Test Answer Key

2020 QDC NRC Exam RO Section
Test ID: 331006

1 **ID: 2116032** **Points: 1.00**

The following conditions exist on Unit 1 during a LOCA:

- Reactor pressure is 560 psig
- Indicated Fuel Zone reactor water level is -142 inches
- Drywell pressure is 5 psig
- Drywell temperature is 183°F
- Both reactor recirc pumps are TRIPPED

What is ACTUAL reactor water level?

Unit 1 FUEL ZONE CORRECTION

INDICATED LEVEL (inches)			ACTUAL LEVEL (inches)
> 800 psig	> 400 psig	> 100 psig	
-62	-40	-13	10
-70	-48	-22	0
-77	-57	-32	-10
-85	-65	-41	-20
-101	-82	-60	-40
-115	-98	-78	-59
-132	-116	-97	-80
-147	-133	-116	-100
-163	-151	-135	-120
-180	-169	-155	-142
-196	-186	-173	-162
-205	-196	-184	-174
-218	-211	-201	-191
-225	-219	-209	-200
-272	-270	-265	-260
-303	-304	-303	-300

A. -93 inches

B. -110 inches

C. -142 inches

D. -169 inches

Answer: B

Answer Explanation
Use the PRESSURE column and cross reference to ACTUAL LEVEL. Since 560 psig is less than 800 psig but greater than 400 psig, use the >400 psig column. -142 inches is halfway between -133 and -151, so actual level is halfway between -100 and -120. Therefore, actual water level is -110 inches. Fuel Zone instruments can only be used to determine Reactor water level when the Reactor Recirculation pumps are OFF and their indicated level has been corrected. Distractor 1: Plausible but incorrect if the >800 psig column is utilized. Distractor 2: Plausible if water level indication does not have to be corrected when recirc pumps are off but incorrect. Distractor 3: Plausible if candidate reverses indicated and actual water level columns during water level conversion. Reference: QCAP 0200-10 Reference provided during examination: Yes, embedded QCAP 0200-10 Attachment A, Page 1 of 2 Cognitive level: High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities ILT Exam Bank (QDC.ILT.809475) Question History: n/a 10 CFR Part 55 Content: 41.7 / 45.6 K/A: 295001 AA1.07 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Nuclear boiler instrumentation system. (RO= 3.1) Comments:

2 **ID: 2116034** **Points: 1.00**

Unit 2 was operating at 100% power when the U2 Reserve Aux Transformer (T-22) experienced an electrical fault resulting in a Phase-C open circuit.

The subsequent drop in voltage on T-22 caused many loads to trip on undervoltage leading to an automatic reactor scram.

The operators then tripped T-22, resulting in a complete Loss of Offsite Power.

Both the Unit 2 and 1/2 EDGs automatically started and loaded to their respective busses.

Assuming NO other operator action, what is the expected plant response?

A. Feedwater pumps maintain RPV water level

B. RBCCW pumps maintain cooling flow to RBCCW loads

C. Turbine Control Valves maintain RPV pressure

D. TBCCW pumps maintain cooling flow to TBCCW loads

Answer: B

Answer Explanation
A loss of offsite power is a complete loss of all AC busses. When the operators open the feeder breakers to the RAT, the Emergency Diesel Generators will automatically start and power the safety related busses. Only the RBCCW pumps will automatically restart and maintain RBCCW flow. Question based on OPEX from Byron station (1/30/2012) in which an unevaluated transformer fault resulted in a Loss of Offsite Power and Automatic reactor scram. Quad Cities uses the same protective relay structure for the Reserve Aux Transformer as Byron does. Reference IR#01320006, "U2 TRIP SAT C-PHASE FOUND OPEN". Distractor 1: Plausible but incorrect because the EHC pumps are not automatically re-energized upon restoration of the safety related busses. Distractor 2: Plausible because feedwater pumps normally maintain RPV level following a scram without a loss of offsite power but incorrect because the RFPs do not have power and would not restart automatically. Distractor 3: Plausible because the TBCCW pumps will automatically restart upon a restoration of power to their supply busses but incorrect because the TBCCW pumps are powered from non-safety related busses that do not automatically have power restored by the EDGs. Reference: QCOA 6100-03 revision 42 / Byron OPEX IR#01320006, "U2 TRIP SAT C-PHASE FOUND OPEN" Reference provided during examination: None. Cognitive level: High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.17154) Question History: 2012 ILT NRC Exam 10 CFR Part 55 Content: 41.10 / 43.5 / 45.13 K/A: 295003, AA2.04 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : System lineups (RO=3.5) Comments:

3 **ID: 2125029** **Points: 1.00**

The following annunciators are received:

- 901-8 A-9 125 V BATTERY CHARGER 1 TRIP
- 901-8 A-5 480V SWGR BREAKER TRIP
- "BUS 19 LIVE" mimic light is out.

