcoal filtered outside air to the Control Room and EFT Building 1st and 2nd floors to pressurize them. This will prevent any leakage into the Control Room from adjacent spaces.

- incorrect: Prior to the modification during the 2007 RFO this would have been correct because the only signal that would cause entry into this mode was the 1 mrem/hr at the CR intake.
- incorrect: The Recirc Mode is initiated manually and is used for total isolation during a toxic gas event.
- correct
- incorrect: This is the correct mode but the control room won't be isolated. When isolated in the recirc mode control room breathing air may be required during a toxic gas event.

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QUESTION # 019

The plant was operating at rated conditions when a lube oil rupture resulted in a fire in the Turbine Building (TB). The following timeline of events occurred:

<u>Time</u>	<u>Event</u>
1300	The plant is manually scrammed
1303	Main condenser vacuum is broken
1305	07-B-11 (VACUUM 20 IN TRIP #1) is received
1310	V-AH-1/2 (TB AIR HANDLING UNITS) automatically start
1312	03-B-55 (REACTOR BLDG EXH PLENUM HI RAD) is received
1315	The Standby Gas Treatment (SBGT) System automatically starts.

Complete the following statement that describes the status of V-AH-1/2 at 1320 and why?

V-AH-1 & 2 will be...

- tripped because of breaking main condenser vacuum.
- tripped because of the SBGT system automatic start signal.
- remain running because of the high TB temperature condition.
- remain running to prevent an unmonitored release from the TB.

ANSWER: b.

REFERENCE:

B.08.07-02

B.08.07-03

NEW

HIGHER

K/A: 600000A1.05 Ability to operate and/or monitor the following as they apply to PLANT FIRE ON SITE: Plant and/or control room ventilation systems

JUSTIFICATION: The controls of the Turbine Building air handling units V-AH-1 and V-AH-2 are interlocked with a differential pressure switch (dPS-9299), so that when the Plenum Room pressure increases to -.2 inch WC the air handling units will shut off and the Plenum Room ceiling dampers will close. A time delay of one minute is provided before an isolation associated with this pressure increase takes place (62-9299 located in Panel N-9302). Automatic initiation of SBGT on high radiation in the exhaust plenum (26 mrem/hr) and the associated trip of V-EF-20, V-EF-21 and V-EF-22 will cause the Plenum Room pressure to become slightly positive and therefore trip V-AH-1 and V-AH-2.

- incorrect: Although TB air pressure will change when vacuum is broken, this will not trip V-AH-1 & 2.
- correct
- incorrect: These units auto start on 250°F in the TB but they will trip approximately 1 minute after SBGT starts.
- incorrect: Plausible to remain running for release purposes but they will trip.

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QUESTION # 020

The plant was operating at rated conditions when an electric grid disturbance resulted in a Loss of ALL Offsite Power and ATWS condition. Given the following:

- 11 EDG responded as expected
- 12 EDG failed to start
- 13 DG failed to start

Which of the following describes the availability of #11 and #12 SBLC Squib Valves based on available plant electrical power?

- ONLY #11 would actuate.
- ONLY #12 would actuate.
- BOTH #11 and #12 would actuate.
- NEITHER #11 nor #12 would actuate.

ANSWER: a.

REFERENCE:

B.03.05-02

B.03.05-05

MNGP USAR 6.6

NEW

HIGHER

K/A: 700000A2.07 Ability to determine and/or interpret the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: Operational status of engineered safety features.

JUSTIFICATION: A loss of ALL offsite power means that the feed from the emergency transformer (1AR) is also lost.

SBLC Pump #11 and its explosive Squib valve are powered from MCC-133 via LC-103 via 15 Bus which in this case would be powered from 11 EDG. Therefore, #11 Squib valve would actuate.

SBLC Pump #12 and its explosive Squib valve are powered from MCC-142 via LC-104 via 16 Bus which in this case would not be powered because 12 EDG failed to start. Therefore #12 Squib valve would not actuate.

- correct
- incorrect Plausible combinations for misinterpretation of the given conditions and/or failure to recall the SBLC Squib power supplies.
- incorrect see distractor b.
- incorrect see distractor b.

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QUESTION # 021

The plant is operating at rated conditions with Breaker 52-908 (LC-102 TO LC-109 XTIE) open for maintenance.

An inadvertent local manipulation results in Breaker 152-301 (2R SUPPLY TO 13 BUS) being opened.

What effect, if any, will this event have on the Circulating Water (CW) System?

- a. No effect, the 1R Transformer will maintain power to the CW System.
- b. BOTH CW Pumps will be lost resulting in degrading condenser vacuum.
- c. 11 CW Pump is lost but 12 CW Pump will maintain adequate flow through the condenser.
- d. 12 CW Pump will pump water backwards through 11 CW Pump resulting in degrading condenser vacuum.

ANSWER: d.

REFERENCE:

C.4-B.09.06.B

BANK

HIGHER

K/A: 295002K1.03 Knowledge of the operational implications of the following concepts as they apply to LOSS OF MAIN CONDENSER VACUUM: Loss of heat sink.

JUSTIFICATION: Both MO-1850 (11 CWP Discharge Valve) and MO-1851 (12 CWP Discharge Valve) are powered from Load Centers which are powered from Bus 13. Loss of Bus 13 would result in loss of 11 CW Pump and loss of LC-109 (Because the XTIE breaker is open) which would result in MO-1850 (11 CW Pump discharge valve) not being able to close due to loss of power. 12 CW Pump would pump water backwards through 11 CW Pump and not to the condenser and a scram could occur on a rapid loss of vacuum.

- a. incorrect: This manipulation will not result in 1R assuming the load.
- b. incorrect: Plausible if the examinee thinks a station power transfer will occur in which case both CW pumps will be lost.
- c. incorrect: 12 CW pump will not maintain adequate flow due to the bypass path as discussed in the justification.
- d. correct

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QUESTION # 022

The plant is operating in Mode 2 during a plant startup/heatup. Given the following:

- RPV pressure is 800 psig
- RPV water level is +35 inches
- The Low Flow FW Regulating valve is controlling RPV level in AUTO

Which of the following is correct if an Inadvertent Group 1 isolation occurs?

- RPS will remain energized due to RPV pressure being \leq 840 psig.
- RPV water level will initially rise due to the reduction in steam flow.
- RPV water level will initially lower due to the collapse in core voids.
- DFCS will shift to single element control due to the reduction in steam flow.

ANSWER: c.

REFERENCE:

C.4-A

BANK

HIGHER

K/A: 295020K3.05 Knowledge of the reasons for the following responses as they apply to INADVERTANT CONTAINMENT ISOLATION: Reactor water level response.

JUSTIFICATION: The increase in pressure will cause voids to collapse and a reduction of indicated level. Additionally this causes a full RPS trip from MSIV closure which will cause level to lower even more due to the collapse in voids following the scram

- incorrect: RPS will not remain energized as the MSIV closure scram is in effect $>$ 600 psig. Plausible confusion between the $<$ 840 in RUN Group 1 isolation.
- incorrect: Plausible as steam flow will be reduced, but water level will lower from the scram.
- correct
- incorrect: With the Low flow FW reg. valve in service the loss of the steam flow input will have no effect on water level since DFCS is already in single element.

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QUESTION # 023

Given EOP Detail W:

W Area Temperature Limits				
Elev	Area	Instrument	Max Normal	Max Safe
896'	Torus Room	TR-4926 Pt. 8,11,21,25	130°F	212°F
	RCIC Equipment Area	TR-4926 Pt. 22,23,24	130°F	212°F
	East CS & RHR Area	TR-4926 Pt. 5,6,7	130°F	212°F
	West CS & RHR Area	TR-4926 Pt. 9,10,12	130°F	212°F
	HPCI Turbine Area	TR-4926 Pt. 26,27,28	130°F	212°F
	Rx Bldg Drain Tank	Local survey	130°F	212°F
931'	Steam Chase	TR-4926 Pt. 1,2,3,4	165°F	212°F
935'	East CRD HCU	Local survey	120°F	130°F
	West CRD HCU	Local survey	120°F	130°F
	Rx Bldg TIP Drive	Local survey	120°F	212°F
962'	Rx Bldg East	Local survey	120°F	130°F
	Outside RWCU	Local survey	120°F	212°F
	RWCU Pump Room	TR-4926 Pt. 13 through 20	140°F	212°F
985'	Chemistry Sample	Local survey	120°F	158°F
1001'	Decon Area	Local survey	120°F	128°F
	Fuel Pool Tank	Local survey	120°F	128°F
	Source Storage	Local survey	120°F	128°F
1027'	Refuel Floor	Local survey	120°F	212°F

Which of the following temperature limits are based on exceeding environmental qualification limits of accident mitigation equipment in those areas?

- a. 120°F MAX NORMAL
- b. 130°F MAX NORMAL
- c. 130°F MAX SAFE
- d. 212°F MAX SAFE

ANSWER: d.

REFERENCE:

C.5.1-1300

EOP Detail W

NEW

HIGHER

K/A: 295032K1.04 Knowledge of the operational implications of the following concepts as they apply to HIGH SECONDARY CONTAINMENT AREA TEMP: Impact of operating environment on components.

JUSTIFICATION: The maximum safe temperatures for all areas (*excluding the 130°F for 935' East & West CRD, and 962' East*) are based on the temperature profiles used for environmental qualification of accident mitigation equipment.

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- a. incorrect: These are indications of a fire **OR** high energy line break, but not a definite primary system break.
- b. incorrect: Up to 130°F Max Safe, operation of equipment may be required (*935' East & West CRD, and 962' East*) and the 130°F values are based on personnel entry and habitability concerns.
- c. incorrect: Temperatures greater than 200°F at Reactor Bldg. 962' East will result in unusable level indications.
- d. correct

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QUESTION # 024

The plant was operating at rated conditions when an event occurred resulting in the following:

- Drywell pressure is 1.6 psig
- Reactor water level is 7 inches
- Fuel Pool radiation monitors indicate 52 mrem/hr
- Reactor Building vent radiation monitors indicate 21 mrem/hr

Which one of the following identifies an expected response to current plant conditions?

- a. RCIC will automatically initiate.
- b. SBGT will automatically initiate.
- c. RWCU will automatically isolate.
- d. LPCI Loop Select Logic will energize.

ANSWER: b.

REFERENCE:

B.04.02-01

B.05.11-02

BANK

FUNDAMENTAL

K/A: 295033K2.04 Knowledge of the interrelations between HIGH SECONDARY CONTAINMENT AREA RADIATION LEVELS and the following: Standby gas treatment system.

JUSTIFICATION: Fuel Pool activity levels have reached the Partial Group 2 isolation and SBGT initiation setpoint. The Fuel Pool monitors upscale initiation setpoint is 50 mrem/hr. (the Reactor Building vent plenum monitors have a high trip of 26 mrem/hr)

- a. incorrect: Although a 9" Low level Group 2 isolation and reactor scram signal is present, RCIC does not automatically initiate until Low-Low Level (-47") is reached.
- b. correct
- c. incorrect: RWCU doesn't automatically isolate until 1.84 psig in the Drywell or -47" RPV water level. Plausible, however, because RWCU previously did automatically isolate at +9".
- d. incorrect: LPCI loop select logic will not energize until 1.84 psig in the drywell or -47" RPV water level.

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QUESTION # 025

The plant is operating at rated conditions. A plant worker calls the control room and reports that it is difficult to pull OPEN Door-63 (MAIN ACCESS TO RX BLDG - INNER DOOR). The manometer on C-24 is reading -1.30 inches of H₂O.

Which of the following is a correct action to normalize the C-24 manometer reading?

- a. Manually place SBTG in service.
- b. Manually isolate Secondary Containment.
- c. Adjust the variable inlet vanes on V-EF-28 (SPENT FUEL POOL EXHAUST FAN).
- d. Adjust the variable inlet vanes on V-EF-24A or V-EF-24B (RX BLDG EXHAUST FAN).

ANSWER: d.

REFERENCE:

B.04.02-05

B.08.07-02

NEW

FUNDAMENTAL

K/A: 295035A1.01 Ability to operate and/or monitor the following as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: Secondary containment ventilation system

JUSTIFICATION: Abnormally low pressure will cause airlock doors to be more difficult to open and cause the doors to close with more force. If the manometer is reading -1.25 inches of H₂O, then adjust the variable inlet vanes (VIVs) on V-EF-24A or V-EF-24B in accordance with the applicable B-manual procedure.

- a. incorrect: Manually starting SBTG will not isolate secondary containment, which will not correct the problem.
- b. incorrect: Procedural direction to perform this procedure is only allowed when the RB is inaccessible. Since the RB is accessible, this procedure would not be performed.
- c. incorrect: V-EF-28 takes suction from the Dryer Separator area and discharges into the exhaust plenum, which is plausible for a negative pressure inside secondary containment; however, this fan does not have variable inlet vanes (VIVs).
- d. correct

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QUESTION # 026

The plant is operating at rated conditions when an electrical malfunction occurs resulting in the loss of BOTH ECCS Sump Pumps in the A RHR ROOM. Both pumps have lost the ability to mitigate high water level in the room and have been declared INOPERABLE.

Based on these conditions; which of the following is correct concerning the operability of the ECCS Pumps?

- a. ALL ECCS pumps remain OPERABLE.
- b. ONLY Division 1 RHR pumps are INOPERABLE.
- c. ONLY Division 1 ECCS pumps are INOPERABLE.
- d. BOTH Division 1 & 2 ECCS pumps are INOPERABLE.

ANSWER: a.

REFERENCE:

B.07.01-02

B.03.04-05

BANK

FUNDAMENTAL

K/A: 295036A2.01 Ability to determine and/or interpret the following as they apply to SECONDARY CONTAINMENT HIGH SUMP/AREA WATER LEVEL: Operability of components within the affected area.

JUSTIFICATION: The ECCS pumps provide a method to remove water from the floor in the A and B RHR Pump rooms. The sumps in both rooms are cross connected therefore only one of the four sump pumps needs to be operable for the ECCS Pumps to be operable. The A ECCS Sump pumps are both powered from MCC-133 which can explain the common cause electrical malfunction..

- a. correct
- b. incorrect: For reasons stated in the justification these are plausible misconceptions of the sump layout, ECCS pump location and the sump pump operability requirements.
- c. incorrect. See (b.) above.
- d. incorrect. See (b.) above

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QUESTION # 027

The plant has experienced a severe accident from rated power. Given the following:

- Drywell pressure is 27 psig
- Torus water level is +0.5 feet
- Both SBT systems are unavailable
- High hydrogen levels exist in the Drywell
- Operators are executing C.5-3504 (PRIMARY CONTAINMENT VENT AND PURGE)

Based on the given conditions; where can the VENT portion(s) of C.5-3504 be performed?

- a. Control Room ONLY
- b. Alternate Shutdown Panel ONLY
- c. Control Room AND Cable Spreading Room
- d. Control Room AND Alternate Shutdown Panel

ANSWER: b.

REFERENCE:

C.5-3504

C.5-3505

NEW

HIGHER

K/A: 500000 2.1.30 Ability to locate and operate components, including local controls.

JUSTIFICATION: C.5-3504 directs the performance of C.5-3505 (VENTING PRIMARY CONTAINMENT) for the venting portions. C.5-3505 has three parts (A-B-C). Parts B and C require the use of SBT to vent the containment. Part A uses the Hard Pipe Vent and this method can be used for the given conditions. The Hard Pipe Vent can only be manually operated from the Alternate Shutdown Panel (ASDS).

- a. incorrect Venting could only be performed from the control room if SBT is available.
- b. correct
- c. incorrect: Venting operations cannot be performed from the cable spreading room. This is plausible; however, because some vital equipment can be manually operated from this room.
- d. incorrect. See (a.) above.

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QUESTION # 028

Which of the following is the MAXIMUM amount of time allowed for the operator to establish ECCS room cooling following a DBA-LOCA?

- a. 2 minutes.
- b. 10 minutes.
- c. 13 minutes.
- d. 16 minutes.

ANSWER: c.

REFERENCE:

OWI-03.07

B.03.04-05

NEW

FUNDAMENTAL

K/A: 203000K4.04 Knowledge of RHR/LPCI INJECTION MODE design features and/or interlocks which provide for the following: Pump motor cooling.

JUSTIFICATION: Each of the RHR (ECCS) rooms contains 2 RHR pumps and 1 Core Spray pump. Only 2 RHR pumps are designed with service water motor cooling. The other 4 pumps rely on air cooling from the room coolers. These room coolers have no automatic start interlocks associated with them. Therefore, it is assumed the operators start the room coolers within 13 minutes of a DBA LOCA to protect the pumps from over heating.

- a. incorrect: This is the TCOA time for donning breathing protection during a toxic gas event.
- b. incorrect: This is the TCOA time for transferring control to the ASDS panel during a CR or CSR fire.
- c. correct
- d. incorrect: This is the TCOA time for performing an ED from the ASDS panel.

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QUESTION # 029

The reactor was operating at 100% power when an event occurred that resulted in the following conditions:

- RPV pressure is 410 psig
- HPCI automatically started
- 11 Recirc system riser pressure sensed by LPCI is 110 psig
- 12 Recirc system riser pressure sensed by LPCI is 410 psig

Which of the following is correct concerning the RHR System response to the above conditions AND why?

- MO-2012 (RHR DIV 1 LPCI INJ OTBD) received an automatic OPEN signal due to the LPCI Loop selection logic.
- MO-2003 (RHR DIV 2 HX BYPASS) received an automatic OPEN signal to allow full LPCI bypass flow around the heat exchanger.
- MO-4085A/B (RHR INTERTIE VALVES) received automatic OPEN signals to allow full LPCI injection flow from ALL four RHR Pumps.
- MO-4086 (RHR SUCTION EQUALIZING VALVE) received an automatic CLOSE signal to prevent an inadvertent loss of LPCI injection flow due to a broken recirc loop.

ANSWER: b.

REFERENCE:

B.03.04-02

BANK

HIGHER

K/A: 203000K5.02 Knowledge of the operational implications of the following concepts as they apply to the LPCI INJECTION MODE: Core Cooling Methods.

JUSTIFICATION: MO-2003 (B RHR) receives an automatic OPEN signal from the LPCI Initiation Logic to allow full bypass of LPCI flow around the heat exchanger and maximize core cooling. Candidate must determine an ECCS initiation has occurred from HPCI automatically initiating. Then they must determine which LPCI loop is selected based on riser pressures. With the lower pressure on the A loop, LPCI loop select will default to the B RHR loop.

- incorrect: This valve will be on the Non-selected loop and will receive a CLOSE signal. Plausible if the candidate thinks A RHR is the default LPCI loop
- correct
- incorrect: These valves receive an automatic close signal to prevent a loss of LPCI flow from the selected loop to a potentially broken loop.
- incorrect: MO-4086 is a RHR to Recirc Intertie line; however this valve does not receive a closed signal. MO-4085A and B, which are on the intertie lines, receive close signals from the LPCI Loop Select logic to prevent inadvertent loss or bypass of RHR LPCI flow.

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QUESTION # 030

The plant is in Mode 4 with the following conditions:

- A RHR is in Shutdown Cooling with 11 RHR pump running
- B RHR is in Torus Cooling with 12 RHR pump running

If a leak occurred resulting in RPV water level lowering to +5 inches, what would be the final status of the following RHR system components?

<u>11 RHR Pump</u>	<u>12 RHR Pump</u>	<u>MO-2014 (RHR DIV 1 LPCI INJ INBD)</u>	<u>MO-2029 (S/D COOL ISO INBD)</u>
a. RUNNING	RUNNING	OPEN	OPEN
b. TRIPPED	RUNNING	OPEN	CLOSED
c. TRIPPED	RUNNING	CLOSED	CLOSED
d. TRIPPED	TRIPPED	CLOSED	CLOSED

ANSWER: c.

REFERENCE:

B.03.04-02

BANK

HIGHER

K/A: 205000K6.04 Knowledge of the effect that a loss or malfunction of the following will have on Shutdown Cooling: Reactor water level.

JUSTIFICATION: With water level lowering to less than + 9 inches a Group 2 isolation will occur. If RHR is in the S/D Cooling mode this will result in the S/D Cooling suction valves (MO-2029 and MO-2030) going closed. Additionally, the LPCI Injection valve (MO-2013 or MO-2014) will close depending on which division of RHR is in S/D cooling.

- incorrect: Plausible if examinee confuses the Low Level isolation (+9") for the Low-Low Level (-47") LPCI signal.
- incorrect: Plausible if examinee fails to recall that the LPCI injection valve also closes.
- correct
- incorrect: The 12 RHR pump that is providing torus cooling from the division 2 side will be unaffected.

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QUESTION # 031

The reactor is operating in MODE 2 at approximately 3% Rated Thermal Power (RTP). HPCI is in operation for surveillance testing.

Which of the following is the HIGHEST Torus water temperature that if reached, would still allow the continuance of HPCI testing IAW Technical Specifications?

- a. 89°F
- b. 94°F
- c. 99°F
- d. 109°F

ANSWER: c.

REFERENCE:

TS 3.6.2.1

BANK

HIGHER

K/A: 206000A1.05 Ability to predict and/or monitor changes in parameters associated with operating the HPCI SYSTEM controls including: Suppression pool temperature.

JUSTIFICATION: While monitoring torus temperature the examinee must determine that with torus temperature >100°F and performance of testing that adds heat to the torus, all testing that adds heat to the suppression pool must be immediately suspended.

- a. incorrect: This is plausible as it is approaching the EOP entry temperature limit (90°F) and the highest allowed limit if no testing were in progress.
- b. incorrect: This is plausible if the candidate believes that the limit is to suspend testing above 95°F.
- c. correct
- d. incorrect: This is plausible as it is approaching the scram limit for torus water temperature (110°F).

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QUESTION # 032

The plant was operating at rated conditions when a Loss of Offsite power and LOCA occurred at **0800**. Given the following:

- At **0801** Drywell pressure is 2 psig and slowly rising
- At **0802** Essential Bus and EDG status are shown pictorially on the next page

If NO operator actions are taken, what will be the status of the Core Spray pumps at **0803**?

- BOTH Core Spray pumps will be running.
- ONLY 11 Core Spray pump will be running.
- ONLY 12 Core Spray pump will be running.
- NEITHER Core Spray pump will be running.

ANSWER: c.

REFERENCE:

B.03.01-01

B.03.01-05

BANK

HIGHER

K/A: 209001A2.03 Ability to (a) predict the impacts of the following on the LOW PRESSURE CORE SPRAY SYSTEM; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those abnormal conditions or operations: AC failures.

JUSTIFICATION: With the loss of offsite power given in the stem an essential bus transfer will occur transferring essential bus power to 1AR. However, the picture shows that 1AR is also deenergized so essential bus power should transfer to the EDGs. 25 seconds after DW pressure reached 1.84 psig the Core Spray pumps should start and load onto the EDGs. The picture shows that 12 EDG started and loaded onto 16 bus supplying power to 12 Core Spray pump, however, 11 EDG started but didn't load onto 15 bus so 11 Core spray pump would be without power.

- incorrect: Plausible if the examinee doesn't recognize that 11 EDG is running but not loaded.
- incorrect: See distractor (a.) above.
- correct.
- incorrect: 12 Core Spray pump will be running as it has a 1.84 psig DW start signal and power available from 16 bus.

NOTE: Only part (a) of the K/A matched IAW NUREG 1021 ES-401 D.2.a. Writing this question to also match the second portion would result in an SRO ONLY question.

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NOTE:
 ESSENTIAL BUS VOLTAGE
 OPERATING ACTION LEVELS
 4800V MAX
 4100V MIN
 PER OPS MAN 8.9.06-05
 CONTROL C.27



15 BUS VOLTS
 VS-4



BUS 15 1AR XFMR AMPERES
 AS2-13A



15 1AR XFMR VOLTS
 VS-10



12 DIESEL GENERATOR AC KILOWATTMETER



12 DIESEL GENERATOR AC VOLTMETER
 VDO2



12 DIESEL GENERATOR AC AMPMETER
 ADO2



12 DIESEL GENERATOR FREQUENCY (HERTZ)
 MAINTAIN 60.0 FREQ BETWEEN 59.5 Hz AND 60.5 Hz WHEN CONNECTED TO THE BUS AND ISOLATED FROM THE GRID

12 EMERGENCY DIESEL GENERATOR



15 BUS VOLTS
 VS-4



BUS 15 1AR XFMR AMPERES
 AS2-13A



11 DIESEL GENERATOR AC KILOWATTMETER



11 DIESEL GENERATOR AC VOLTMETER
 VDO1



11 DIESEL GENERATOR AC AMPMETER
 ADO1



11 DIESEL GENERATOR FREQUENCY (HERTZ)
 MAINTAIN 60.0 FREQ BETWEEN 59.5 Hz AND 60.5 Hz WHEN CONNECTED TO THE BUS AND ISOLATED FROM THE GRID

11 EMERGENCY DIESEL GENERATOR

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QUESTION # 033

During an ATWS condition, the CRS directed initiation of SBLC. The OATC successfully started and began injection with SBLC System 1. The OATC now observes the following:

- The MSIVs are open
- RCIC is injecting at 400 gpm
- RPV water level is -60 inches and intentionally being lowered
- A RWCU pump is running with 160 gpm total system flow

Based on the above conditions which of the following actions are required?

- a. RCIC should be terminated.
- b. Manually Initiate SBLC System 2.
- c. Manually perform a Group 1 isolation.
- d. Manually perform a Group 3 isolation.

ANSWER: d.

REFERENCE:
B.03.05-05.G.1

BANK HIGHER

K/A: 211000A3.06 Ability to monitor automatic operations of the STANDBY LIQUID CONTROL SYSTEM including: RWCU system isolation.

JUSTIFICATION: The operator is required to verify that the RWCU pumps have tripped and Group 3 RWCU Isolation valves MO-2397, 2398, and 2399 close when SBLC is initiated from the control room.

- a. incorrect: With RPV level lowering, the use of RCIC is warranted to maintain RPV water level.
- b. incorrect: The same Group 3 circuitry is used for SYS 1 or 2, this would have no effect on RWCU
- c. incorrect: The MSIVs are kept open by bypassing the RPV lo-lo water level isolation.
- d. correct.

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QUESTION # 034

The plant is in Mode 1 with two Recirc loops in operation. The APRM ODAs currently indicate that Total Recirc flow is 44%.

Which of the following approximates the current STP Scram setpoint?

- a. 78%
- b. 84%
- c. 89%
- d. 95%

ANSWER: c.

REFERENCE:

ARP 5-A-22

NEW

HIGHER

K/A: 212000A4.05 Ability to manually operate and/or monitor in the control room: Reactor power.

JUSTIFICATION: This number represents the APRM STP two loop scram setpoint $0.66W + 59.6\%$. W is equal to percent total recirc flow which in this case is 44%. Calculated answer is 88.64%.

- a. incorrect: This number is the STP APRM HI Alarm/Rod Block setpoint using the equation $0.66W + 48.6\%$.
- b. incorrect: This number is the STP Flow Biased Scram setpoint in single loop. This equation is $0.66W + 54.6$.
- c. correct.
- d. incorrect: This number represents the OLD flow biased scram setpoint prior to the PRNM installation. The equation was $0.66W + 65.6$.

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QUESTION # 035

The plant is in Mode 2 with a Reactor Startup in progress.

What is the required number of operable IRM Neutron Flux High-High channels for the given conditions?

- a. 1 per TRIP SYSTEM.
- b. 2 per TRIP SYSTEM.
- c. 3 per TRIP SYSTEM.
- d. 4 per TRIP SYSTEM.

ANSWER: c.

REFERENCE:

B.05.01.01-05

TS LCO 3.3.1.1

NEW

FUNDAMENTAL

K/A: 215003 2.2.38 Knowledge of conditions and limitations in the facility license.

JUSTIFICATION: The IRM system is divided into two groups of IRM channels, with four IRM channels inputting to each RPS trip system. Six channels, with three channels in each trip system, are required for IRM Operability.

- a. incorrect: This is the SRM rod block requirement from the TRM
- b. incorrect: This is the IRM rod block requirement from the TRM.
- c. correct.
- d. incorrect: Plausible as the majority of RPS instrumentation requires all channels to be operable.

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QUESTION # 036

A plant startup is in progress with the Mode Switch in STARTUP. Given the following:

- All SRM indicators are on-scale with detectors partially withdrawn
- All IRMs are on Range 1 reading between 10-50 on the 125 scale.

An event occurs that results in the following C-05 indication:



Which one of the following will cause the above conditions?

- An SRM reading lowers to 90 cps.
- An SRM reading rises to 60,000 cps.
- An SRM period shortens to 10 seconds.
- An IRM reading lowers to 4 on the 125 scale.

ANSWER: a.

REFERENCE:

B.05.01.01-02

ARP 5-A-3

BANK

HIGHER

K/A: 215004K1.02 Knowledge of the physical connections and/or cause-effect relationships between the SOURCE RANGE MONITOR SYSTEM and the following: Reactor manual control

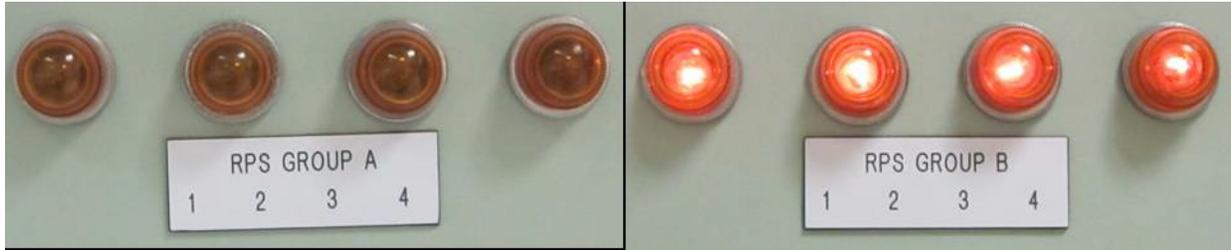
JUSTIFICATION: This will cause annunciator 5-A-28 (SRM RETRACT NOT PERMITTED) and the white RETRACT PERMIT indicating light on C-05 to go off AND will cause a rod block if IRMs are < Range 3. The rod block will result in annunciator 5-A-3 (ROD WITHDRAWAL BLOCK) and the rod out permit light to go out as shown in the picture.

- correct.
- incorrect: The SRM upscale rod block is set at 9.07×10^4 or 90,700 cps (Nominal 1×10^5). 60,000 cps would be 6×10^4 and not above the HI (rod block).
- incorrect: If the period is shorter than 12 seconds a period alarm is received but this doesn't cause a rod block.
- incorrect: An IRM reading lowering to <5 will result in a rod block only if IRMs are on range 2 or higher.

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QUESTION # 037

The plant is operating at rated conditions when a RPS MG Set malfunction results in the following:



Which of the following PRNM components, if any, will lose power with the above condition?

- a. RBM A.
- b. APRMs 1 & 3.
- c. 2 of 4 Voters – 1 & 3.
- d. None, they are all auctioneered with RPS Bus B.

ANSWER: c.

REFERENCE:

B.5.1.2-05

B.09.12-05

BANK

HIGHER

K/A: 215005K2.02 Knowledge of electrical power supplies to the following: APRM Channels

JUSTIFICATION: Primary power (120 VAC) for the PRNM system is provided from bus A and bus B of the RPS Power Distribution System. The 2 of 4 Voters are powered from the associated RPS bus; RPS A powers 2 of 4 Voters 1 and 3, RPS B powers 2 of 4 Voters 2 and 4.

- a. incorrect: APRM and RBM drawers are powered from both RPS A and RPS B through LVPS and auctioneering circuits.
- b. incorrect. See (a.) above.
- c. correct.
- d. incorrect: The 2 of 4 voters do not receive auctioneered power.

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QUESTION # 038

The plant was operating at rated conditions with HPCI out of service when a Group I Isolation Occurred. Given the following:

- RCIC received an auto initiation signal on RPV Low-Low Level
- The RCIC pump flow signal was lost resulting in a constant **ZERO gpm flow signal** being sent to the flow controller.

Complete the following statement describing the RCIC system response if no operator action is taken?

The RCIC turbine will...

- remain at minimum speed.
- trip on high RPV water level.
- trip as soon as the signal is lost.
- trip on overspeed and remain shutdown.

ANSWER: b.

REFERENCE:

B.02.03-02

NEW

HIGHER

K/A: 217000K3.01 Knowledge of the effect that a loss or malfunction of the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) will have on the following: Reactor water level

JUSTIFICATION: In automatic flow control mode, the RCIC system flow controller compares the pump flow with the controller-setpoint and generates a signal proportional to the difference. Controller output of 4 mA to 20 mA corresponds to turbine speeds of 2000 rpm to 4500 rpm, respectively. On an RCIC initiation, the ramp generator output is the most limiting and turbine speed is increased at a rate determined by the ramp slope. The flow controller output will drop from 20 mA as the RCIC flow approaches the setpoint value. At some point the controller output becomes the most limiting signal as the ramp generator output approaches saturation, and turbine speed is controlled by the flow controller. Therefore, in this situation, the RCIC turbine speed would increase due to the loss of flow signal and continue to operate at 4500 rpm until the turbine tripped on high water level.

- incorrect: As described above, these conditions will not occur.
- correct.
- incorrect: As described above, these conditions will not occur.
- incorrect: The overspeed trip mechanism operates at approximately 5535-5715 rpm.

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QUESTION # 039

The plant was operating at rated conditions when the following events occurred:

0800:00	A LOCA & Loss of ALL Offsite Power occurs
0800:10	BOTH Essential AC Busses are re-energized
0800:15	3-A-41 (AC INTERLOCK) is received
0800:45	3-A-38 (REACTOR LOW LOW LEVEL) is received
0801:15	8-B-18 (NO. 15 4160V BUS LOCKOUT) is received
0802:00	3-A-38 (REACTOR LOW LOW LEVEL) clears.

Based on the above timeline, which one of the following describes the expected response of the ADS valves, and why?

- At 0801:52 the ADS valves will OPEN due to the ADS timer having timed out.
- At 0802:32 the ADS valves will OPEN due to the ADS timer having timed out.
- The ADS valves will REMAIN CLOSED due to the receipt of a 15 Bus LOCKOUT.
- The ADS valves will REMAIN CLOSED due to the RPV Low-Low level condition clearing.

ANSWER: d.

REFERENCE:

B.03.03-01

BANK

HIGHER

K/A: 218000K4.01 Knowledge of ADS SYSTEM design feature(s) and/or interlock(s) which provide for the following: Prevent inadvertent initiator of ADS logic.

JUSTIFICATION: In order for the ADS System to initiate, the following two signals are required.

- 100 psig discharge pressure from a low pressure ECCS pump (This causes the AC Interlock alarm) AND
- RPV level below -47" (This causes the Reactor Low-Low Level alarm).

The above conditions are present at time 0800:45. If the AC interlock clears at any time the ADS timer stops or the valves will close. However, the Low-Low level signal clearing can only stop the timer (107 seconds or 1 minute 47 seconds). Since the timer had not timed out (75 seconds) before the Reactor Low-Low Level cleared, the ADS SRVs will not get an open signal and thus prevent an inadvertent initiation.

- incorrect: This only would be 67 seconds on the timer. Commonly performed calculation error to incorrectly transpose 107 seconds with 1 minute 7 seconds.
- incorrect: This would be the full 107 seconds, but since the low level condition cleared the valves won't open.
- incorrect: This would keep the valves close if it were the only source of power left. However, 16 Bus is still energized and the Division 2 low pressure ECCS pumps will be running.
- correct

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QUESTION # 040

During a surveillance test, LS-2-3-657C & D trip settings are found to be out of tolerance.

Given NH-36242 (P&ID VESSEL INSTRUMENTATION NUCLEAR BOILER SYSTEM), which of the following trip logics will be affected by the out of tolerance switches?

- a. Reactor Scram logic
- b. Group 1 Isolation logic
- c. Group 2 Isolation logic
- d. ATWS Recirc Pump trip logic

ANSWER: b.

REFERENCE: NH-36242

NEW

HIGHER

K/A: 223002K6.04 Knowledge of the effect that a loss or malfunction of the following will have on the PRIMARY CONTAINMENT ISOLATION SYSTEM: Nuclear boiler instrumentation

JUSTIFICATION: The print identifies that these two level switches feed into the following logic strings; Trip of Recirc Pump, Initiate Closure of Main Steam Line (Group 1) & RWCU Isolation Valves (Group 3). The Recirc Pump trip is based on the -47 inch RPV level drive motor breaker trip and NOT the ATWS field breaker trip.