With no operator action, 125 VDC Turbine Building Bus 1A is _____.

A. energized from the 125VDC Battery Charger #1A.

B. de-energized.

C. energized from the U-1 125 VDC Battery.

D. energized from the U-2 125 VDC Battery.

Answer: C

Answer Explanation
Answer Explanation: The Unit 1 125 VDC distribution remains energized from the battery when the charger is lost. Bus 19 (MCC19-2) powers Unit 1 125 VDC Charger 1. When Bus 19 is re-energized, the charger is already aligned to restart (AC and DC breakers are closed) without further operator action. Distractor 1: Plausible because feed breaker from Battery Charger #1A to the 125 VDC Battery Bus is normally closed. Incorrect because the #1A Battery Charger is not "ON", (i.e. the feed breaker from MCC 18-2 to the battery charger is open). Also the AC and DC breakers on the #1A Batt Charger are open. Distractor 2: Plausible because the Battery Charger is the normal supply to the 125 VDC system. Incorrect because the 125 VDC Battery will supply load if the charger trips. Distractor 3: Plausible because the U-2 125 VDC Battery is the normal supply to U-1 125VDC Division II. Incorrect because 125 VDC Bus 1A is Division I. Reference: QCOP 6900-40 Rev. 40 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: (41.10 / 43.5 / 45.3 / 45.12) KA: 295004 G2.4.46 - Partial or Total Loss of DC Power: Ability to verify that the alarms are consistent with the plant conditions. (RO=4.2) Comments:

4 **ID: 2116035** **Points: 1.00**

Unit 2 is at 26% reactor power during a plant startup.

- DFWLC is in 3-element control
- Feedwater flow is 2.8 Mlbm/Hr

Which of the following is expected to occur NEXT if the Main Turbine trips AND the Turbine Bypass Valves fail CLOSED?

A. DFWLC will shift to single-element control due to the reduction in feed flow.

B. PCIS will initiate a Group I isolation due to lowering main steam line pressure.

C. A scram will occur due to FASTC header pressure lowering to < 460 psig.

D. Indicated RPV water level will lower due to the collapse in core voids.

Answer: D

Answer Explanation
The increase in pressure will cause voids to collapse and a reduction of indicated level. This will result in a rapid power increase and a full RPS trip from APRM high flux or RPV high pressure which will cause level to lower even more due to the collapse in voids following the scram Distractor 1: Plausible if the low FASTC header pressure scram is not bypassed when < 38.5% power. Distractor 2: Plausible because DWFLC does shift to single-element automatically when Feed Flow lowers to <1.8 Mlb/Hr. However, this would happen after indicated RPV level has shrunk due to the collapse of the voids. Distractor 3: With the Bypass valves failing to open, steam line pressure will rise. The candidate must recall that the Group 1 isolation signal is on lowering pressure < 785 psig. Reference: UFSAR QDC 15.02 Rev 14 Reference provided during examination: None. Cognitive level: High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.815763) Question History: 2011 ILT Cert Exam 10 CFR Part 55 Content: 41.8 / 41.10 K/A: 295005, AK1.03 - Knowledge of the operational implications of the following concepts as they apply to MAIN TURBINE GENERATOR TRIP: Pressure effects on reactor level. (RO= 3.5) Comments:

5 **ID: 2116036** **Points: 1.00**

A manual reactor scram has been inserted on Unit One.

- All Feedwater controllers are in AUTO.
- The Master feedwater controller is set at +30 inches.
- RPV water level lowered to -20 inches and is now recovering with feedwater.

(1) When will the Master Feedwater Controller setpoint setdown function take effect?

(2) What is the control mode for digital feedwater during setpoint setdown?

A. (1) When the scram profile has been active for 2 minutes

(2) three element control.

B. (1) When water level is >+15” rising

(2) three element control.

C. (1) When the scram profile has been active for 2 minutes

(2) single element control.

D. (1) When water level is >+15" rising

(2) single element control.

Answer: D

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Answer Explanation

For distracters, the scram profile de-activates after two minutes. Technically this does not enter setpoint setdown.

Per QCOP 0600-21 and LIC-0600 page 31 Setpoint setdown is entered when:

The reactor water level is greater than +15 inches, coming from below. The reactor water level is on its way up. By intercepting it well below the normal setpoint (+30 inches), the FWLC is given a reasonable time to prevent large reactor water level overshoots.