- a. incorrect: This logic does not provide a Low level Scram signal or Group 2 Isolation signal, this is fed from LIS-2-3-657A and B respectively.
- b. correct.
- c. incorrect. See (a.) above.
- d. incorrect: ATWS Recirc Pump Trip logic is fed from LIS-2-3-680A and C respectively. The Recirc Pump trip shown for LS-2-3-657C and D is based on the -47 inch RPV level drive motor breaker trip and NOT the ATWS field breaker trip.

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QUESTION # 041

The plant is operating at rated conditions when the following annunciator is received:

5	CONTAINMENT SPRAY FLOW LOW	6	CORE SPRAY PUMP 11 PWR FAILURE	7	HPCI STEAM LINE HI DIF PRESS	8	HPCI PUMP LOW SUCTION PRESS
13	CORE SPRAY I NOZZLE HI DIF PRESS	14	CORE SPRAY PUMP 11 OL/MAN-OVRD	15	HPCI SYSTEM LOW FLOW	16	HPCI PUMP HI SUCTION PRESS
21	CORE SPRAY I HI PRESS VLV LEAKAGE	22	CORE SPRAY PUMP 11 LOCKOUT	23	COND STORAGE TANK LOW LEVEL	24	HPCI SUPPRESSION CHAMBER HI LEVEL
29	CORE SPRAY I VLV MOTOR OL	30	REACTOR LOW PRESS	31	HPCI TURBINE TEST	32	GLAND SEAL COND HOTWELL HI LEVEL
37	CORE SPRAY SYS I INJ VLV MOT OL	38	REACTOR LOW LOW LEVEL	39	HPCI TURBINE TRIPPED	40	GLAND SEAL DRAIN PRESS HI
45	AUTO BLOWDOWN IN TEST STATUS	46	N2 LOW PRESSURE SRVS, INBD MSIVS, OTBD T-RINGS, HPV	47	CORE SPRAY ISOL VLV 1751 BYPASS	48	N2 LOW PRESSURE SRVS, INBD T-RINGS
53	AUTO BLOWDOWN FAULTY TEST PROCEDURE	54	CORE SPRAY SUCT VLV 1741 CLOSED	55	HPCI MOTOR OL AUX. ANNUNCIATOR	56	RHR PMP 11/13 NO SUCT AUTO TRIP

C03-A

The Out Plant Operator reports that Alternate N₂ Train B pressure is 195 psig and lowering.

Which of the following combinations of Safety Relief Valves (SRVs) will be affected by current plant conditions?

- a. A, B & G
- b. A, B & E
- c. C, H & F
- d. C, D & H

ANSWER: c.

REFERENCE:

B.8.4.3-05

**BANK
HIGHER**

K/A: 239002K6.02 Knowledge of the effect that a loss or malfunction of the following will have on the SRV System: Air (Nitrogen) supply.

JUSTIFICATION: 3-A-46, alarms setpoint is at 200 psig from PS-4237 on Alt Nitrogen System Train B bottle rack.

- Train A supplies one ADS SRV (A), one Lo-Lo Set SRV (E), and B SRV. It also supplies the INBD T-Rings.
- Train B supplies one ADS SRV (C) one Lo-Lo Set SRV (H) and F SRV. It also supplies the INBD MSIVs, OTBD T-rings and the HPV.

The candidate must recognize which train is affected by systems affected on the annunciator. Additionally losing the Alt N₂ supply to SRVs renders them inoperable.

- a. incorrect: SRV A is supplied by Train A and SRV G doesn't have Alt N₂ backup.

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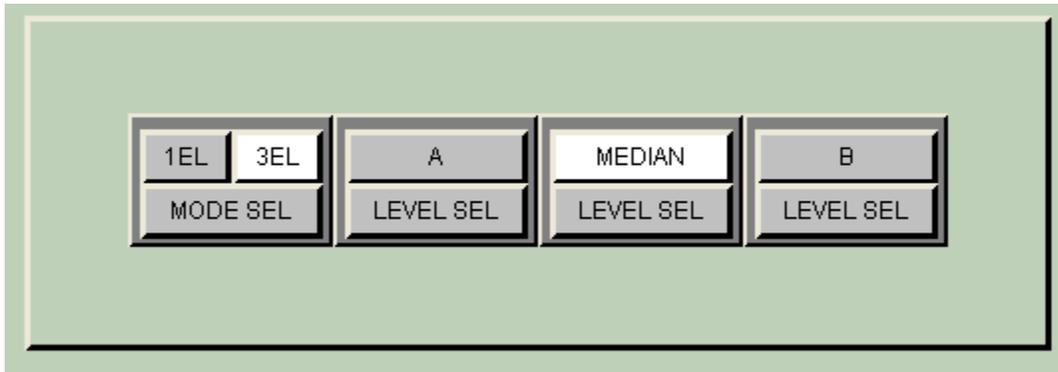
- b. incorrect: These are supplied by Train A.
- c. correct
- d. incorrect: SRV H doesn't have Alt N2 backup.

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QUESTION #42

The plant is operating at rated conditions with the following level inputs to the Digital Feedwater Level Control System (DFLC):

- LI-2-3-85A (REACTOR VESSEL WATER LEVEL) reads 34 inches
- LI-6-94A (FW REACTOR VESSEL A LEVEL CONTROL) reads 35 inches
- LI-6-94B (FW REACTOR VESSEL B LEVEL CONTROL) reads 36 inches



Given the DFCLC mode of operation in the picture, what will be the final status of DFCLC if LI-6-94A instantaneously lowers to 23 inches due to a leak in its variable leg sensing line? (Assume the leak doesn't affect the indication of LI-2-3-85A or LI-6-94B.)

- DFCLC will shift to 1EL and use LI-6-94B as its level input.
- DFCLC will shift to 1EL and use LI-2-3-85A as its level input.
- DFCLC will remain in 3EL and automatically use LI-6-94B as its level input.
- DFCLC will remain in 3EL and automatically use LI-2-3-85A as its level input.

ANSWER: d.

REFERENCE:

B.05.07-02

BANK

HIGHER

K/A: 259002A1.01 Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER LEVEL CONTROL SYSTEM controls including: Reactor water level.

JUSTIFICATION: A 10 inch deviation of any of the three level signals from the median (middle) value will result in annunciator 5-B-48 (FW CONTROL SIGNAL FAILURE) alarm but either A, Median, or B may still be selected. An attempt to choose a failed (out of range, high or low) signal results in a Median Selection. In this case with Median control selected and the A (median) instrument drifting low out of range, DFCLC will use Median control and select the middle level input which is from LI-2-3-85A at 34 inches.

- incorrect: DFCLC will not shift to single element and not use the B FW level instrument.

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- b. incorrect: DFLL will not shift to single element.
- c. incorrect: DFLL will shift to Median control and use the safeguards level instrument for an input.
- d. correct

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QUESTION # 043

The plant is operating at rated conditions. SBGT A has been running for 15 minutes due to a valid initiation signal.

If V-EF-17A (SBGT A EXHAUST FAN) trips from an electrical fault, which of the following correctly predicts the SBGT System automatic response?

- a. SBGT B will start 10 seconds after SBGT A flow lowers to **2800** CFM.
- b. SBGT B will start immediately after SBGT A flow lowers to **2800** CFM.
- c. SBGT B will start 10 seconds after SBGT A flow lowers to **3000** CFM.
- d. SBGT B will start immediately after SBGT A flow lowers to **3000** CFM.

ANSWER: b.

REFERENCE:

B.04.02-01

NEW

HIGHER

K/A: 261000A2.01 Ability to (a) predict the impacts of the following on the SBGT SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: Low system flow.

JUSTIFICATION: If the SBGT A trips the B train will auto start when flow is less than 2800 CFM. The 10 second time delay is associated with the initiation signal. Since the initiation signal has been present for 15 minutes the 10 second time delay has already timed out.

- a. incorrect: Plausible response for misunderstanding of the auto start logic.
- b. correct
- c. incorrect: 3000 CFM is the setpoint for the low flow alarm. Plausible system response for misunderstanding of the setpoint and/or the auto start logic.
- d. incorrect: See (c.) above

NOTE: Only part (a) of the K/A matched IAW NUREG 1021 ES-401 D.2.a. Writing this question to also match the second portion would result in an SRO ONLY question.

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QUESTION # 044

The plant is at normal rated conditions when the following occurs on 15 and 16 Bus:

TIME	15 AND 16 BUS VOLTAGE
00:00:00	4300 volts
00:00:01	3950 volts
00:00:02	3913 volts
00:00:03	3009 volts
00:00:04	3011 volts
00:00:05	3015 volts
00:00:06	3010 volts
00:00:07	3012 volts
00:00:08	0 volts
00:00:11	0 volts
00:00:13	4260 volts

Based on the above timeline, which of the following is correct?

- At 00:00:02 the EDGs automatically started.
- At 00:00:13 the EDGs loaded onto their respective bus.
- At 00:00:08 the degraded essential bus voltage logic is blocked and the loss of essential bus voltage logic is actuated.
- At 00:00:11 the degraded essential bus voltage logic trips OPEN 152-308 (13/15 Bus Tie) and 152-408 (14/16 Bus Tie).

ANSWER: c.

REFERENCE:

B.09.06-01

BANK

HIGHER

K/A: 262001A3.02 Ability to monitor automatic operations of the AC DISTRIBUTION SYSTEM including: Automatic bus transfer.

JUSTIFICATION: If at any time loss of voltage (2345-2905 volts) occurs while the degraded (3913-3927 volts) voltage logic timer (8.8 to 9.2 sec.) is actuated, the degraded logic is locked out and the 5 and 10 second time delay relays are actuated.

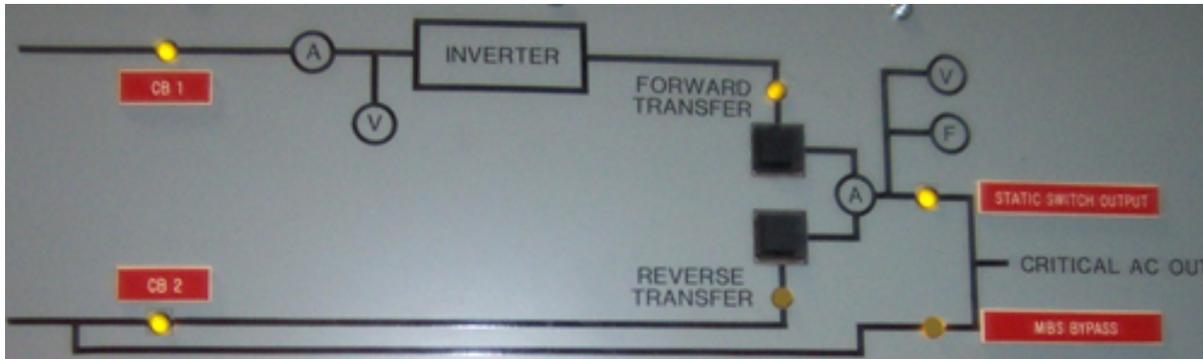
- incorrect. EDGs do not start when the degraded logic is actuated. The EDGs will start when the degraded voltage timers time out or immediately when loss of voltage logic is actuated.
- incorrect. 1AR accepted load, Diesel would not load bus until 00:00:18
- correct.
- incorrect. Loss of voltage initiated the essential bus transfer.

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QUESTION # 045

The plant is operating at rated conditions when 8-A-24 (DIV 1 INVERTER Y71 TROUBLE) is received in the Control Room. It was determined that Y-71 (DIVISION 1 UPS) experienced a low output voltage condition. Given the following:

- 8-A-24 (DIV 1 INVERTER Y71 TROUBLE) has RESET
- Y-71 (DIVISION 1 UPS) status is now as follows:



Based on the conditions above; which of the following is correct?

- Y71 is currently operating in the ZIP MODE.
- Y71 was manually transferred to the ALTERNATE source
- Y71 has automatically transferred to the ALTERNATE source.
- Y71 automatically transferred to the ALTERNATE and back to the PREFERRED source.

ANSWER: d.

REFERENCE:

B.09.13.01

**NEW
HIGHER**

K/A: 262002A4.01 Ability to manually operate and/or monitor in the control room: Transfer from alternative source to preferred source.

JUSTIFICATION: If there is a fault on the system resulting in a low output voltage (108), the static switch will transfer the load to the alternate source (MCC) until the fault is clear. When the fault is cleared, the NORMAL SEEKING static switch will then transfer the load back to the preferred source (Inverter)

- incorrect: During the ZIP mode the inverter will supply the out put voltage; however, the static switch will only enter the ZIP mode if the alternate source is not available. With the CB2 light lit the alternate source is available.
- incorrect: On a low voltage condition the switch will auto transfer and doesn't require a manual transfer.
- incorrect: Being on the alternate source is plausible for an undervoltage condition, but if this were the case 8-A-24 would not reset.
- correct

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QUESTION # 046

A General Precaution in B.08.07-05 (HEATING AND VENTILATION) states that V-EF-34A or V-EF-34B (BATTERY ROOM EXHAUST FANS) should be operating at all times.

Complete the following statement that describes the reason for this precaution?

Exhaust fan operation...

- a. prevents the buildup of hydrogen gas that is generated as the batteries are charged.
- b. maintains a flow of outside air across the Radiation Monitors for the CRV-EFT system.
- c. ensures Battery Room temperature is maintained above 50°F during the winter months.
- d. ensures Battery Rooms are maintained at -0.25" d/p for secondary containment integrity.

ANSWER: a.

REFERENCE:

B.08.07-05

BANK

FUNDAMENTAL

K/A: 263000K1.03 Knowledge of the physical connections and/or cause-effect relationships between the DC ELECTRICAL DISTRIBUTION SYSTEM and the following: Battery ventilation.

JUSTIFICATION: The Division 1 250 VDC Battery room contains a battery, DC distribution panels and charging equipment. One of the Battery Room exhaust fans should be operating at all times to prevent hydrogen from building up in these rooms.

- a. correct.
- b. incorrect: This is the function of V-EF-40A/B which ventilate the Div II 250 VDC Battery Room
- c. incorrect: This is not a requirement for the operation of these fans.
- d. incorrect: This differential pressure is not required as this Battery room is outside secondary containment.

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QUESTION # 047

With a complete loss of AC power to the 480 Volt UPS Y-91, how long will the No. 17 Battery maintain power to ALL of its connected loads?

- a. 10 Minutes.
- b. 30 Minutes.
- c. 60 Minutes.
- d. 90 Minutes.

ANSWER: **b.**

BANK

FUNDAMENTAL

K/A: 263000 2.1.28 Knowledge of the purpose and function of major system components and controls

JUSTIFICATION: The length of time available for operating Y-91 from the battery is as follows:

- 1) All connected loads for the first thirty minutes of a loss of AC power.
- 2) At the end of thirty minutes from the time both LC-107 and LC-108 lost power, the NO. 13 DG Load Shed logic will trip the three feeds to the computer distribution panels.
- 3) The capacity of No. 17 battery is sufficient to provide power to the UPS for sixty minutes after the three feeds to the computer distribution panels have been tripped.

- a. incorrect: Plausible options for the given conditions as discussed above.
- b. correct.
- c. incorrect. See distractor (a.) above.
- d. incorrect. See distractor (a.) above.

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QUESTION # 048

The plant is operating at rated conditions when a small fire starts in the #11 EDG Room.

Complete the following statement that describes the response of the EDG Room Preaction Sprinkler System?

If a thermal electric detector is activated...

- a. the Wet Pipe system will spray when the fusible link melts.
- b. spray will NOT occur until a second EDG Room detector is activated.
- c. the sprinkler valve opens, immediately spraying water from the spray heads in the #11 EDG Room.
- d. the sprinkler valve opens admitting water to the sprinkler piping but doesn't spray until the fusible link melts.

ANSWER: d.

REFERENCE:

B.08.05-01

BANK

FUNDAMENTAL

K/A: 264000K1.03 Knowledge of the physical connections and/or cause-effect relationships between the EDG SYSTEM and the following: Fire protection system.

JUSTIFICATION: When ambient temperatures reach a high setpoint, the thermal electric detectors actuate opening the sprinkler valve and admitting water to the sprinkler piping. If the temperature in the area of a sprinkler head reaches higher setpoint, the fusible link on that head melts allowing water to flow.

- a. incorrect: This is not a wet pipe system.
- b. incorrect: A second detector isn't required to activate the system
- c. incorrect: Immediate spray will not occur until 160°F when the fusible link melts.
- d. correct.

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QUESTION # 049

The plant is at rated conditions with the 1AR Transformer ISOLATED for modifications. A LONOP then occurs coincident with an ECCS initiation signal.

Complete the following statement for the above conditions.

Nominally, #13 and #14 RHR Pumps will auto start _____ after the LONOP.

- a. 10 seconds
- b. 15 seconds
- c. 20 seconds
- d. 25 seconds

ANSWER: c.

REFERENCE:

B.03.04-02

NEW

FUNDAMENTAL

K/A: 264000K5.06 Knowledge of the operational implications of the following concepts as they apply to the EDG SYSTEM: Load sequencing

JUSTIFICATION: If normal auxiliary electrical power is not available at the time of an ECCS automatic initiation, a 10 second delay is added to allow the two Emergency Diesel Generators to start, come up to speed and for their respective breakers to CLOSE. This will be followed by a 10 second delay before starting 13 & 14 RHR Pumps.

Electrical Power Interlocks:

If normal auxiliary electrical power is available at the time of an ECCS automatic initiation, the starting of the RHR and Core Spray pumps will be delayed to limit the maximum motor starting load. The time delays employed are as follows:

<u>Time</u>	<u>Essential Bus 15</u>	<u>Essential Bus 16</u>
5 seconds	11 RHR Pump	12 RHR Pump
10 seconds	13 RHR Pump	14 RHR Pump
15 seconds	11 Core Spray Pump	12 Core Spray Pump

- a. incorrect: Plausible time for the EDG start time.
- b. incorrect: Plausible start time for 11 and 12 RHR pumps
- c. correct.
- d. incorrect: Plausible start times for Core Spray pumps based on the power loss.

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QUESTION # 050

The plant was operating at rated conditions when a Loss of ALL Offsite Power occurred. Given the following conditions:

- 11 EDG Failed to start
- 12 EDG started and properly loaded
- 13 Diesel Generator started and properly loaded

For the above conditions, which of the following is the expected **power availability** to the Instrument Air Compressors (A/C)?

<u>POWER to 15 A/C</u>	<u>POWER to 16 A/C</u>	<u>POWER to 17 A/C</u>
a. UNAVAILABLE	UNAVAILABLE	UNAVAILABLE
b. AVAILABLE	UNAVAILABLE	AVAILABLE
c. AVAILABLE	AVAILABLE	UNAVAILABLE
d. UNAVAILABLE	AVAILABLE	AVAILABLE

ANSWER: d.

REFERENCE:

B.08.04.01-05

BANK

HIGHER

K/A: 300000K2.01 Knowledge of electrical power supplies to the following: Instrument air compressor.

JUSTIFICATION:

15 A/C Power - LC-103 via 15 Bus from 13 bus or 1AR or 11 EDG

15 A/C load sheds on a loss of power. It does require operator actions to restart the compressor but in this case where 11 EDG failed to start LC-103 will be without power.

16 A/C Power - LC-107 via 13 Bus or from 13 DG

No 16 A/C does not load shed and does not automatically restart but power will be available since 13 DG started and loaded on to LC-107.

17 A/C Power - LC-108 via 14 Bus

No 17 A/C does not load shed and automatically restarts either to run as the lead to supply plant loads or should another compressor supply plant loads, it will go to standby. In this case LC-108 will cross connect with LC-107 and be supplied by 13 DG.

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QUESTION # 051

Which of the following systems/components have their own backup air compressors for use upon a loss of the normal air supply?

- a. RCIC
- b. HPCI
- c. RHRSW
- d. Inboard MSIVs

ANSWER: c.

REFERENCE: B.08.01.03-01

BANK

FUNDAMENTAL

JUSTIFICATION: The RHRSW Heat Exchanger Discharge Valves are normally operated using instrument air. In the event of a loss of instrument air, auxiliary air compressors will supply air to hold the valves closed or to modulate them.

- a. incorrect: These systems do have air operated valves that are backed up with accumulators and/or alternate nitrogen manual connections, however, they do not have their own compressors.
- b. incorrect. See (b.) above.
- c. correct
- d. incorrect: The Outboard MSIVs do have back up air operated compressors (Air Intensifiers) but these are not for use on the inboard MSIVs.

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QUESTION # 052

The plant startup is in progress with RPV level being controlled by RWCU Dump Flow to the Main Condenser. An RBCCW transient occurs resulting in the following conditions:



Based ONLY on the given conditions above, what would be the expected final positions of the RWCU valves listed below?

MO-2397
(DUMP TO HOTWELL)

MO-2398
(INLET OUTBOARD)

MO-2404
(INLET INBOARD)

- | | | |
|-----------|--------|--------|
| a. OPEN | OPEN | OPEN |
| b. OPEN | OPEN | CLOSED |
| c. CLOSED | CLOSED | OPEN |
| d. CLOSED | CLOSED | CLOSED |

ANSWER: b.

REFERENCE:

B.02.02-01

C.4-B.02.05.A

BANK
HIGHER

K/A: 400000K3.01 Knowledge of the effect that a loss of malfunction of the COMPONENT COOLING WATER SYSTEM will have on the following: Loads cooled by CCW.

JUSTIFICATION: An RBCCW malfunction, specifically a loss, will cause RWCU filter Demin temps to rise. If Inlet Filter Demineralizer water temperature is $>140^{\circ}\text{F}$ then the following valves will receive an auto close signal: MO-2399 (RWCU RETURN ISOL), **MO-2404 (DUMP TO HOTWELL)** AND MO-2405 (DUMP TO WCT OR WST).

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- a. incorrect: Plausible to think these valves are only affected by the Group 3 high room temperature isolation and or only the dump valves close on high water temperature.
- b. correct
- c. incorrect: MO-2397/98 would not close. MO-2399 would close. Plausible for confusion between the high room temperature isolation and high water temperature isolation.
- d. incorrect: MO-2397/98 would not close. Plausible to think all would close for a high temperature condition.

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QUESTION # 053

The plant was operating at rated conditions when a Loss of ALL Offsite Power and LOCA occurred.

Which of the following describes when the EDG-ESW pumps will auto start?

- a. When the EDGs reach 125 rpm.
- b. When Drywell pressure reaches 1.84 psig.
- c. When the EDG output breakers close onto their bus.
- d. When Service Water header pressure lowers to 40 psig.

ANSWER: c.

REFERENCE:

B.08.01.02-01

BANK

HIGHER

K/A: 400000K4.01 Knowledge of Component Cooling Water System design feature(s) and/or interlock(s) which provide for the following: Automatic start of standby pump.

JUSTIFICATION: With a loss of all offsite power these pumps will not have power to auto start until the respective EDG output breaker close onto their bus. The EDGs will auto start on the Loss of all offsite power but their standby cooling water pumps will not start until the output breakers close.

- a. incorrect: This is when the pumps normally auto start if power is available on the EDG start.
- b. incorrect: 1.84 psig is an EDG fast start signal, but without power the cooling water pumps will not auto start.
- c. correct
- d. incorrect: Service water normally supplies cooling to the EDG cooling header. 40 psig is the auto start pressure for a standby SWP.

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QUESTION # 054

Complete the following statement that describes where displaced reactor water is sent during a control rod INSERTION?

Displaced reactor water is sent from the CRDM over-piston area...

- a. back to the Reactor.
- b. to the Cooling Water header.
- c. back to the Drive water header.
- d. to the RB Floor and Equipment Drain Tanks.

ANSWER: a.

REFERENCE:

B.01.03-01

NEW

FUNDAMENTAL

K/A: 201003K1.02 Knowledge of the physical connections and/or cause-effect relationships between the CONTROL ROD AND DRIVE MECHANISM and the following: Reactor water.

JUSTIFICATION: Water displaced by the upward movement of the piston flows through the over-piston water port, through directional control valve SV-121, through the exhaust header and into the reactor (through the other CRDs). Water displaced by the piston also flows past the control rod drive seals of the drive being inserted and into the reactor.

- a. correct
- b. incorrect: Although the cooling water header does have relief valves that equalize pressure with the exhaust header, their function is to equalize pressure post scram to minimize differential pressure across the drive piston.
- c. incorrect: Plausible option to think water is recycled back to the drive header during rod movement.
- d. incorrect: This is the correct location for draining displaced reactor water from the result of a reactor scram after the SDV is drained but not for a rod insertion.

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QUESTION # 055

A reactor startup is in progress with the plant in Mode 2. Given the following:

- Control Rod (CR) 22-31 has been single-notch withdrawn to position 10
- The OATC attempts to withdraw CR 22-31 to its withdraw limit, position 12
- CR 22-31 is double-notched to position 14 causing a RWM Withdraw Error

Which of the following identifies the RMCS control rod movement, if any, which will be allowed for the above conditions?

- a. The INSERTION of CR 22-31 **only**.
- b. The INSERTION of **any** withdrawn control rod.
- c. The INSERTION and WITHDRAWAL of CR 22-31 **only**.
- d. None, the RWM must be **bypassed** to allow control rod movement.

ANSWER: a.

REFERENCE:

B.05.02-02

BANK

FUNDAMENTAL

K/A: 201006K3.01 Knowledge of the effect that a loss or malfunction of the ROD WORTH MINIMIZER SYSTEM will have on the following: Reactor manual control.

JUSTIFICATION: The RWM should not allow errors under normal drive speeds. The physics calculations allow a tolerance of 1 notch for these conditions. The only Reactor Manual Control (RMCS) rod movement the RWM will allow is to correct the Withdraw Error that was created when rod 22-31 went past its Withdraw Limit. The Operator must insert rod 22-31 to its Withdraw Limit, position 12, before any other rod movements are permitted by the RWM.

- a. correct.
- b. incorrect: Plausible if examinee believes these conditions will only result in a withdrawal block.
- c. incorrect: Plausible for correction of the error, but a withdraw error will only allow the rod to be inserted.
- d. incorrect: Plausible required action with a control rod out of sequence because anything other than a one notch error would require this.

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QUESTION # 056

The reactor is operating at rated conditions. A tachometer failure on the 11 Recirc MG Set results in the speed signal failing high.

Which of the following describes the Recirc Flow Control response to this failure?

- a. NO effect because the MG Set speed signal is for indication ONLY.
- b. A Scoop Tube Lock will occur LOCKING the actuator in its current position.
- c. The Programmable Logic Controller (PLC) will LOWER 11 Recirc MG Set speed.
- d. A Drive Motor breaker TRIP will occur resulting in the LOSS of the 11 Recirc MG Set.

ANSWER: b.

REFERENCE:

B.05.08-01/06

B.01.04-01

BANK

FUNDAMENTAI

K/A: 202002K4.03 Knowledge of RECIRCULATION FLOW CONTROL SYSTEM design feature(s) and/or interlock(s) which provide for the following: Signal failure detection.

JUSTIFICATION: Protective logic functions monitor the flow control loop and lock the actuator in position if abnormal conditions exist. This protective circuit will generate a scoop tube lock upon sensing a change in MG set actuator position or MG set speed which was not called for by the control room operator. **This failure is MNGP site specific OE (AR 01008012).**

- a. incorrect: The speed indication is feed from the MG set tachometer but it is also sent to the PLC where the lock will be generated.
- b. correct.
- c. incorrect: This is a function provided by the PLC but in this case it won't compensate for the change since it wasn't called for. Prior to the PLC upgrade this type of speed feedback was utilized.
- d. incorrect: Many failures will result in both a scoop tube lock and a drive motor breaker trip but this failure is not one of them.

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QUESTION # 057

The plant is in Mode 1 with control rod manipulations in progress. Control rod 06-31 is being repositioned when annunciator 5-A-11 (ROD OVERTRAVEL) is received.

Which one of the following would you expect to see on the full core display window for control rod 06-31?

- a. Green "00"
- b. "Blank" indication
- c. Red "double dashes"
- d. Green "double dashes"

ANSWER: b.

REFERENCE:

B.05.04-02

BANK

FUNDAMENTAL

K/A: 214000K5.01 Knowledge of the operational implications of the following concepts as they apply to ROD POSITION INFORMATION SYSTEM: Reed switches.

JUSTIFICATION: The rod overtravel annunciator is received when control rod notch position 49 (reed switch 50) is closed. This is an indication of the control rod becoming uncoupled from the CRDM. When Reed switch 50 is closed the window will indicate blank (black and shows no position indication).

- a. incorrect: This is the normal indication for a fully inserted rod.
- b. correct.
- c. incorrect: It is not possible to get red double dashes, however plausible because double dashes are display for the insert overtravel.
- d. incorrect: This is the indication for insert overtravel and 5-A-11 is not received for this overtravel.

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QUESTION # 058

The plant is operating at rated conditions. Traversing In-core Probe (TIP) scans are in progress when a PCIS malfunction results in an inadvertent Group 2 isolation.

Which of the following is correct if the TIP detector didn't automatically retract from the core with the above conditions?

- The TIP Shear Valve must be manually actuated from panel C-13.
- The TIP Ball Valve will automatically close from the Group 2 isolation.
- The TIP Shear Valve will automatically actuate from the Group 2 isolation.
- The TIP detector must be manually retracted THEN the Ball Valve will automatically close.

ANSWER: d.

REFERENCE:

B.05.03-05.H.1

NEW

FUNDAMENTAL

K/A: 215001K6.04 Knowledge of the effect that a loss or malfunction of the following will have on the TRAVERSING IN-CORE PROBE SYSTEM: PCIS.

JUSTIFICATION: When a Group 2 isolation is received, the PCIS logic should retract the cable in fast speed and close the TIP Ball Valve. If the PCIS logic failed to retract the detector then it can be manually retracted from panel C-13 or locally using the hand crank to manually retract the probe,

- incorrect: This would be a correct action to take if containment isolation was imperative due to an actual Group 2 isolation with elevated fission product releases.
- incorrect: With no scans in progress the Ball Valve does receive a close signal. However, in this case, the ball valve won't close until the cable retracts. The cable is suppose to auto retract if a Group 2 isolation is received.
- incorrect: The TIP shear valve doesn't auto actuate; it must be manually fired from the control room.
- correct

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QUESTION # 059

The plant was operating at rated conditions when a LOCA occurred in the Drywell (DW). Given the following:

- DW pressure is 11 psig and slowly lowering
- RPV pressure is 440 psig and slowly lowering
- RPV water level is -184 inches and slowly lowering
- B RHR System status is shown on the following page

Based on the given conditions, complete the following statement concerning the Torus Spray valves?

The Torus Spray valves...

- WILL automatically close when DW pressure is < 1.5 psig.
- WILL automatically close when RPV pressure is < 420 psig.
- SHOULD have automatically closed when RPV water level went < -174 ".
- SHOULD have automatically closed when RPV pressure went < 460 psig.

ANSWER: c.

REFERENCE:

B.03.04-02

NEW

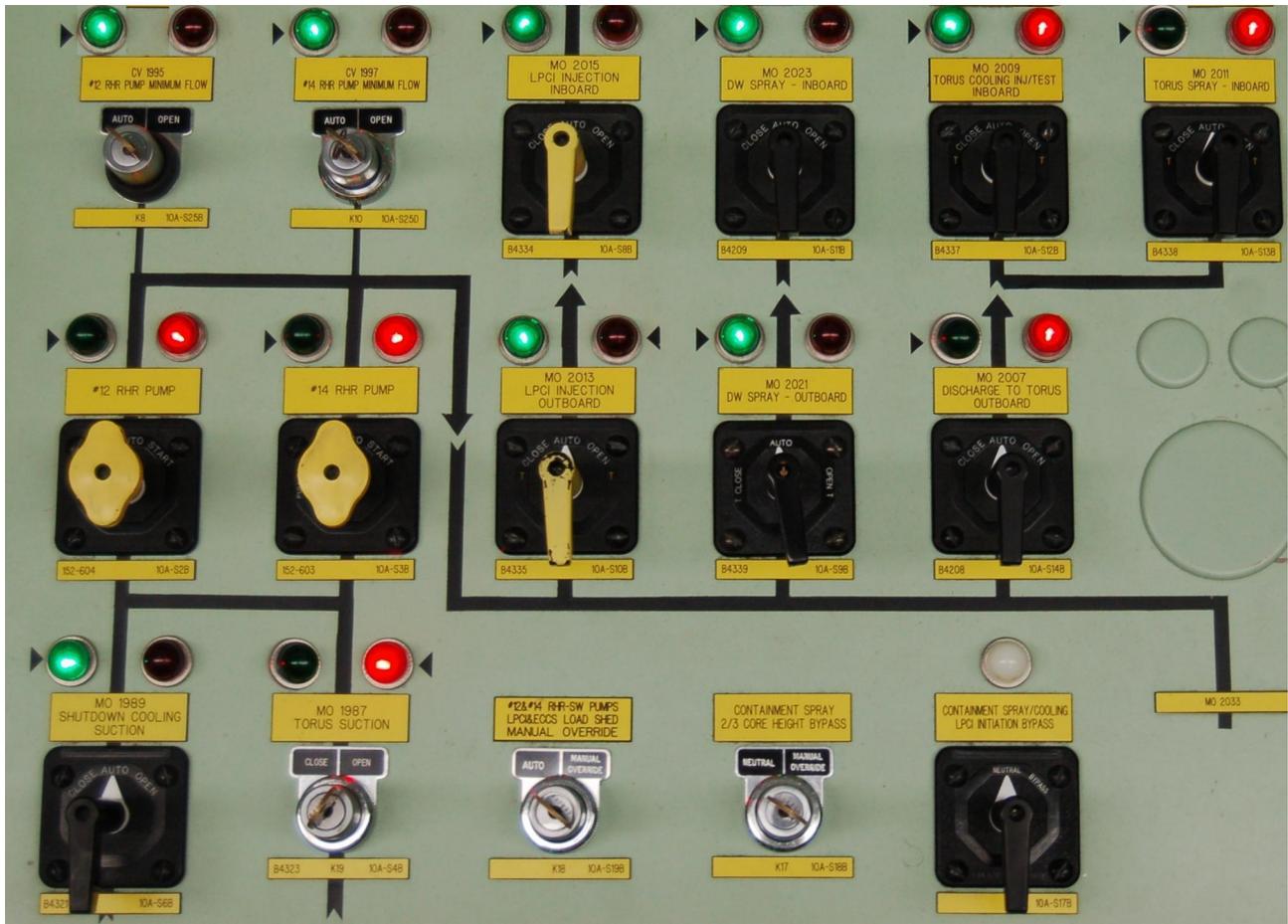
HIGHER

K/A: 230000K6.08 Knowledge of the effect that a loss or malfunction of the following will have on RHR/LPCI TORUS SPRAY MODE: Nuclear boiler instrumentation

JUSTIFICATION: Based on the given conditions, the examinee must determine that the torus spray valves failed to automatically close when RPV level went below -174 " (2/3 Core Height). This would be indicative of an instrumentation failure. Keylocked switch (NEUTRAL-MAN OVERRIDE) 10A-S18B will override the 2/3 core height permissive but the picture shows that this hasn't been overridden. These valves are all interlocked to be automatically closed when a LPCI automatic initiation signal is received. Interlocks are designed to prevent diverting LPCI flow to areas other than the Vessel unless it is necessary or unless the LPCI requirements are satisfied. The Torus spray valves (MO-2006 through MO-2011) cannot be opened when a LPCI initiation signal is present except under the following conditions:

- Reactor water level is greater than 2/3 core height and
 - Drywell pressure is greater than 1 psig.
-
- incorrect: The torus spray valve (MO-2011) will automatically close if DW pressure lowers to $< .75$ psig.
 - incorrect: This would be true, however the LPCI signal is currently bypassed as indicated by the LPCI Initiation Bypass light being out.
 - correct.
 - incorrect: The LPCI initiation signal pressure used to be 460 psig. Plausible to think these valves have already closed on RPV pressure.

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QUESTION # 060

Complete the following statement concerning system component temperatures on a loss of RBCCW from rated power?

The _____ (1) _____ system must be shutdown prior to the outlet temperature of the _____ (2) _____ exceeding 120° F to protect downstream piping from over temperature.

(1)

(2)

- a. CRDH CRD Pump Gear Box oil Cooler
- b. FPCC Fuel Pool Cooling Heat Exchanger
- c. Recirc Reactor Recirc Pump Seal Coolers
- d. RWCU Non-regenerative Heat Exchanger

ANSWER: b.

REFERENCE: C.4-B.02.05.A

BANK

FUNDAMENTAL

K/A: 233000A1.07 Ability to predict and/or monitor changes in parameters associated with operating the FUEL POOL COOLING/CLEANUP SYSTEM: System temperature.