The post scram profile is de-activated, and the reactor water level is not greater than +34 inches. The FWLC will ramp the reactor water level towards the previous setpoint after the deactivation of the post scram profile, but if the reactor water level is too high, the previous setpoint will be active momentarily to prevent even higher levels more quickly.

When in setpoint setdown, the system operates in single element control.

Distractor 1: Plausible because of the relationship between the scram profile and setpoint setdown, although both parts are incorrect.
Distractor 2: Plausible because setpoint setdown takes effect at greater than +15 inches rising but incorrect because DFWLC automatically shifts to Single Element.
Distractor 3: Plausible because DFWLC automatically shifts to Sigle Element but incorrect because the scram profile is deactivated at 2 min, not setpoint setdown.

Reference: QCOP 0600-21 Revision 21 / Lesson Plan LIC-0600 Revision 13
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): RO
Tier: 1 Group: 1

Question Source: Quad Cities Exam Bank (QDC.ILT.507792)
Question History: n/a

10 CFR Part 55 Content: 41.7 / 45.8

KA: 295006, AK2.02 - Knowledge of the interrelations between SCRAM and the following: Reactor water level control system. (RO= 3.8)

Comments:

6 **ID: 2116037** **Points: 1.00**

Why is the turbine tripped during the execution of QOA 0010-05, PLANT OPERATION WITH THE CONTROL ROOM INACCESSIBLE?

A. To ensure that reactor pressure is maintained at the relief valve setpoint.

B. To ensure the heaters trip, thus aiding in the attempt to cool down the reactor.

C. To ensure the turbine and generator get separated from the grid.

D. To protect the turbine and generator from an overspeed condition.

Answer: C

Answer Explanation
Per QOA 0010-05, the turbine and generator are locally tripped to protect the machines from an electrical transient and to ensure the plant is in a safe condition. Distractor 1: The turbine cannot help with pressure control due to the MSIVs being shut and no steam going to the turbine. (a step in the procedure has students verify a group one occurs at ~785 psig) Distractor 2: The turbine cannot physically overspeed without steam to turn the rotors. Distractor 3: The heaters trip due to the MSIVs being closed, not due to the turbine trip. Reference: QOA 0010-05 Revision 26 Reference provided during examination: Yes, QOA 0010-05 PLANT OPERATION WITH THE CONTROL ROOM INACCESSIBLE Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.LN.182967) Question History: n/a 10 CFR Part 55 Content: 41.5 / 45.6 KA: 295016, AK3.02 - Knowledge of the reasons for the following responses as they apply to CONTROL ROOM ABANDONMENT: Turbine Trip. (RO=3.7) Comments:

7 **ID: 2125147** **Points: 1.00**

Unit 1 is at 100% power.

The following annunciators alarm:

• 912-1 D-1, RX BUILDING COOLING WATER LOW PRESSURE
• 912-1 F-1, RX BUILDING CW EXP TANK HI/LO LEVEL
• 901-4 A-17, DRYWELL FLOOR DRAIN SUMP HIGH LEVEL

U1 RBCCW pressure is 23 psig and STEADY.

Drywell pressure is 1.3 psig and slowly RISING.

What is the location of the leak?

How do the following valves react?

• MO 1-3706, U1 RBCCW INBD RTN VLV
• MO 1-3703, U1 RBCCW OTBD RTN VLV
• MO 1-3702, U1 RBCCW SPLY VLV

A. In the Reactor Building but outside the Drywell.

The above valves will close automatically.

B. Inside the Drywell.

The above valves will close automatically.

C. Inside the Drywell.

The above valves must be closed manually.

D. In the Reactor Building but outside the Drywell.

The above valves must be closed manually.

Answer: C

Answer Explanation
QCOA 3700-06, RBCCW Line Break Inside Containment per step D.1, D.2 and D.4. Distractor 1: Plausible because the leak is inside the Drywell but incorrect because the valves must be closed manually from the control room. Distractor 2: Plausible because the answer choice is a hybrid of the plausible selections. Distractor 3: Plausible because the valves must be closed manually but incorrect because the leak is located inside the Drywell. Reference: QCOA 3700-06 Revision 8 Reference provided during examination: None. Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.568584) Question History: n/a 10 CFR Part 55 Content: 41.7 / 45.6 KA: 295018, AA1.03 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: Affected systems so as to isolate damaged portions. (RO= 3.3) Comments:

8 **ID: 2116039** **Points: 1.00**

Unit 2 is operating at 100% power when the following annunciators alarm:

- 912-1 B-11, U-2 INST AIR LOW PRESSURE
- 912-1 B-12, U-2 SERVICE AIR BACKUP VALVE OPEN
- 902-5 A-1, SCRAM VALVE AIR SUPPLY LOW PRESSURE

Scram air header pressure is 55 psig and lowering.