JUSTIFICATION: The FPCC heat exchanger outlet temp must be monitored and FPCC system removed from service before the heat exchanger outlet temp reaches 120°F. The FPCC Heat Exchanger outlet piping is not analyzed for temps above 120°F.

a., c. and d. are incorrect: Plausible RBCCW cooled components, however, these systems don't have temperature concerns for downstream piping.

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QUESTION # 061

The plant was operating at rated conditions when a station power transfer occurred from the 2R to the 1R transformer. A reactor scram was inserted and all system responded as expected.

Which one of the following actions must be taken next to control Reactor Feedwater IAW procedure C.4-A (REACTOR SCRAM)?

- a. Prepare and restart #11 Reactor Feed Pump.
- b. Prepare and restart #12 Reactor Feed Pump.
- c. Control RPV water level using HPCI and/or RCIC.
- d. Control RPV water level with the Low Flow Reg valve.

ANSWER: d.

REFERENCE:

B.09.06-01

C.4-A

NEW

HIGHER

K/A: 259001A2.06 Ability to (a) predict the impacts of the following on the REACTOR FEEDWATER SYSTEM; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those abnormal conditions or operations: Loss of AC electrical power.

JUSTIFICATION: On a station power transfer, all plant busses will transfer to the 1R transformer with the exception of 12 bus. This is to prevent a second feed pump from starting and complicating the electrical situation. 12 Reactor Feed pump is powered from 12 bus so it will not be running. 11 Reactor Feed pump will remain running and will be sufficient to maintain level post scram. Therefore RPV level will be maintained on the low flow feedwater regulating valve.

- a. incorrect: Assuming the power transfer occurs correctly, 11 RFP will remain running.
- b. incorrect: This pump can not be used as 12 Bus will be de-energized. If 12 Bus didn't re-power correctly then 12 Bus would get re-powered and 12 RFP would start.
- c. incorrect: Plausible C.4-A action to take if the RFPs aren't available.
- d. correct

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QUESTION # 062

The plant is operating at rated conditions. Given the following:

- At 1800 **RM-17-150A** (OG Pretreatment Radiation Monitor) failed downscale
- At 1815 **RM-17-150B** (OG Pretreatment Radiation Monitor) failed upscale

Which of the following, if any, will occur for the above conditions?

- a. At 1845, main condenser vacuum will begin to degrade.
- b. At 1830, AO-7557A/B (A & B RECOMBINER CDSR OUT) will close.
- c. At 1830, AO-1085A/B (11 & 12 A/E 2ND STAGE SUCTION ISOLATIONS) will close.
- d. None, the trip logic requires 2 upscale OR 2 downscale trips to initiate an Off-Gas isolation.

ANSWER: a.

REFERENCE:

B.07.02.01-02

BANK

HIGHER

K/A: 271000A3.07 Ability to monitor automatic operations of the OFFGAS SYSTEM including: Process radiation monitoring system indications.

JUSTIFICATION: With one radiation monitor upscale and one downscale a 30 minute timer will start. After 30 minutes AO-1085 A/B will close and AO-7557 A/B will close. The Main Condenser Off-Gas isolation will occur at 1845. Condenser vacuum will lower to the point that results in a reactor scram and turbine trip.

- a. correct.
- b. incorrect: These valves will not automatically close until 1845
- c. incorrect: AO-1085 A/B will not automatically close until 1845.
- d. incorrect: One upscale and one downscale will result in an actuation of the off gas timers and condenser isolation in 30 minutes.

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QUESTION # 063

The plant was operating at rated conditions with an outside air temperature of 95°F. A loss of MCC-111 occurred resulting in a PCIS Group I Isolation.

Based on the loss of MCC-111, which of the following is a valid cause for this isolation?

- a. A loss of RPS logic power will directly cause this isolation.
- b. A loss of PCIS logic power will directly cause this isolation.
- c. A loss of Drywell ventilation will cause this isolation on high temperature.
- d. A loss of Reactor Building ventilation will cause this isolation on high temperature.

ANSWER: d.

REFERENCE:

C.4-B.04.01.B

B.05.06-02/05

B.05.11-05

NEW

HIGHER

K/A: 288000A4.02 Ability to manually operate and/or monitor in the control room: Area temperature.

JUSTIFICATION: A loss of MCC-111 will cause 'A' RB Vent and 'A' Fuel Pool radiation monitors to lose power. This causes these monitors to fail upscale which results in a Partial Group 2 isolation. This isolation will result in the loss of Reactor Building ventilation (V-AC-10A&B) which will cause temperatures to rise in the Main Steam Chase. At temperatures of 195°F-200°F, a PCIS Group 1 isolation will occur. Based on the high outside air temperature, procedural precautions remind the operators to monitor steam chase temperatures from the control room because an isolation would be possible.

- a. incorrect: Although half of the RPS logic power is lost and power to Group 1 instruments is lost, this will not directly cause a Group 1 isolation.
- b. incorrect: Although half of the PCIS logic power is lost and power to Group 1 instruments is lost, this will not directly cause a Group 1 isolation.
- c. incorrect: Although it is plausible that Drywell temperature will isolate MSIV due to the inboard valves being inside the Drywell, this is not an input to this isolation logic.
- d. correct.

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QUESTION # 064

What is the MINIMUM emergency event classification level in which the Emergency Response Organization (ERO) is required to be fully activated?

- a. NUE
- b. ALERT
- c. SITE AREA EMERGENCY
- d. GENERAL EMERGENCY

ANSWER: b.

REFERENCE: A.2-001

BANK

FUNDAMENTAL

K/A: 290003 2.4.41 Knowledge of the emergency action level thresholds and classifications.

JUSTIFICATION: The site ERO is activated and staffed in an emergency condition corresponding to an ALERT classification or higher.

- a. incorrect: ERO is not activated for an NUE.
- b. correct
- c. incorrect: The ERO would be activated for this level, but is not the minimum.
- d. incorrect: The ERO would be activated for this level, but is not the minimum.

NOTE: Using the guidance in NUREG 1021 ES-401 D.2.a, question matches K/A description but not the category. There are no EAL concepts for ROs that relate to CR HVAC. Additionally, the exam already contains a question with a K/A related to control room ventilation or emergency filtration.

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QUESTION # 065

Complete the following statement concerning the IRM Detectors.

When FULLY INSERTED, IRM detectors are...

- a. **IN** direct contact with water AND 24 inches **ABOVE** core centerline.
- b. **IN** direct contact with water AND 24 inches **BELOW** core centerline.
- c. **NOT** in direct contact with water AND 24 inches **ABOVE** core centerline.
- d. **NOT** in direct contact with water AND 24 inches **BELOW** core centerline.

ANSWER: c.

REFERENCE: B.05.01.01-01/06

BANK

FUNDAMENTAL

K/A: 290002K1.20 Knowledge of the physical connections and/or cause-effect relationships between the REACTOR VESSEL INTERNALS and the following: Nuclear instrumentation

JUSTIFICATION: IRM detectors are located in a dry tube and can be vertically positioned from 2 ft. above the core centerline (fully inserted) to 2 ft. below the core (fully withdrawn).

- a. incorrect: IRMs are in a dry tube and not in direct contact with water. Plausible for confusion between IRMs and LPRMs.
- b. incorrect: IRMs are in a dry tube and not in direct contact with water. Plausible for confusion between IRMs and LPRMs. Additionally, when fully inserted the detectors are 24 inches above core centerline. This is plausible as when IRMs are fully withdrawn they are 24 inches below core bottom.
- c. correct.
- d. incorrect: When fully inserted the detectors are 24 inches above core centerline. This is plausible as when IRMs are fully withdrawn they are 24 inches below core bottom.

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QUESTION # 066

Which of the following will require a plant page announcement prior to a pre-planned start?

- a. Electric Fire Pump
- b. Mechanical Vacuum Pump
- c. Main Turbine Aux Oil Pump
- d. Emergency Bearing Oil Pump

ANSWER: c.

REFERENCE:

OWI-01.01

B.06.01-05

NEW

FUNDAMENTAL

K/A: 2.1.14 Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc.

JUSTIFICATION: All crew members should ensure that appropriate announcement of pre-planned 4 KV breaker operations occurs in a timely manner. The plant page system should be used for the announcement. Make the announcement twice. In the choices provided, the Main Turbine Aux Oil pump is the only 4 KV breaker (152-510) which is powered from Bus 15.

- a. incorrect: Page announcement not required, 480 V pump.
- b. incorrect: Page announcement not required, 480 V pump.
- c. correct
- d. incorrect: Page announcement not required, this is a 250 VDC Pump.

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QUESTION # 067

How and where can the deluges be initiated for the 1R, 2R and Main Transformers?

- a. A control switch on C-300 (Zonalert Control Room Panel).
- b. A deluge valve in the Northwest corner of the 12 EDG Room.
- c. A deluge valve in the Southeast corner of the East Electrical Equipment Room.
- d. Arming collar pushbuttons on C-08 (Control Room Electrical Distribution Panel).

ANSWER: b.

REFERENCE:

B.08.05-01/03

A.3-37

A.3-15-A

BANK

FUNDAMENTAL

K/A: 2.1.30 Ability to locate and operate components, including local controls.

JUSTIFICATION: Initiation for these transformers is manual and may be accomplished from C-20 (Control Room Fire Panel), or **locally at the deluge valve in the 12 EDG Room** or from a control switch on the outside of the 12 EDG Building.

- a. incorrect: This is a Control Room fire alarm panel only.
- b. correct
- c. incorrect: The deluge valves in this area are only for the 13 Diesel Generator Room.
- d. incorrect: These can be initiated from arming collar pushbuttons in the control room but they are on panel C-20.

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QUESTION # 068

Which of the following represents the discharge canal rate of change temperature limit, if any, when upstream river temperature is 40°F?

- a. 5°F/hr limit on RISING discharge canal temperature.
- b. 5°F/hr limit on LOWERING discharge canal temperature.
- c. 5°F/24 hr limit on LOWERING discharge canal temperature.
- d. There is NO LIMIT due to current upstream river temperature.

ANSWER: b.

REFERENCE:

B.06.04-05

NEW

FUNDAMENTAL

K/A: 2.1.32 Ability to explain and apply system limits and precautions.

JUSTIFICATION: Below 50°F, the Discharge Canal Temperature may NOT decrease more than 5°F/hr. Whenever the upstream river water temperature is ABOVE 50 °F, the Discharge Canal Temperature may increase or decrease at any rate.

- a. incorrect: This is the rate of change temperature limit but not in the rising direction.
- b. correct.
- c. incorrect: Plausible distracter for the <50°F requirement and for confusion between daily average requirements.
- d. incorrect: Plausible for no limits when upstream river temp is >50°F.

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QUESTION # 069

A plant startup is in progress with reactor power at 18%.

Complete the following statement regarding transfer from the FW LOW FLOW REG VALVE to the A MAIN FW REG VALVE.

Caution must be exercised during the manual operation of these valve controllers as...

- a. the controller pushbuttons are two speed in the OPEN direction ONLY.
- b. the controller pushbuttons are two speed in the CLOSE direction ONLY.
- c. the controller pushbuttons are two speed in both the OPEN and CLOSE direction.
- d. the longer each pushbutton is held in the OPEN or CLOSE direction, the faster the signal changes.

ANSWER: c.

REFERENCE:

B.05.07-05.D.1

BANK

FUNDAMENTAL

K/A: 2.2.2 Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.

JUSTIFICATION: Feedwater controllers have a two speed controlling function, depressing the open or close pushbuttons halfway will cause slower response than depressing the buttons fully.

a., b. and d. are incorrect: These represent plausible but incorrect variations on the operation of these controllers during operation from shutdown and designated power levels.

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QUESTION # 070

A plant startup is in progress with RPV pressure at 685 psig and both Recirc loops in service.

Which of the following would be a Safety Limit violation with the above conditions?

- a. MCPR lowered to 1.35
- b. Reactor power rose to 27%
- c. Rated core flow lowered to 8%
- d. RPV water level lowered to -50 inches

ANSWER: b.

REFERENCE:

TS LCO 2.1.1.1

BANK

FUNDAMENTAL

K/A: 2.2.22 Knowledge of limiting conditions for operations and safety limits.

JUSTIFICATION: With reactor steam dome pressure <785 psig **OR** <10% rated core flow then THERMAL POWER shall be \leq 25% RTP.

- a. incorrect: This is below the COLR limit but during two loop operation MCPR must remain > 1.15 for the safety limit.
- b. correct.
- c. incorrect: Being < 10% rated core flow by itself is not a safety limit violation.
- d. incorrect: Although this level is below the Low-Low Level trip and initiation setpoint it is not a safety limit violation until level goes below – 126”

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QUESTION # 071

While the plant is operating in Mode 1 a pressure regulator failure causes reactor pressure to rise and stabilize at 1030 psig.

Which of the following represents the Technical Specifications required time allowed to restore pressure to ≤ 1025.3 psig?

- a. 15 minutes
- b. 20 minutes
- c. 30 minutes
- d. 60 minutes

ANSWER: a.

REFERENCE:

TS 3.4.10

BANK

FUNDAMENTAL

K/A: 2.2.38 Knowledge of conditions and limitations in the facility license.

JUSTIFICATION: If Reactor Steam Dome pressure is exceeded it must be restored within 15 minutes. Operation above this limit will not ensure RPV integrity during an overpressure transient.

- a. correct.
- b. incorrect: Plausible time for inoperable control rod scram accumulators.
- c. incorrect: Plausible time for violation of RPV heatup and cooldown rate.
- d. incorrect: Plausible time for various < 1 hour TS action times.

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QUESTION # 072

During an abnormal evolution an operator receives a dose of 11 REM to the eye lenses. CRS approval **was given** to the operator to receive this dose.

In accordance with the 10CFR20 Federal Dose Limits and AWI 08.04.01 "RADIATION PROTECTION PLAN", which, if any, dose limits have been exceeded?

- a. NEITHER limit has been exceeded
- b. ONLY the AWI limit has been exceeded
- c. ONLY the 10CFR limit has been exceeded
- d. BOTH the 10CFR and AWI limits have been exceeded

ANSWER: b.

REFERENCE: AWI-08.04.01

BANK

HIGHER

K/A: 2.3.4 Knowledge of radiation exposure limits under normal or emergency situations.

JUSTIFICATION:

The 10CFR 20 Limit for Lens of the Eye is 15 Rem. Without 1st line supervisor approval the AWI limit is up to 40% of 15 Rem, or 6 Rem. With 1st line supervisor approval the AWI limit is 40-60% or 6-9 Rem. 11 Rem exceeds the AWI limits

a., c., and d. are incorrect: Plausible choices for lack of knowledge on radiation limits and/or approval allowances and/or miscalculation.

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QUESTION # 073

The following coolers are supplied by the Reactor Building (RB) Service Water header:

1. V-AC-6 (RCIC ROOM COOLER)
2. V-AC-7A/B (CRD ROOM COOLERS)
3. V-AC-8A/B (HPCI ROOM COOLERS)
4. V-AC-9 (RB 985' ELEVATION COOLER)

Which of the coolers listed above are monitored for Service Water outlet radiation prior to leaving the **Reactor Building**?

- a. 1 and 3 ONLY
- b. 1, 2 and 3 ONLY
- c. 2, 3 and 4 ONLY
- d. ALL are monitored by RM-17-351 (RB SW RAD MON) prior to leaving the RB.

ANSWER: c.

REFERENCE:

B.08.01.01-01

NH-36664 (P&ID M-112

NEW

FUNDAMENTAL

K/A: 2.3.15 Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarm, portable survey instruments, personnel monitoring equipment, etc.

JUSTIFICATION: All service water from the reactor building, except the discharge from V-AC-6 RCIC Room Air Cooling Unit, is monitored for radiation before it leaves the plant. Discharge from the V-AC-6 is monitored by the discharge canal sample radiation monitoring system. For the service water discharge pipe a signal proportional to the radiation level is transmitted to an indicating recorder located on Panel C-10 in the Control Room. The recorder is equipped with a switch to alarm annunciator 4-A-23 (LIQUID PROCESS HI RADIATION) when a high radiation level is reached or exceeded.

- a. incorrect: Plausible choice for RB Steam Systems.
- b. incorrect: Plausible choice as all 3 are specific room coolers.
- c. correct.
- d. incorrect: Plausible choice to monitor all discharges leaving the RB.

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QUESTION # 074

The plant is operating in Mode 1 on the weekend with ONE duty crew on-site. The control room receives a report of a fire in Warehouse 6.

Based on the conditions above, what action is required to be taken by the Fire Brigade IAW the A.3 (FIRE FIGHTING) procedures?

- a. All fire brigade members must report to Warehouse 6 and attempt to contain and/or extinguish the fire.
- b. Notify the Monticello Fire Department and provide them with isolation and direction to contain and/or extinguish the fire.
- c. Notify Security to direct fire fighting activities for the Monticello Fire Department because the fire is outside the Protected Area.
- d. The Duty Chemist and RP Technician must attempt to contain and/or extinguish the fire until additional fire brigade members report on-site.

ANSWER: b.

REFERENCE:

A.3-002

AWI-08.06.01 FIG 5.2

BANK

FUNDAMENTAL

K/A: 2.4.27 Knowledge of "fire in the plant" procedures.

JUSTIFICATION: The examinee must first determine that warehouse 6 is outside the protected area then determine the fire fighting requirements. In the case of a fire outside the protected area, when only one fire brigade is available, that brigade shall provide isolation and direction for the Monticello fire department and its surrounding departments.

- a. incorrect: This action is not taken unless 2 or more brigades are on-site.
- b. correct
- c. incorrect: Although the fire is outside the protected area, security personnel are not qualified in fire fighting strategies.
- d. incorrect: Although the Duty Chemist and RP Technician are not operators, they are fire brigade members and would not be dispatched for this fire.

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QUESTION # 075

The plant is operating at rated conditions when a fire occurs in the control room requiring IMMEDIATE control room evacuation. Given the following conditions:

- 15 minutes later annunciator 292-A-3 (Loss of Voltage Bus No. 16) alarms.
- ALL appropriate C.4-C actions are taken AND Bus 16 voltage is restored from 1AR.

Which one of the following identifies automatic control features, if any, that have been **DISABLED**?

- a. Auto start of #12 RHR Pump and auto start of #12 EDG.
- b. Auto start of #14 RHR Pump and auto start of #14 ESW pump.
- c. Auto start of #12 RHR Pump and operation of LO-LO Set SRVs.
- d. None, ALL automatic control features associated with a loss of voltage are enabled.

ANSWER: a.

REFERENCE:

B.05.17-01

B.05.17-02

C.4-C

BANK

HIGHER

K/A: 2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.

JUSTIFICATION: Based on the initiating conditions, C.4-C has been entered and Part A of C.4-C has been completed, transferring 12 EDG control to the ASDS panel. When the normal voltage is lost C.4-C directs that the operator transfer control of the bus and restore power. This transfer at the ASDS Panel will disable the following automatic control features:

Auto start of #12 Core Spray Pump, Auto start of #14 ESW Pump, Auto start of #12 EDG, Auto start of #12 RHR Pump, Automatic load sequencing of ECCS pumps onto #12 EDG

- a. correct.
- b. incorrect: Auto start features are not disabled form 14 RHR Pump
- c. incorrect: Although LO-LO Set SRVs are controlled from the ASDS Panel their auto function is not disabled.
- d. incorrect: Plausible if examinee doesn't realize that the required actions for loss of voltage are to transfer control of bus 16 to the ASDS Panel. This will disable the control features listed above.

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QUESTION 076

The plant is operating at rated conditions when an electrical transient occurs. While the panel operators are investigating the cause, you observe the following indications on the C-03 Mimic Bus (See Picture on following page).

Based on the indications, determine the extent of the electrical transient AND what Technical Specification Action is required as the CRS?

- a. **ONLY** a loss of D312 (Div 2 250V DC MCC) has occurred.
Direct the isolation of ONE penetration flow path within 4 hours.
- b. **ONLY** a loss of D312 (Div 2 250V DC MCC) has occurred.
Direct the Isolation of ONE penetration flow path within 8 hours.
- c. A loss of D313 (Div 1 250V DC MCC) **AND** D312 (Div 2 250V DC MCC) has occurred.
Direct the Isolation of ONE penetration flow path within 4 hours.
- d. A loss of D313 (Div 1 250V DC MCC) **AND** D312 (Div 2 250V DC MCC) has occurred.
Direct the Isolation of THREE penetration flow paths within 4 hours.

ANSWER: a.

REFERENCE:

C.4-B.09.09.A

TS 3.6.1.3

REFERENCE PROVIDED DURING EXAM:

TS 3.6.1.3

BANK

HIGHER

K/A: 295004A2.02 Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: Extent of partial or complete loss of D.C power.

JUSTIFICATION: The following valves are shown with no power:

MO-2035 HPCI Outboard which is powered by D312

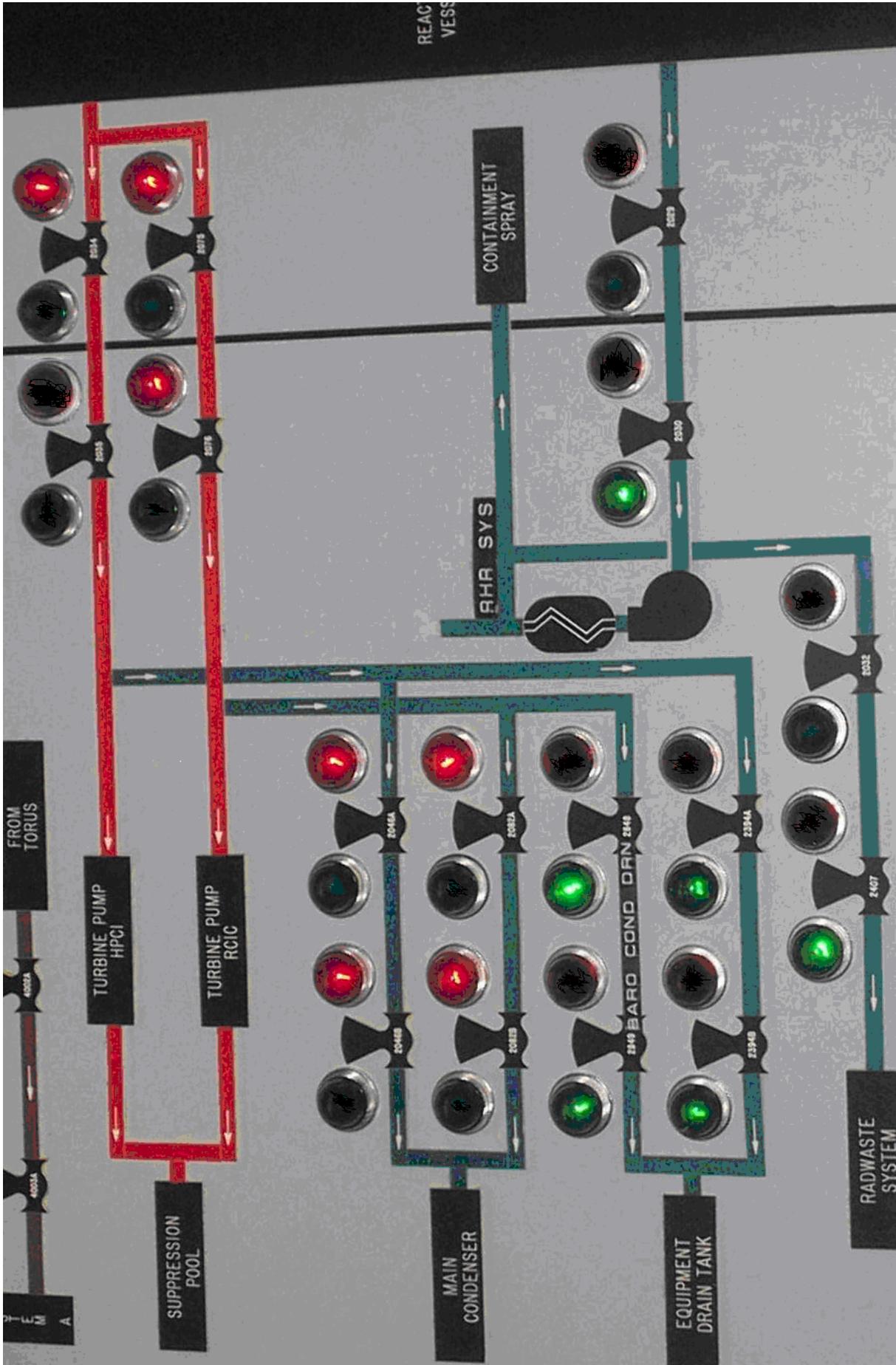
MO-2029 RHR S/D Cooling Inboard which is AC powered and normally de-energized at power

MO-2032 RHR/Radwaste Drain Inboard which is AC powered and normally de-energized at power.

The picture only depicts a loss of power to the HPCI Outboard therefore the electrical transient has only affected ONE (HPCI) penetration flow path. This affected flow path must be isolated within 4 hours IAW TS 3.6.1.3 Condition A

- a. correct
- b. incorrect: This is the correct transient but the 8 hour completion time only applies to MSIVs
- c. incorrect: If D313 was lost, there would be no power to MO-2030.
- d. incorrect: Only one penetration flow path is affected.

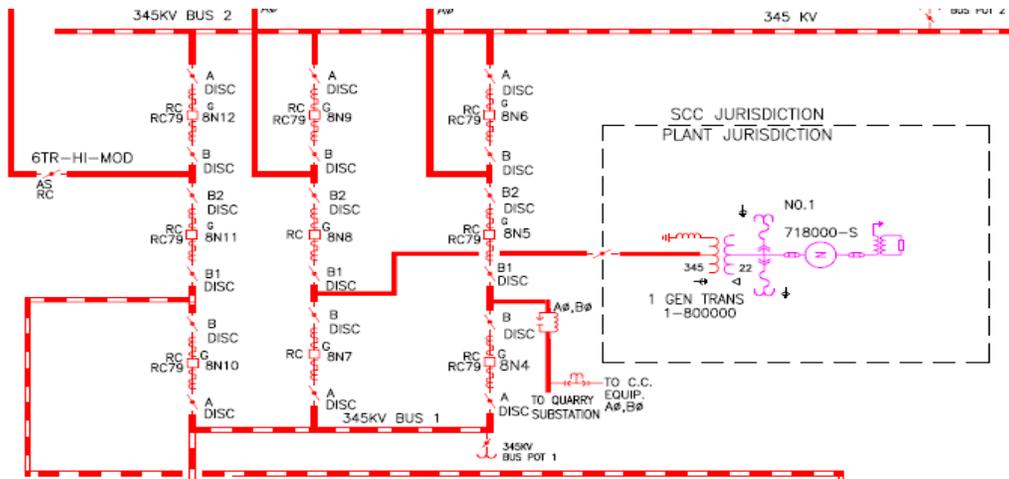
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QUESTION # 077

The plant is operating at rated conditions with 345KV Bus 1 ISOLATED for maintenance. Given the Subyard one-line diagram:



If a Main Generator LOCKOUT occurs with the above conditions, which of the following procedure(s) must be directed by the CRS, and why?

- C.4-B.09.06.A (LOSS OF BUS 12) ONLY, because a station power transfer has occurred.
- C.4-A (REACTOR SCRAM) ONLY, because station power was originally being supplied from the 1R transformer.
- C.4-A (REACTOR SCRAM) ONLY, because station power was originally being supplied from the 2R transformer.
- C.4-A (REACTOR SCRAM) AND C.4-B.09.06.A (LOSS OF BUS 12) because a station power transfer and a reactor scram have occurred.

ANSWER: b.

REFERENCE:

NF-36298-1

B.09.06-01

C.6-008-A-01

NEW

HIGHER

K/A: 295005A2.08 Ability to determine and/or interpret the following as they apply to MAIN TURBINE GENERATOR TRIP: Electrical distribution status

JUSTIFICATION: With 345KV Bus No. 1 isolated, the examinee must determine that plant power is from the 1R transformer. If a generator lockout is received, the 286G relays will actuate and trip 8N7 and 8N8 and will also actuate the 286T relays to trip the main turbine. The trip of the main turbine will cause a scram from the load reject circuitry. Additionally, based on the electrical lineup, the examinee must determine that the electrical distribution status will remain unaffected by the turbine generator trip.

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- a. incorrect: The loss of bus 12 procedure is normally entered on a station power transfer.
- b. correct.
- c. incorrect: The 345KV Bus No. 1 is isolated; therefore, station power would have already been supplied from the 1R transformer. A 2R to 1R station power transfer will not occur.
- d. incorrect: see (c.) above

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QUESTION # 078

The plant is operating at rated conditions. A Loss of Instrument Air occurs resulting in the receipt of alarm 5-B-22 (SCRAM PILOT AIR HEADER HI/LO PRESS).

Based on the conditions above; which procedure must be entered/directed, and why?

- a. C.4-A (REACTOR SCRAM); the backup scram valves will open at this pressure and an automatic reactor scram will occur.
- b. C.4-B.01.03.C (CONTROL ROD DRIFTING); the CRD flow control valve will fail OPEN causing multiple control rods to drift in.
- c. C.5-2007 (FAILURE TO SCRAM); the potential exist for an ATWS condition due to a hydraulic lock in the Scram Discharge Volume.
- d. C.4-K (IMMEDIATE REACTOR SHUTDOWN); random control rods could begin inserting into the core resulting in uneven flux distribution.

ANSWER: d.

REFERENCE:

C.4-B.08.04.01

BANK

HIGHER

K/A: 295019 2.1.20 Ability to interpret and execute procedure steps.

JUSTIFICATION: When air pressure lowers to 60 psig, the CRD HCU scram valves may begin to open causing controls to insert into the core. If the rods begin to insert or alarm 5-B-22 is received, the reactor should be scrammed. The scram prevents uneven flux distribution from random control rod insertion and minimizes the challenges to the CRD system through flooding of the SDV.

- a. incorrect: Following a manual scram this procedure will be entered, but an automatic scram will not occur.
- b. incorrect: This procedure is plausible as control rods will initially appear to drift in due to the lowering scram air header pressure. The CRD flow control valve fails closed on a loss of air and if multiple rods drift though the operators are instructed to execute C.4-K.
- c. incorrect: SDV challenges may exist under these conditions; however this procedure wouldn't be entered preemptively.
- d. correct.

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QUESTION # 079

A normal plant cooldown is in progress with the following conditions:

- Rx Mode Switch in SHUTDOWN
- Reactor coolant temperature is 180°F
- Secondary Containment IS established

A loss of all Shutdown Cooling occurs resulting in the following heatup:

<u>TIME</u>	<u>Reactor Coolant Temperature</u>
00:00:00	180°F
00:15:00	210°F
00:30:00	225°F
00:45:00	235°F
01:00:00	245°F

Based on the indications above, which of the following is a correct action?

- Declare a NUE
- Declare an ALERT
- Enter LCO 3.4.9 Condition A
- Enter LCO 3.4.9 Condition C

ANSWER: b.

REFERENCE:

EAL Matrix

TS 3.4.9

REFERENCE PROVIDED DURING EXAM:

Steam Tables

EAL Matrix

TS 3.4.9

NEW

HIGHER

K/A: 295021A2.04 Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING: Reactor water temperature

JUSTIFICATION: The examinee must be able to correctly correlate the given Reactor Coolant Temperature into an equivalent Reactor Pressure. According to the steam tables, 212°F correlates to 14.709 PSIA and 244°F correlates to 26.844 PSIA, a pressure difference of greater than 10 PSIG should be inferred by the candidate and these two numbers. An ALERT should be declared in accordance with CA4.3 due to the fact that an unplanned event resulted in an RCS pressure increase greater than 10 PSIG.

- incorrect: The conditions ARE met for CU4.1, however, the higher EAL should be declared since conditions for an ALERT are also met.
- correct.

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- c. incorrect: Based on reactor coolant temperature and the mode switch position, the reactor can only be in modes 4 or 5. LCO 3.4.9 condition A is only applicable in Modes 1, 2 and 3.
- d. incorrect: LCO 3.4.9 condition C was not violated based on the information provided due to the fact that reactor coolant temperature did not heat-up greater than 100°F in a one hour period.

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QUESTION # 080

Given the following sets of parameters:

Case1)	Torus Water Temperature, stable at	170°F
	RPV Pressure, stable at	700 psig
	Drywell Pressure, stable at	20 psig
	Torus Water Level, stable at	-3 ft
Case 2)	Torus Water Temperature, stable at	160°F
	RPV Pressure, stable at	800 psig
	Drywell Pressure, stable at	20 psig
	Torus Water Level, stable at	-2 ft

Assuming actions to restore and maintain the above parameters have NOT been successful; determine if an Emergency Depressurization (BLOWDOWN) is required/not required to be directed by the CRS for each of these cases?

- Case 1) BLOWDOWN NOT required.
Case 2) BLOWDOWN NOT required.
- Case 1) BLOWDOWN NOT required.
Case 2) BLOWDOWN required.
- Case 1) BLOWDOWN required.
Case 2) BLOWDOWN NOT required.
- Case 1) BLOWDOWN required.
Case 2) BLOWDOWN required.

ANSWER: c.

REFERENCE:

C.5.1-1200

C.5-1200

REFERENCE PROVIDED DURING EXAM:

EOP Flowchart C.5-1200

BANK

HIGHER

K/A: 295026A2.03 Ability to determine and/or interpret the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Reactor pressure.

JUSTIFICATION: EOP-1200 (PRIMARY CONTAINMENT CONTROL) directs a blowdown based on High/Low Torus water level, high Drywell temperature/pressure, Heat Capacity limit or Pressure Suppression Pressure. Based on the conditions above, only Case 1 would require a blowdown. The SRO examinee can determine this by plotting Drywell pressure vs. Torus level on the Pressure Suppression Pressure Curve Detail O. In Case 1 Detail O is being exceeded and an Emergency Blowdown is required.

a., b. and d. are incorrect: Torus water level, Drywell pressure, Heat Capacity limit Pressure Suppression Pressure are all within limits for Case 2 and a blowdown is not required.

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QUESTION # 081

The plant was operating at rated conditions when a Group 1 isolation and subsequent reactor scram occurred. Reactor power immediately following the scram was 7% but the following conditions now exist:

- RPV level is +20 inches and stable
- RPV pressure is 1030 psig and rising
- Reactor period is -80 seconds and steady
- Reactor power is now on IRM Range 5 and lowering
- Standby Liquid Control (boron) has NOT been injected
- Five (5) control rods are at position 08, all other rods have fully inserted

Based on the conditions above, which of the following must be directed by the CRS?

- a. Perform C.5-3101 (ALTERNATE ROD INSERTION).
- b. Insert the five control rods IAW C.4-A (REACTOR SCRAM).
- c. Stabilize RPV pressure below 1056 psig using the main turbine bypass valves.
- d. Terminate and prevent injection from Condensate & Feedwater, HPCI and LPCI.

ANSWER: **b.**

REFERENCE:

C.5-1100 Flowchart

C.5-2007 Flowchart

C.4-A

REFERENCE PROVIDED DURING EXAM: EOP-1100 & 2007 Flowcharts

BANK

HIGHER

JUSTIFICATION: Based on the given conditions the examinee must interpret control rod position to determine which EOP procedures must be entered. With more than one rod out beyond position 04 the failure to scram EOP must be entered. Once that is entered the examinee must use reactor power and period to determine that the reactor is NOT critical. If the reactor is not critical the Failure to Scram EOP (C.5-2007) directs the exit of the Power Leg and entry into AOP C.4-A. This procedure will direct the insertion of the remaining control rods.

- a. incorrect: If the reactor was critical this would be performed.
- b. correct
- c. incorrect: This action would be directed from EOP-1100 or 2007. However, the MPR would not be available for pressure control because RPV pressure dropped to 820 psig causing an MSIV isolation on <840 in RUN and subsequent reactor scram.
- d. incorrect: This action would be performed if reactor power was >3.5%.