The required action is to _____(1)_____ in order to _____(2)_____.

A. (1) perform a rapid power reduction

(2) comply with the assumptions in the control rod drop analysis

B. (1) scram

(2) comply with the assumptions in the control rod drop analysis

C. (1) perform a rapid power reduction

(2) maintain control of reactivity.

D. (1) scram

(2) maintain control of reactivity

Answer: D

Answer Explanation
This is an indication of a loss of Instrument Air, Per QOA 4700-06 A manual scram is taken to maintain Operator control of core reactivity. Distractor 1: Plausible because the basis of the actions in QOA 4700-06 is to maintain Operator control of reactivity, but incorrect because the loss of IA procedure directs a scram, not a rapid power reduction. Distractor 2: Plausible because a power reduction is directed by QOA 4700-06 but incorrect because the procedure directs a scram, not a rapid power reduction or restoring the rod pattern and the rod drop analysis is not taken into consideration for loss of IA. Distractor 3: Plausible because QOA 4700-06 directs a scram but incorrect because the rod drop analysis is not taken into consideration for loss of IA. Reference: QOA 4700-06 Revision 28 Reference provided during examination: None. Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.10 / 43.5 / 45.13 KA: 295019, AA2.01 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Instrument air system pressure. (RO= 3.5) Comments:

9 **ID: 2123108** **Points: 1.00**

Unit 1 is in Cold Shutdown.

Shutdown Cooling is being placed in service using "A" loop

RPV level is +80 inches and RPV temperature is 148°F.

When the 1A RHR pump is started, RPV level drops 2 inches initially and continues to drop at a slow rate.
After 10 minutes, RPV level is +70 inches and RPV temperature is 143°F.

What action, if any, is required?

A. Close the 1-1001-47, SDC OUTBD ISOL VLV, 1-1001-50, SDC INDB ISOL VLV, and 1-1001-29A, INBD LPCI INJ VLV.

B. No actions required.

C. Shut the 1-1001-43A, SDC SUCT VLV.

D. Immediately secure the 1A RHR Pump.

Answer: A

Answer Explanation
IAW QCOP 1000-05 Limitations and Actions, on an unexpected drop in reactor water level Distractor 1: Plausible because QCOP 1000-05 states that there could be a level drop when SDC flow is initiated but incorrect because a continued RPV level drop is not expected. Distractor 2: Plausible because an improper system lineup could cause a vessel drain event and securing the RHR pump would stop the driving head but incorrect because procedure states to shut the valves in the flow path not secure the RHR pump. Distractor 3: Plausible because if there was a leak from the Torus, shutting the shutting the 1-1001-43A, SDC SUCT VLV would isolate the leak but incorrect because this is not directed by the procedure in response to a level drop. Reference: QCOP 1000-05 Revision 61 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.11867) Question History: n/a 10 CFR Part 55 Content: 41.10 / 43.2 / 45.12 KA: 295021, G2.1.32 - Ability to explain and apply system limits and precautions. (RO= 3.8) Comments:

10 **ID: 2116040** **Points: 1.00**

A core reload is in progress. A fuel assembly is being lowered into its assigned core location.
The NSO announces, "The reactor is critical" as indicated on nuclear instrumentation.

What immediate operator actions are required?

A. Stop all fuel movement and do not attempt to raise or lower the fuel assembly. Scram the reactor, evacuate the Reactor Building and control access.

B. Raise the fuel assembly until the bottom clears the top of the top guide and then stop fuel movement. Scram the reactor. Isolate Reactor Building Ventilation.

C. Lower the fuel assembly until full in and then stop fuel movement. Scram the reactor. Evacuate the reactor building and control access.

D. Raise the fuel assembly to the full up position, verify Reactor Building Ventilation isolated and SBGTS has auto started, evacuate the Refuel Floor.

Answer: A

Answer Explanation
Answer explanation: Per QCFHP 0110-02, Immediate Operator Actions, C.1. **Stop** all fuel movement **AND** do **NOT** attempt to raise **OR** lower Grapple. C.2. **Request** Control Room Operator to scram Reactor. C.3. **Direct** the Unit Reactor Operator to evacuate Reactor Building **AND** control access to the Reactor Building (including Drywell). Distractor 1: Plausible because an evacuation is directed but incorrect because the evacuation includes the entire reactor building. QCFHP explicitly directs to NOT raise the grapple. Distractor 2: Plausible because "Scram the reactor and Evacuate the reactor building and control access." is per the procedure but incorrect because QCFHP explicitly directs to NOT raise or lower the grapple. Distractor 3: Plausible because the direction to Scram the reactor is per the procedure but incorrect because QCFHP explicitly directs to NOT raise the grapple. Reference: QCFHP 0110-02 Revision 4 Reference provided during examination: None Cognitive level: High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities ILT Exam Bank (QDC.L.10147) Question History: n/a 10 CFR Part 55 Content: 41.8 / 41.10 KA: 295023, AK1.03 - Knowledge of the operational implications of the following concepts as they apply to REFUELING ACCIDENTS: Inadvertent criticality. (RO=3.7) Comments:

11 **ID: 2116048** **Points: 1.00**

How are the following Unit 2 valves affected by rising drywell pressure during a LOCA (Steam leak inside containment)?

MO 2-1001-23A, OUTBD DW SPRAY ISOL
MO 2-1001-26A, INBD DW SPRAY ISOL
MO 2-1001-34A, TORUS TEST OR SPRAY
MO 2-1001-36A, TORUS H2O TEST VLV
MO 2-1001-37A, TORUS SPRAY SHUTOFF

A. At 2.0 psig, the valves are interlocked closed, but the interlock may be bypassed by a minimum of two switches in each division.

B. At 2.0 psig, the valves are interlocked closed, but the interlock may be bypassed by a single switch in each division.

C. At 2.5 psig, the valves are interlocked closed, but the interlock may be bypassed by a minimum of two switches in each division.

D. At 2.5 psig, the valves are interlocked closed, but the interlock may be bypassed by a single switch in each division.

Answer: D

Answer Explanation
LPCI Automatic Initiation on high drywell pressure (2.5 psig) cause AUTOMATIC ACTIONS B.2.e, The following valves close **AND** are interlocked closed: MO 1(2)-1001-23, 26, 34, 36, 37 A **AND** B. The interlock may be overridden via the "CONTAINMENT CLG PERMISSIVE SWITCH 17" switches (one in each division). If level were also below 2/3 core height, the "CNMT CLG 2/3 LVL AND ECCS INT BYP SWITCH 18" (one in each division) would also need to be used. Distractor 1: Plausible because the valves are interlocked closed. Incorrect because the setpoint is 2.5 psig and only one switch (S17) in each division is needed to bypass the interlock. Distractor 2: Plausible because the valves are interlocked closed and only one switch (S17) in each division is needed to bypass the interlock. Incorrect because the setpoint is 2.5 psig. Distractor 3: Plausible because the setpoint is 2.5 psig and the valves are interlocked closed. Incorrect because only one switch (S17) in each division is needed to bypass the interlock. Reference: QCOA 1000-04 Revision 20 / QCOP 1000-40 Revision 8 / LN-1000 Revision 20 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Modified from Quad Cities Exam Bank (CERT 12633) Question History: Bank 10 CFR Part 55 Content: 41.7 / 45.8 KA: 295024, EK2.15 - Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: Containment spray logic: Plant-Specific. (RO= 3.8) Comments:

12 **ID: 2116049** **Points: 1.00**

Unit 2 is at 100% power when Turbine Control Valve #1 slowly drifts CLOSED over 30 seconds.

In response to the event, Reactor power will initially _____(1)_____, followed by _____(2)_____.

A. (1) RISE
(2) ONLY Turbine Control Valve #2 going OPEN

B. (1) LOWER
(2) the remaining Turbine Control Valves and/or Turbine Bypass Valves going OPEN

C. (1) LOWER
(2) ONLY Turbine Control Valve #2 going OPEN

D. (1) RISE
(2) the remaining Turbine Control Valves and/or Turbine Bypass Valves going OPEN

Answer: D

Answer Explanation
The rise in RPV pressure will cause voids to collapse, adding positive reactivity due to the void coefficient, which will then cause reactor power to increase, further raising RPV pressure. The remaining Turbine Control Valves (TCVs) and Turbine Bypass Valves will respond to the pressure rise and throttle open to control RPV pressure. This question is based on a recent event at Quad Cities on Unit 2. Reference IR 01216208. Distractor 1: Plausible because power will rise but incorrect because all of the remaining TCVs will open in response to the event and the BPVs will open if necessary, to control RPV pressure. Distractor 2: Plausible because all of the remaining TCVs will open in response to the event and the BPVs will open if necessary, to control RPV pressure but incorrect because power will RISE due to the increase in RPV pressure. Distractor 3: Plausible but incorrect because power will RISE due to the increase in RPV pressure from closure of TCV #1. Reference: QOA 5650-02 Revision 11, Quad Cites specific OPEX, Reference IR 01216208. Reference provided during examination: None Cognitive level: High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.17075), Quad Cites specific OPEX Reference IR 01216208. Question History: 2012 ILT NRC Exam 10 CFR Part 55 Content: 41.8 K/A: 295025, EK1.01 - Knowledge of the operational implications of the following concepts as they apply to HIGH REACTOR PRESSURE: Pressure effects on reactor power. (RO=3.9) Comments:

13 **ID: 2124092** **Points: 1.00**

A loss of offsite power (LOOP) has occurred on Unit 1. All automatic actions functioned as designed.