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QUESTION # 082

The plant was operating at rated conditions when the control room receives a report of a fire in the Heating Boiler Room. Given the following:

00:00:00 Fire reported to control room
 00:08:00 Fire Brigade began attacking the fire
 00:16:00 Control Room notified the fire is extinguished

HA2 FIRE or EXPLOSION Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown	HU2 FIRE Within PROTECTED AREA Boundary Not Extinguished Within 15 Minutes of Detection	Table H-1 EAL Classification Areas												
<input type="checkbox"/> HA2.1 <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="width: 20px; text-align: center;">1</td><td style="width: 20px; text-align: center;">2</td><td style="width: 20px; text-align: center;">3</td><td style="width: 20px; text-align: center;">4</td><td style="width: 20px; text-align: center;">5</td><td style="width: 20px; text-align: center;">DEF</td></tr></table> FIRE or EXPLOSION in any of the following areas (Table H-1). AND Affected system parameter indications show degraded performance or plant personnel report VISIBLE DAMAGE to permanent structures or equipment within the specified area.	1	2	3	4	5	DEF	<input type="checkbox"/> HU2.1 <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="width: 20px; text-align: center;">1</td><td style="width: 20px; text-align: center;">2</td><td style="width: 20px; text-align: center;">3</td><td style="width: 20px; text-align: center;">4</td><td style="width: 20px; text-align: center;">5</td><td style="width: 20px; text-align: center;">DEF</td></tr></table> FIRE in buildings or areas contiguous to any Table H-1 area not extinguished within 15 minutes of control room notification or verification of a control room alarm.	1	2	3	4	5	DEF	- Reactor Bldg - HPCI Bldg - Turbine Bldg - Control & Administration Bldg - Diesel Generator Bldg - Diesel Fuel Oil Transfer House - EFT Bldg - Intake Structure - Security Building ¹ - Security Diesel Generator Building ¹ <small>Note 1: These buildings are only considered when classifying per HU2.1, HA3.1 and HA3.2</small>
1	2	3	4	5	DEF									
1	2	3	4	5	DEF									

Given the information above, complete the statement below by determining if an Emergency Plan classification is required? If SO, who assumes the responsibilities of the Shift Emergency Communicator (SEC)? If NOT, why?

Emergency Plan classification...

- a. is required. Shift Security Supervisor
- b. is required. Shift Radiation Protection Technician
- c. is NOT required. The fire was only fought for 8 minutes.
- d. is NOT required. The Heating Boiler is not vital equipment.

ANSWER: a.

REFERENCE:

EAL Matrix

4AWI-08.02.02

BANK

HIGHER

K/A: 600000A2.16 Ability to determine and interpret the following as they apply to PLANT FIRE ON SITE: Vital equipment and control systems to be maintained and operated during a fire.

JUSTIFICATION: The SRO examinee must determine that the Heating Boiler room is contiguous to vital equipment as defined by EAL Table H-1(Turbine Building & Control and Administration building). The SRO examinee must then determine that E-Plan classification HU2.1 applies because the fire is burning longer than 15 minutes. In the case of a fire, the Shift Chemist and Shift RPT are required to report as part of the fire brigade resulting in the Security Shift Supervisor as the only available SEC.

- a. correct

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- b. incorrect: Although the Shift RPT is qualified SEC they must report as a fire brigade members.
- c. incorrect: An E-Plan classification is required because the fire burned longer than 15 minutes.
- d. incorrect: Plausible if examinee doesn't recognize the Heating Boiler is located contiguous to H-1 areas.

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QUESTION # 083

The plant is in Mode 2 with a reactor startup in progress. RPV pressure is 900 psig when a LOCA occurs resulting in the following:

- Drywell Pressure is 5.0 psig and rising
- Drywell Temperature is 282°F and rising
- All available drywell cooling is in service

As the CRS, can Drywell sprays be directed at this time AND why?

- a. Yes; the structural integrity of the drywell is being challenged.
- b. No; Drywell Sprays cannot be initiated when operating in Mode 2.
- c. No; Torus Sprays are always placed in service prior to Drywell sprays.
- d. No; evaporative cooling may cause containment failure or Drywell de-inertion.

ANSWER: d.

REFERENCE:

C.5-1200

C.5.1-1000

NEW

HIGHER

K/A: 295012 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.

JUSTIFICATION: According to C.5.1-1000, evaporative cooling refers to spray droplet heat and mass transfer which occurs when water is sprayed into a superheated atmosphere. This could result in a negative drywell pressure large enough to challenge the negative pressure capability of the primary containment. This is determined through the use of Detail N (Drywell Spray Limit). The SRO examinee must evaluate EOP Figure N to determine that Drywell sprays CANNOT be initiated at this time.

- a. incorrect: Drywell integrity is being challenged at this temperature, however, according to Detail N (Drywell Spray Limit), the examinee must determine that conditions are not met to spray the drywell.
- b. incorrect: This distracter is plausible because EOPs are only applicable in modes 1, 2 and 3. Since there are modes that EOPs would not be applicable, the examinee may choose this option.
- c. incorrect: This would be true if Figure N was met and the examinee only chose to spray the drywell based on Drywell pressure leg; however, Drywell sprays would only be required if the CRS determines that Drywell pressure cannot be maintained below 12 psig. Additionally, in this case the CRS should be executing the Drywell temperature leg which will allow drywell sprays prior to torus sprays.
- d. correct

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QUESTION # 084

The plant was operating at rated conditions when a steam leak occurred in the Steam Chase. Given the following conditions:

- Steam Chase blowout panels ruptured on high D/P
- Turbine Building ventilation has been restarted
- The steam leak is unisolable

Which of the following stable RB Vent Effluent readings would be the HIGHEST allowed that will **NOT** require the CRS to direct C.5-2002 (EMERGENCY DEPRESSURIZATION)?

- 7×10^5 uCi/sec
- 7×10^6 uCi/sec
- 7×10^7 uCi/sec
- 7×10^8 uCi/sec

ANSWER: c.

REFERENCE:

C.5-1400

EAL Matrix

REFERENCE PROVIDED DURING EXAM:

C.5-1400 EOP flowchart

EAL Matrix

NEW

HIGHER

K/A: 295035A2.02 Ability to determine and/or interpret the following as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: Off-site release rate.

JUSTIFICATION: The SRO examinee must recognize the high d/p and ruptured blowout panels will result in entry into EOP C.5-1400 (OFFSITE RELEASE). This EOP requires that the CRS perform an emergency depressurization prior to reaching the General Emergency release limits. From the EAL Matrix the SRO examinee can determine that the RB Vent Effluent GE limit is 1.5×10^8 uCi/sec. Therefore 7×10^7 uCi/sec would be the highest reading before exceeding the limit.

- incorrect: At this level an ED would be allowed but it isn't the highest. Plausible if examinee misreads EOPs and thinks the ED has to be performed before the ALERT level.
- incorrect: At this level an ED would be allowed but it isn't the highest. Plausible if examinee misreads EOPs and thinks the ED has to be performed before the SITE AREA level.
- correct.
- incorrect: This level is above the GE release limit. Plausible if examinee believes the limit has to be exceeded prior to directing the ED.

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QUESTION # 85

The plant was operating at rated conditions when a DBA LOCA occurred. All systems responded as expected and the following conditions now exist:

- RPV water level is +20" and stable
- Drywell pressure is 18 psig and stable
- Drywell temperature is 245°F and stable

Based on the conditions above, which of the following procedures must be directed by the CRS in order to place the H₂/O₂ analyzers in service, AND why?

1. C.4-B.04.01.B (PRIMARY CONTAINMENT GROUP 2 ISOLATION)
 2. C.5-3501 (H₂/O₂ ANALYZER OPERATION)
 3. C.5-3502 (CONTAINMENT SPRAY)
- a. 2 ONLY
This procedure will reset the Group 2 isolation for the H₂/O₂ Analyzer valves.
- b. 1 & 2 ONLY
The entire Group 2 isolation must be reset to allow for H₂/O₂ Analyzer operation.
- c. 2 & 3 ONLY
Drywell temperature must be lowered prior to placing the H₂/O₂ analyzers in service.
- d. 1, 2 & 3
The entire Group 2 isolation must be reset and drywell temperature must be lowered for H₂/O₂ Analyzer operation.

ANSWER: a.

REFERENCE:

C.5-3501

C.5-1200

NEW

HIGHER

K/A: 500000A2.01 Ability to determine and/or interpret the following as they apply to HIGH PRIMARY CONTAINMENT HYDROGEN CONCENTRATION: Hydrogen monitoring system availability.

JUSTIFICATION: Under current plant conditions EOP C.5-1200 (Primary Containment Control) would be entered and would direct the H₂/O₂ analyzers to be placed in service IAW C.5-3501. The H₂/O₂ sample and return valves will be isolated from the Group 2 isolation; however, the H₂/O₂ system has separate reset logic that allows the valves to be opened under Group 2 Conditions. This can be done using the 3501 procedure. Additionally, the 3501 requires that drywell temperature be < 280°F in order for the H₂/O₂ system to be placed in service. The SRO examinee must recognize under the current plant conditions the H₂/O₂ system is available and only the 3501 procedure must be directed.

b. and d. are incorrect: The Group 2 isolation can be reset using the 3501 procedure.

c. and d. are incorrect: Drywell pressure is low enough to allow the 3501 procedure to be performed.

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QUESTION # 86

The plant is at rated conditions with surveillance test 0255-03-IA-1-1 (CORE SPRAY LOOP A QUARTERLY PUMP AND VALVE TESTS) in progress. During the performance of STEP H.20, the BOP operator records an opening time for MO-1751 of 11.0 seconds. As the CRS, you direct the valve to be immediately retested.

Which of the following completes the statement below describing the requirements to maintain compliance with the Inservice Testing Program?

If the retest opening time is _____ (1) _____, then the CRS must _____ (2) _____

- a. (1) 11.0 seconds
(2) declare the valve INOPERABLE because the Limiting Stroke time has been exceeded.
- b. (1) 13.0 seconds
(2) declare the valve OPERABLE because the average of the two stroke times is less than the Limiting Stroke Time.
- c. (1) 9.5 seconds
(2) declare the valve INOPERABLE because the average of the two stroke times exceeds the IST acceptance band.
- d. (1) 10.5 seconds
(2) ensure the data is analyzed within 96 hours to verify that the new stroke time represents acceptable operation OR the valve must be declared INOPERABLE.

ANSWER: d.

REFERENCE:

0255-03-IA-1-1

REFERENCE PROVIDED DURING EXAM:

0255-03-IA-1-1

BANK

HIGHER

K/A: 209001A2.08 Ability to (a) predict the impacts of the following on the LPCS system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Valve openings

JUSTIFICATION: Valves with measured stroke times in their safety related direction which fall outside of the IST acceptance band but do not exceed the LST **SHALL** be immediately retested or declared inoperable. If retested and the second set of data also does not meet the acceptance criteria, the data **SHALL** be analyzed within 96 hours to verify that the new stroke time represents acceptable valve operation or the valve **SHALL** be declared inoperable. OPEN _____ Sec (6.0 - 10.0 Sec) (LST 12.0 Sec)

- a. incorrect: The LST has not been exceeded.
- b. incorrect: The valve would be inoperable because of exceeding LST.
- c. incorrect: The valve would not be inoperable with this retest time.
- d. correct

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QUESTION # 087

Complete the following statement that describes the TRM Bases for the APRM HI Rod Block.

The APRM HI Rod Block setting will...

- a. ensure PCIUTL is not exceeded.
- b. preclude a MCPR safety limit violation.
- c. ensure Peak Fuel Enthalpy is not exceeded.
- d. minimize the consequences of a Control Rod Drop Accident.

ANSWER: b.

REFERENCE:

TRM T LCO 3.3.2.1 Bases

NEW

FUNDAMENTAL

K/A: 215005 2.2.22 Knowledge of limiting conditions for operations and safety limits.

JUSTIFICATION: The APRM control rod block function is provided to prevent excessive control rod withdrawal so that MCPR remains above the Safety Limit

- a. incorrect: Although PCIUTL does protect the fuel from plastic strain of the cladding, it is a conservative administrative preconditioning limit that isn't maintained by the APRM rod block.
- b. correct
- c. incorrect: The RWM rod block ensures peak fuel enthalpy (280cal/gm) is not exceeded and that fuel damage does not occur during a control rod drop accident.
- d. incorrect. See (c.) above.

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QUESTION # 088

The plant was operating at rated conditions with HPCI Out Of Service for planned maintenance. A small LOCA concurrent with a loss of both feedwater pumps occurred and conditions are as follows:

- RCIC has auto initiated
- Drywell pressure is 6 psig and rising slowly
- RPV pressure is 600 psig and lowering slowly
- RPV water level is -50 inches and is now stable
- 'A' RHR has just been placed in the Torus Spray mode

Based on the above conditions; which of the following actions must be directed by the CRS at this time?

- a. Inhibit ADS.
- b. Cooldown using the PRO.
- c. Maximize Torus Spray flow using 'B' RHR.
- d. Restore RPV water level using a condensate pump.

ANSWER: a.

REFERENCE:

C.5-1100

B.03.03-01

NEW

HIGHER

K/A: 218000A2.06 Ability to (a) predict the impacts of the following on the AUTOMATIC DEPRESSURIZATION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: ADS initiations signals present.

REFERENCE PROVIDED DURING EXAM

EOP Flowchart C.5-1100

JUSTIFICATION: The SRO examinee must recognize entry into C.5-1100 (RPV Control) without the need for alternate level control. Since Alternate level control was not needed the step to inhibit ADS in C.5-1100 would not have been performed yet. With RPV water level below - 47 inches and a RHR pump running in the Torus cooling mode the ADS timer will have initiated and the valves may already be open. In the C.5-1100 Preferred level control leg an override exists to inhibit ADS if the timer starts. This step should now be directed to prevent an unnecessary depressurization of the vessel.

- a. correct.
- b. incorrect: The main turbine bypass valves would not be available because RPV water level is < -47 inches and the MSIVs would be closed.
- c. incorrect: Maximum torus spray flow is 300 gpm. Placing an additional division of RHR in this mode will not raise the spray flow.
- d. incorrect: A condensate pump by itself would not inject with RPV pressure at 600 psig.

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QUESTION # 089

The plant was operating in MODE 1 when a common mode failure was discovered to exist with the safety function on a number of Safety/Relief Valves. An extent of condition is being performed.

At this time; what is the minimum number of inoperable SRVs that will require a **4 hour** Non-Emergency NRC notification?

- a. 2 of 8
- b. 3 of 8
- c. 4 of 8
- d. 5 of 8

ANSWER: c.

REFERENCE:

TS LCO 3.4.3

AWI-04.08.02

REFERENCE PROVIDED DURING EXAM

TS 3.4.3

AWI-04.08.02 Figures 5.1-5.3

BANK

HIGHER

K/A: 239002 2.4.30 Knowledge of events related to system operations/status that must be reported to internal organizations or external agencies, such as State, the NRC, or the transmission system operator.

JUSTIFICATION: 7 of the 8 SRVs are required to be operable to meet the LCO. If 3 or more required SRVs are inoperable (4 OF 8), then the plant must be in MODE 3 within 12 hours. This meets the criteria of 10CFR50.72(b)(2)(i), 4 hour notification for plant shutdown required by technical specifications.

a., b. and d. are incorrect: Plausible misinterpretations of the TS requirements and/or the notification requirements.

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QUESTION # 090

The plant is at rated conditions when several valid annunciators are received including the following:

- 3-A-49 (SBGT ANNUNCIATOR)
- 8-A-4 (Y-10/Y-70 INSTR AC LOSS OF VOLTAGE)
- 8-A-24 (DIV 1INVERTER Y71 TROUBLE)

Based on the given conditions, which one of the following procedures, if any, must be directed to mitigate the conditions above?

- a. C.4-B.05.07.A (LOSS OF REACTOR WATER LEVEL CONTROL)
- b. C.4-B.04.01.A (PRIMARY CONTAINMENT ISOLATION – GROUP 1)
- c. C.4-B.04.01.B (PRIMARY CONTAINMENT ISOLATION – GROUP 2)
- d. NONE would be directed without knowing what specific circuit was lost.

ANSWER: c.

REFERENCE:

C.4-B.09.13.F

C.4-B.09.13.F Bases

NEW

FUNDAMENTAL

K/A: 262002A2.01 Ability to (a) predict the impacts of the following on UNINTERRUPTABLE POWER SUPPLY (AC/DC); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Under voltage

JUSTIFICATION: The examinee must recall that 8-A-4 will not be received unless a complete loss of Y-10 and/or Y-70 has occurred. Additionally, the examinee must recall that a loss of Y-70 has occurred and will result in a loss of power to some of the Group 2 Isolation Logic. A Partial Group 2 isolation will occur and that this procedure must be entered.

- a. incorrect: Y-10 and Y-30 auctioneer power to DFWLC; however, control will not be lost as Y-10 and Y-30 will maintain power.
- b. incorrect: Y-70 does supply power to the inboard solenoids for the MSIVs; however, this power is backed up by 125 VDC and entry into this procedure would not be required.
- c. correct.
- d. incorrect: Plausible for not understanding the implications of annunciator 8-A-4.

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QUESTION # 091

The plant was operating at 95% with a down power in progress. While adjusting #11 Recirc Pump, the speed control failed causing a continuous lowering of pump speed. The #11 Recirc Pump scoop tube was locked and the following conditions exist:

- Reactor power is 90%
- 'A' jet pump loop flow is 20 Mlb/hr
- 'B' jet pump loop flow is 24 Mlb/hr

Which of the following Technical Specification actions, if any, are correct for the above conditions and why?

- Be in Mode 3 within 12 hours to satisfy 2/3 core height reflood analyses.
- Match Recirc loop jet pump flows within 24 hours to satisfy LOCA analyses.
- No action required because both jet pump loop flows are currently matched.
- No action required provided the limits of LCO 3.2.1, 3.2.2 and 3.3.1.1 are applied.

ANSWER: b.

REFERENCE:

TS 3.4.1

TS 3.4.1 Bases

B.01.04-01 pg 3

REFERENCE PROVIDED DURING EXAM:

TS 3.4.1

TS 3.4.2

BANK

HIGHER

K/A: 202001A2.06 Ability to (a) predict the impacts of the following on the RECIRCULATION SYSTEM: and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Inadvertent recirculation flow decrease.

JUSTIFICATION: With two recirc loops in operation above 70% reactor power recirc loop flows must be matched within 5% of rated core flow (57.6 Mlb/hr). Based on the given jet pump flows the current mismatch is 7%. This makes LCO 3.4.1 not met with Condition A applicable. This condition requires flows to be matched within 24 hours. The bases for this action is to ensure that during a LOCA caused by a break of the piping of one recirc loop the assumptions of the LOCA analysis are satisfied.

- incorrect: Plausible action requirement and reason for a failed jet pump.
- correct.
- incorrect: Plausible and correct if reactor power was below 70%
- incorrect: Plausible misinterpretation of the LCO action statement.

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QUESTION # 092

The plant is at rated conditions with MO-2021 (RHR DIV 2 DRYWELL SPRAY OTBD) **closed** and its breaker **open** for maintenance activities. While conducting rounds, the Reactor Building Operator reports the following:

- PI-10-115A (A RHR HX DISCHARGE PRESSURE) indicates 27 psig
- PI-10-115B (B RHR HX DISCHARGE PRESSURE) indicates 49 psig

Which of the following Tech Spec REQUIRED ACTIONS and COMPLETION TIMES are required for the above conditions?