- Bus 13 is backfed from bus 13-1
- Bus 14 is backfed from bus 14-1
- RPV pressure is 700 psig with a cooldown in progress
- Torus temperature is 120°F and slowly rising
- 'A' RHRSW Pump flow is at 3500 gpm
- 'A' and 'B' RHR Pumps are in Torus Cooling Mode at 12,000 gpm

What method will establish MAXIMUM Torus Cooling in accordance with plant procedures?

A. Throttle open the MO 1-1001-36A, TORUS H2O TEST VLV.

B. Start the 'B' RHRSW Pump and establish a flowrate of 7500 gpm.

C. Throttle open the MO 1-1001-5A, RHR HX SW DISCH VLV.

D. Start Torus Cooling on the B RHR Loop.

Answer: D

Answer Explanation
Starting the 'B' loop of Torus Cooling is procedurally permitted and at least 3500 gpm flowrate could be established (7000 gpm combined). Distractor 1: Plausible because starting the second RHR service water in that loop would increase cooling but incorrect because procedural guidance in subsequent steps is to maintain flow < 7200 gpm for two pump operation. (QCOP 1000-04) step F.2.c.(3) Distractor 2: Plausible because throttling 1-1001-36A would typically increase flow rate but incorrect because the flow indicates 12,000 gpm which is full scale and no significant flow increase will be attained by attempting to open the valve further. Distractor 3: Plausible because throttling open the 1-1001-A would increase RHR service water flow and therefore cooling but incorrect because per QCOP 1000-04, Limitations and Actions E.2, A sustained flow rate of > 3600 gpm per RHR Service Water Pump is NOT recommended. Reference: QCOP 1000-04 Revision 22 Reference provided during examination: None. Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.967314) Question History: ILT 12-1 Comp 2, ILT 14-1 Comp 2 10 CFR Part 55 Content: 41.7/45.8 KA: 295026, EK2.01 - Knowledge of the interrelations between SUPPRESSION POOL HIGH WATER TEMPERATURE and the following: Suppression pool cooling. (RO= 3.9) Comments:

14 **ID: 2123750** **Points: 1.00**

What is the basis for initiating Drywell Spray prior to reaching 280°F Drywell temperature?

A. Maintain Drywell temperature below the Primary Containment design temperature.

B. Maintain Drywell temperature below the LCO level.

C. Prevent piping damage from water hammer when restarting RBCCW pumps.

D. Prevent exceeding the maximum temperature at which Recirc Pump motors are qualified.

Answer: A

Answer Explanation
EOP Appendix B, Drywell spray operation reduces primary containment pressure and temperature through the combined effects of evaporative and convective cooling. In evaporative cooling the water spray undergoes a change of state from liquid to vapor, whereas convective cooling involves no change of state. 281°F is the design temperature limit of the containment rounded down to 280°F is for QGA execution. Distractor 1: Plausible because 180° is a temperature limit in the QGA 200 Drywell temperature leg but incorrect because it is the LCO limit. Distractor 2: Plausible because it is a similar temperature and during high Drywell temperatures but incorrect because it is specified for the restoration of Drywell cooler operation. Distractor 3: Plausible because 338°F is a temperature limit in the QGA 200 Drywell temperature leg for ADS qualification and because Recirc pumps are located in the drywell but incorrect because the Recirc Pump motors are not safety related equipment and do not apply to that limit. Reference: QGA 200 Revision 12, EOP Technical Basis: BWROG EPGs/SAGs Appendix B Revision 3 Reference provided during examination: None. Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.5/45.6 KA: 295028, EK3.03 - Knowledge of the reasons for the following responses as they apply to HIGH DRYWELL TEMPERATURE: Drywell spray operation. (RO= 3.6) Comments:

15 **ID: 2120586** **Points: 1.00**

Unit 1 was at 100% power when a transient occurred, and a manual scram was inserted.

- Reactor Pressure is 600 psig and lowering
- All Control Rods are at position 00
- Reactor Level is -125 inches and lowering
- Torus Level is 11.5 ft. and lowering
- Drywell pressure is 13.2 psig and rising
- Torus pressure is 12.0 psig and rising

RCIC should be _____(1)_____ because _____(2)_____.

A. (1) allowed to inject

(2) ALL trips are bypassed.

B. (1) immediately TRIPPED

(2) it should have automatically tripped.

C. (1) immediately TRIPPED

(2) the steam exhaust discharging into the Torus WILL cause the PCPL to be exceeded.

D. (1) allowed to inject

(2) the steam exhaust discharging into the Torus will NOT cause the PCPL to be exceeded.

Answer: D

Answer Explanation
RCIC will start automatically at -59 inches, REACTOR LOW LOW LEVEL therefore should already be running and injecting. The RCIC turbine exhaust cannot supply sufficient energy to challenge the Primary Containment Pressure Limit with Torus level below the RCIC exhaust. Distractor 1: Plausible because if RCIC failed to trip automatically it should be manually tripped but incorrect because none of the RCIC trips would have occurred. Distractor 2: Plausible because the steam exhaust challenge to PCPL is true for HPCI but incorrect because the RIC exhaust would not provide this challenge. Distractor 3: Plausible because RCIC should be allowed to inject but incorrect because ALL RCIC turbine trips are not bypassed in this condition. Reference: EOP Technical Basis, BWROG EPGs/SAGs Appendix 'B' Revision 3 Reference provided during examination: None. Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.03-01 NRC RO 16) Question History: n/a 10 CFR Part 55 Content: 41.7/45.6 KA: 295030, EA1.02 - Ability to operate and/or monitor the following as they apply to REACTOR LOW WATER LEVEL: RCIC: Plant-Specific. (RO= 3.4) Comments:

16 **ID: 2120587** **Points: 1.00**

Unit 2 was operating at 100% when a LOCA occurred.

- DW temperature is 280°F
- Reactor pressure is 35 psig

RPV water level indications are as follows:

- 'A' Fuel Zone is reading erratic
- 'B' Fuel Zone is reading -70 inches actual level and lowering slowly
- 'A' Medium Range is reading erratic
- 'B' Medium Range is reading -58 inches
- 'A' Narrow Range is reading erratic
- 'B' Narrow Range is reading 0 inches
- Upper Wide Range is reading erratic
- Lower Wide Range is reading -77 inches actual level and lowering slowly

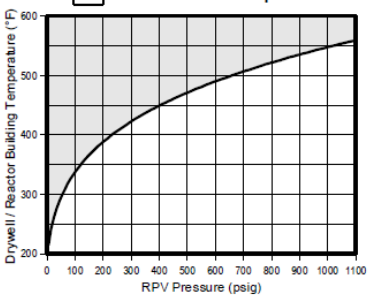
Is QGA 500-4, RPV FLOODING, required to be entered? Why or why not?

A **RPV Water Level Instruments**

CAUTION: RPV water level instruments may be unreliable due to boiling in the instrument runs when drywell or reactor building temperature is above Fig B, RPV Saturation Temperature.

An RPV water level instrument may be used only if the criteria in Table C are satisfied.

B **RPV Saturation Temperature**



C **RPV Level Instrument Criteria**

Instrument	Range (in.)	Use only if...
Fuel Zone	–340 to +60	Indicated level above –299 in.
Lower Wide Range	–344 to +66	Indicated level above –299 in.
Medium Range	–60 to +60	Indicated level above –42 in. OR Reactor building temperature below 185°F
Upper Wide Range	–42 to +358	Indicated level above 70 in.
Narrow Range	0 to +60	Indicated level on-scale.

A. Do NOT enter QGA 500-4, the RPV water level instrumentation CAN be relied upon to assure adequate core cooling.

B. Enter QGA 500-4, the RPV water level instrumentation CANNOT be relied upon to assure adequate core cooling.

C. Do NOT enter QGA 500-4, DW temperature CAN be maintained within the Drywell Spray Initiation Limit

D. Enter QGA 500-4, DW conditions are at or near saturation conditions and RPV level instruments show indications of saturation.