- Restore one LPCI subsystem to OPERABLE status within 7 days ONLY.
- Restore a RHR drywell spray subsystem to OPERABLE within 7 days ONLY.
- Restore a RHR drywell spray subsystem to OPERABLE within 7 days AND Restore low pressure ECCS injection/spray subsystem to OPERABLE within 7 days.
- Restore a RHR drywell spray subsystem to OPERABLE within 8 hours AND Restore low pressure ECCS injection/spray subsystem to OPERABLE within 7 days.

ANSWER: d.

REFERENCE:

TS 3.6.1.8

TS 3.5.1

B.03.04-05

NEW

HIGHER

K/A: 2260012.2.36 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.

JUSTIFICATION: With B4339 (MO-2021, RHR DIV 2 DW SPRAY-INBOARD 480V SUPPLY) being OPEN, the Division II DW sprays must be declared inoperable. Also, since Division I keep fill system is not maintaining a minimum of 40 psig in the system, all Division I RHR functions must be declared INOPERABLE. This requires entry of the specified tech spec conditions and required actions.

- incorrect: Plausible if examinee believes that no tech spec entry for Drywell Spray is required.
- incorrect: Plausible if examinee fails to recognize that Div I RHR subsystem is INOPERABLE based on keep fill system pressure.
- incorrect: Plausible if examinee fails to recognize that based on the maintenance occurring, BOTH divisions of DW sprays are INOPERABLE
- correct.

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QUESTION # 093

The plant was operating at rated conditions when a transient occurred resulting in a reactor scram. All control rods fully inserted and conditions are now as follows:

- The MSIVs are OPEN
- SRVs CANNOT be opened
- Drywell pressure is 1.0 psig and slowly rising
- RPV pressure is 400 psig and lowering slowly
- It has been determined that RPV water level is UNKNOWN
- ONLY Division 1 RHR and Core Spray pumps are available for injection

Complete the following statement based on the conditions above.

The CRS **will / will NOT** direct the MSIVs to be CLOSED because...

- a. **will**; the RPV cooldown rate is being exceeded.
- b. **will NOT**; a flowpath must be maintained for minimum steam cooling.
- c. **will**; the pipe hangers are NOT designed for excessive water weight loading.
- d. **will NOT**; this will help depressurize the reactor vessel and raise injection flow.

ANSWER: d.

REFERENCE:

C.5.1-2006

C.5-2006

BANK

HIGHER

REFERENCE PROVIDED DURING EXAM:

EOP flowchart C.5-2006

K/A: 239001A2.13 Ability to (a) predict the impacts of the following on the MAIN AND REHEAT STEAM SYSTEM: and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High reactor water level.

JUSTIFICATION: If no SRV can be opened, RPV pressure may remain high and flooding may not be possible with low pressure systems. If no high pressure motor-driven system is available, the steam lines are then left open to help depressurize the RPV and increase injection flow.

- a. incorrect: Although RPV cooldown rate is approaching 100°F/hr, MSIVs should remain open because the SRVs can't be open.
- b. incorrect: MSIVs will remain open but adequate core cooling at this point should be by RPV Flooding core submergence.
- c. incorrect: Pipe hangar loading stress will occur but MSIVs should remain open because the SRVs can't be open.
- d. correct.

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QUESTION # 094

A reactor startup is in progress with the following conditions:

Time	THERMAL POWER (%)	Steam Flow (lbm/hr)	Chloride ion concentration (ppm)	RCS Conductivity ($\mu\text{mho/cm}$)
0100	0	0	0.0	1.0
0200	.30	20,000	0.1	1.2
0300	.75	85,000	0.1	5.2
0400	1.0	106,000	0.3	9.2
0500	2.0	250,000	0.3	12.5

Of the times below; when is the earliest that TLCO 3.0.3 ACTIONS are REQUIRED?

- a. 0200
- b. 0300
- c. 0400
- d. 0500

ANSWER: c.

REFERENCE:

TLCO 3.4.1

REFERENCE PROVIDED DURING EXAM:

TLCO 3.4.1

NEW

HIGHER

K/A: 2.1.34 Knowledge of primary and secondary plant chemistry limits

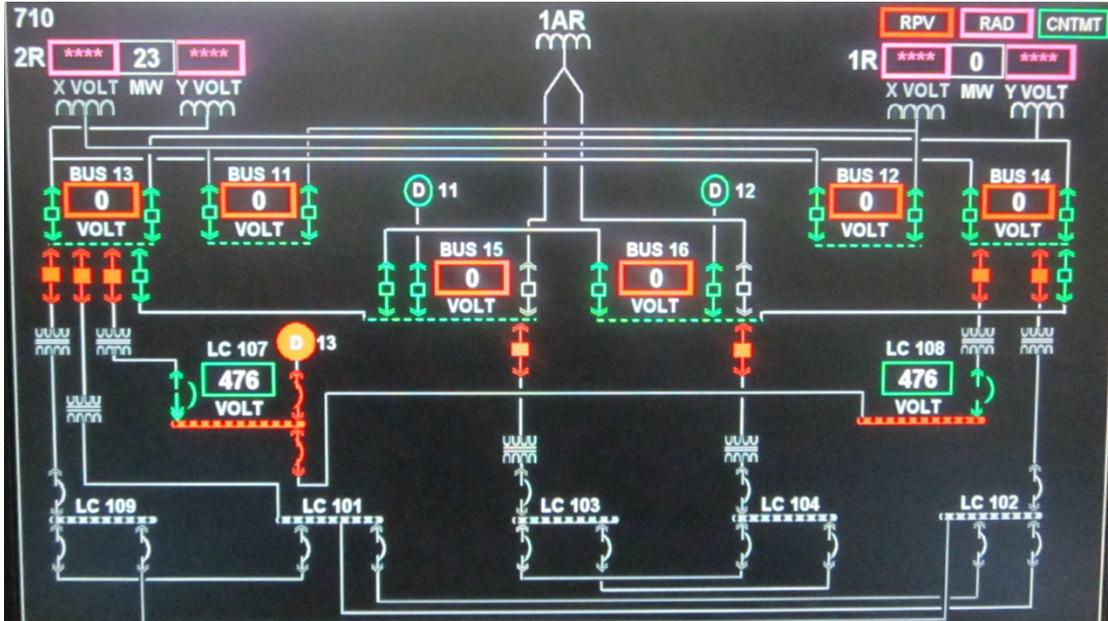
JUSTIFICATION: According to table 3.4.1-1 of TLCO 3.4.1, with steam flow greater than 100,000 lbm/hr, the maximum allowed chloride ion concentration would be less than or equal to 0.5 ppm. The maximum allowed RCS conductivity would be less than or equal to 10 $\mu\text{mho/cm}$, based on note (a) that states "upon commencing a reactor startup until 24 hrs after THERMAL POWER is >1% RTP, the conductivity shall be less than or equal to 10 $\mu\text{mho/cm}$ and the chloride ion concentration shall be less than or equal to 0.1 ppm."

a., b. and d. are incorrect: Plausible distracters due to misinterpretation of Table 3.4.1-1.

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QUESTION # 095

The plant was operating at rated conditions when an event occurred resulting in the following plant computer readings:



Based on the given conditions, which one of the following parts of C.5-3203 must be directed by the CRS for Alternate RPV Injection?

- a. PART A – RHRSW A CROSS-TIE TO LPCI
- b. PART B – CONDENSATE SERVICE TO PRESSURIZATION STATION
- c. PART C – SERVICE WATER CROSS-TIE TO CONDENSATE/FEEDWATER
- d. PART D – FIRE WATER CROSS-TIE TO LPCI

ANSWER: d.

REFERENCE:

C.5-3203

C.5-1100

BANK

HIGHER

K/A: 2.1.19 Ability to use plant computers to evaluate system or component status.

JUSTIFICATION: This part can be used as long as the Screen Wash, Electric or Diesel Fire pump is available. The Screen Wash FP is de-energized as it is powered from LC-101. The Electric FP is de-energized as it is powered from LC-104. The Diesel Fire Pump would be available.

- a. incorrect: ONLY RHRSW A can be used to cross-tie with LPCI. Since all other busses are de-energized (15 Bus), the 'A' pumps would not have power. This part cannot be used because 11 and/or 13 RHRSW pumps must be available.

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- b. incorrect: In order to use this part the condensate service pumps must have power. 11 CSP is powered from MCC-111 which doesn't have power because LC-101 is de-energized. 12 CSP is powered from MCC-141 which does come off of LC-104 but is non-essential so it also doesn't have power.
- c. incorrect: In order for this part to be used a condensate pump must be running. With the SBO both condensate pumps would not have power.
- d. correct.

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QUESTION # 096

The plant has been operating at rated conditions for several months.

On August 6th at 1300 it is discovered that SR 3.1.3.2 had not been performed on control rod 26-19 since June 28th at 0800. Given the following:

- Control rod 26-19 is at position 12
- SR 3.0.3 is provided on the following page
- SR 3.1.3.2 has a FREQUENCY of 31 Days
- An assessment has been performed and the risk can be managed

Determine if an extension is allowed, if so, when is the latest the surveillance can be completed and remain in compliance with Technical Specifications?

- a. Perform the surveillance prior to August 7th at 0200.
- b. Perform the surveillance prior to August 7th at 1300.
- c. Perform the surveillance prior to September 6th at 1300.
- d. An extension IS NOT allowed, immediately enter the ACTIONS of TS 3.1.3.

ANSWER: c.

REFERENCE:

TS 3.1.3

TS SR 3.0.3

BANK

HIGHER

K/A: 2.2.12 Knowledge of surveillance procedures.

JUSTIFICATION: SR 3.1.3.2 has a 31 day frequency with a 1.25 times grace period which would require the SR to have been performed by 0200 on August 6th. SR 3.0.3 allows from time of discovery, 24 hours or the length of the specified frequency which ever is greater to perform the surveillance. Note: 24 hours can only be exceeded if a risk evaluation has been performed. 31 days past time of discovery is equal to September 6th at 1300.

- a. incorrect: Plausible for miscalculation of days.
- b. incorrect: Plausible if a risk assessment wasn't performed.
- c. correct.
- d. incorrect: SR 3.0.3 allows delay of entering actions.

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SR 3.0.3

If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is greater. This delay period is permitted to allow performance of the Surveillance. A risk evaluation shall be performed for any Surveillance delayed greater than 24 hours and the risk impact shall be managed.

If the Surveillance is not performed within the delay period, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

When the Surveillance is performed within the delay period and the Surveillance is not met, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

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QUESTION # 097

Which of the following activities REQUIRE the use of the Bypass Control Process?

- a. Modifying a Control Room annunciator circuit by LIFTING an electrical lead.
- b. Installing a TEMPORARY hose to drain the Service Water System to the floor drains.
- c. Opening C-31 INSTALLED Knife Switch 16 with plant power fed from the 1R Transformer.
- d. Installing new Condensate Demineralizers that have NOT yet been RELEASED to the plant.

ANSWER: a.

REFERENCE:

AWI-04.04.03

NEW

FUNDAMENTAL

K/A: 2.2.43 Knowledge of the process used to track inoperable alarms.

JUSTIFICATION: AWI-04.04.03 BYPASS CONTROL is the process used for this and states "When alarm circuitry is modified directly (annunciator card removal, lifted lead, jumper or shutting off computer alarm points), a Bypass Tag or TMod Tag SHALL be used to identify the circuit modification and a Temporary Information Tag SHALL be placed on the alarm stating it is disabled."

b., c. and d. are incorrect: These are all examples of when this process is not required to be used.

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QUESTION # 098

During the "End of Shift Brief" a NLO on your crew reports his total accumulated dose for the year is 1905 mrem.

As the CRS, which of the following TEDE restrictions are required for the above situation?

The individual should be restricted from...

- a. Contaminated Areas until they have your approval to exceed 2000 mrem/yr.
- b. High Radiation Areas until they have your approval to exceed 2000 mrem/yr.
- c. Airborne Radioactivity Areas until they have your approval to exceed 2000 mrem/yr.
- d. Radiologically Controlled Areas until they have your approval to exceed 2000 mrem/yr.

ANSWER: b.

REFERENCE:

4AWI-08.04.01

BANK

FUNDAMENTAL

K/A: 2.3.13 Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high radiation areas, aligning filters, etc.

JUSTIFICATION: MNGP Rad workers have an administrative dose limit of 2000 mrem. Individuals within 100 mrem of their TEDE administrative dose guideline should be restricted from High Radiation Areas.

- a. incorrect: An individual should be restricted from these areas if they are within 20 mrem of their CEDE admin dose limit or if they have reached their internal dose limit. This question is only concerned with the TEDE limits.
- b. correct.
- c. incorrect. See (a.) above.
- d. incorrect: An individual should be restricted from an RCA if they are within 20 mrem of their TEDE admin dose limit.

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QUESTION # 099

An event has occurred that has resulted in the declaration of a General Emergency and the following conditions:

- A Radioactive release is in progress
- State dose projections have NOT been received
- A severe winter storm is in progress with the wind from the North
- 5790-102-02 (MONTICELLO EMERGENCY NOTIFICATION REPORT FORM) TABLE 1 is provided on the following page

Given the above conditions, determine the initial Protective Action Recommendations (PARS)?

- (1) Evacuate or Shelter.
(2) sectors out to 2 miles.
(3) sectors out to 5 miles.
(4) sectors out to 10 miles.

	(1) <u>Evacuate or Shelter</u>	(2) <u>2 miles</u>	(3) <u>5 miles</u>	(4) <u>10 miles</u>
a.	Evacuate	H, J, K	5S, 5W	10SE, 10S, 10SW
b.	Shelter	R, A, B	5N	10NW, 10N, 10E
c.	Shelter	All	5S, 5W	None
d.	Evacuate	All	5S, 5W	None

ANSWER: c.

REFERENCE:

A.2-204

5790-102-02

NEW

HIGHER

K/A: 2.4.44 Knowledge of emergency plan protective actions recommendations.

JUSTIFICATION: Wind is from 0°. This will require all sectors within 2 miles sheltered and the 5S & 5W sectors sheltered. The 10-mile sectors are based on dose projection and are only evacuated with state recommendation. Since dose projections have not been received "None" would be entered.

- a. incorrect: Evacuation would not be recommended based on weather conditions, all 2 mile sectors would be sheltered and 10 mile sectors are based on dose projections.
- b. incorrect: All 2 mile sectors should be sheltered and plausible for opposite wind direction.
- c. correct
- d. incorrect: This would be correct but evacuation would not be performed based on weather conditions.

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**TABLE 1
SECTOR/SUBAREA CONVERSION CHART**

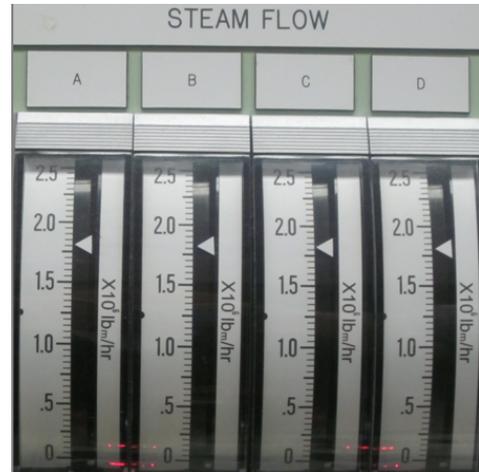
Choose geopolitical subareas corresponding to the current wind direction (or affected downwind sectors) and the desired downwind distance one needs to apply the Protective Action Recommendations.

WIND FROM (DEGREES)	AFFECTED DOWNWIND SECTORS	SUBAREAS		
		2 MILES	5 MILES	10 MILES
348.75 - 11.25	H, J, K	2	5S, 5W	10SE, 10S, 10SW
11.25 - 33.75	J, K, L	2	5S, 5W	10S, 10SW, 10W
33.75 - 56.25	K, L, M	2	5S, 5W	10S, 10SW, 10W
56.25 - 78.75	L, M, N	2	5W, 5S	10SW, 10W
78.75 - 101.25	M, N, P	2	5W	10SW, 10W, 10NW
101.25 - 123.75	N, P, Q	2	5W, 5N	10W, 10NW
123.75 - 146.25	P, Q, R	2	5W, 5N	10W, 10NW, 10N
146.25 - 168.75	Q, R, A	2	5W, 5N	10NW, 10N
168.75 - 191.25	R, A, B	2	5N	10NW, 10N, 10E
191.25 - 213.75	A, B, C	2	5N, 5E	10N, 10E
213.75 - 236.25	B, C, D	2	5N, 5E	10N, 10E
236.25 - 258.75	C, D, E	2	5N, 5E	10E
258.75 - 281.25	D, E, F	2	5N, 5E, 5S	10E, 10SE
281.25 - 303.75	E, F, G	2	5E, 5S	10SE
303.75 - 326.25	F, G, H	2	5E, 5S	10SE, 10S
326.25 - 348.75	G, H, J	2	5S	10SE, 10S

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QUESTION # 100

The plant is at rated conditions when annunciator 5-A-46 (SRV OPEN) is received along with the following indications:



Which of the following is a required TRM/Tech Spec REQUIRED ACTION and COMPLETION TIME for the above conditions?

- None; TRM/Tech Spec Actions are NOT required.
- Restore SRV A to OPERABLE status within 14 days.
- Restore the instrument channel to OPERABLE status within 30 days
- Restore the instrument channel to OPERABLE status within 72 hours.

ANSWER: c.

REFERENCE:

TRM TLCO 3.3.3.1

NEW

HIGHER

REFERENCE PROVIDED DURING EXAM:

TLCO 3.3.3.1

TS 3.3.6.3

TS 3.4.3

TS 3.5.1

TS 3.6.1.5

JUSTIFICATION: The SRO examinee must determine if the SRV OPEN alarm is consistent with conditions shown in the pictures. The amber light lit means pressure switch has activated (30#), which would indicate that an S/RV is open; however, the associated MSL flow does not reflect that the S/RV is open. This is indicative of a pressure switch instrument failure which requires entry into condition A.

- incorrect: Plausible if the examinee does not think a TS or TRM is applicable to this pressure switch.

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- b. incorrect: Plausible if the examinee believes that the associated ADS valve is INOPERABLE, however, since no indication exists that anything is wrong with the valve itself, it should not be assumed INOPERABLE.
- c. correct.
- d. incorrect: Plausible if the examinee believes that the associated S/RV is a Low-Low Set valve.