Answer: A

Answer Explanation
QGA 100 detail 'A', 'B' fuel zone level and the Lower Wide Range Levels are still usable and indicate above TAF and QGA 500-4, RPV FLOODING, should only be entered when reactor water level is unknown. Distractor 1: Plausible because if indicated level is interpreted as water level unknown the QGA 500-4 entry would be the correct course of action but incorrect because two of the level indicators show actual level in a usable band. Distractor 2: Plausible because QGA 500-4 should not be entered but incorrect because the DSIL is not the limitation of concern. Distractor 3: Plausible because the conditions for the level instruments are at or near saturation but incorrect because QGA 500-4 would not be entered until ALL indication of RPV water level is "unknown". Reference: QGA Detail 'A', QCAP 0200-10 Revision 25 Reference provided during examination: Embedded excerpt of QGA Detail 'A'. Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.662115) Question History: n/a 10 CFR Part 55 Content: 41.10/43.5/45.13 KA: 295031, EA2.01 - Ability to determine and/or interpret of the following as they apply to REACTOR LOW WATER LEVEL: Reactor water level. (RO= 4.6) Comments:

17 **ID: 2124109** **Points: 1.00**

U-1 was at 100% power when a 1/2 core hydraulic ATWS occurred.

• Immediate Operator Actions have been taken.
• Reactor water level is being lowered to -35 inches.
• RPV pressure is controlled between 800 to 1000 psig with Main Turbine Bypass Valves.
• 1A CRD pump is running with Drive Water pressure at 150 psig.
• All CRD accumulator lights are LIT on the Full Core Display.

What action, if any, will permit control rod insertion per QCOP 0300-28, ALTERNATE ROD INSERTION?

A. Bypass the RWM and close the U1 CRD CHARGING WTR SV, 1-301-25.

B. No additional actions required.

C. Bypass the RWM ONLY

D. Close the U1 CRD CHARGING WTR SV, 1-301-25 ONLY

Answer: A

Answer Explanation
Answer Explanation: QCOP 0300-28 page 5 lists the steps required to drive rods. Requirement would be to insert Cram arrays followed by spiraling out from the center. RWM would impose a block for any out of sequence rod therefore must be bypassed. The CRD 25 valve should be shut to ensure water is redirected from the accumulators to the drive header. Normal drive water pressure is 260-350 psig greater than reactor pressure. Distractor 1: Plausible because CRD Drive Water pressure is below 260 psid and closing the 1-340-25, CRD Charging Water SV will provide sufficient Drive Water pressure. Incorrect because the RWM will prevent control rod movement as out-of-sequence selected rods will generate a Select Block. Distractor 2: Plausible because an in-sequence rod may insert slowly. Incorrect because not all selected control rods can be moved as they are blocked by the RWM. Distractor 3: Plausible because the RWM will not prevent selection and the control rod may insert slowly. Incorrect because action to increase Drive Water pressure would allow for rapid insertion via the RMCS. Reference: QCOP 0300-28 Rev. 34 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.L.179007) Question History: n/a 10 CFR Part 55 Content: (41.5 / 43.5 / 45.12) KA: 295037, G2.2.44 - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. (RO= 4.2) Comments:

18 **ID: 2124343** **Points: 1.00**

What is the basis for maximizing Turbine Building ventilation when executing QGA 400, Radioactivity Release Control?

A. To provide dilution flow for elevated releases from the SBGTS through the Main Chimney.

B. To allow operation of Turbine Building equipment without exceeding max safe temperature conditions.

C. To maintain the Secondary Containment differential pressure within operational limits.

D. To allow personnel access to the Turbine Building and discharge radioactivity through an elevated, monitored release point.

Answer: D

Answer Explanation
Turbine Building ventilation is maximized to allow personnel to access the Turbine Building. This is essential for responding to emergencies or transients which may degrade into emergencies. These buildings are not always airtight structures, and radioactivity released inside the buildings would not only limit personnel access but would eventually lead to an unmonitored ground level release. A monitored, elevated release (vice unmonitored ground release) is necessary to ensure the protection of the general public. Distractor 1: Plausible because Turbine Building ventilation will provide some dilution flow, however, the concern for QGA 400 is release outside secondary containment; diluting SBGTS flow would not address the problem QGA 400 is attempting to address. Distractor 2: Plausible because there are EOPs that address the maximum temperature in the Reactor Building. However, Turbine Building temperatures are not addressed in QGA 400. Distractor 3: Plausible because this is the basis for restarting Reactor Building Ventilation if the restart will not result in an excessive release of radioactivity to the environment. Incorrect because maximizing Turbine Building ventilation will not assist with Secondary Containment. Reference: L-QGA400 Rev 8 Reference provided during examination: None Cognitive level: Memory Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.15618) Question History: 2011 NRC Exam 10 CFR Part 55 Content: 41.8 to 41.10 KA: 295038, EK1.02 - Knowledge of the operational implications of the following concepts as they apply to HIGH OFF-SITE RELEASE RATE: Protection of the general public. (RO= 4.2) Comments: None

19 **ID: 2120588** **Points: 1.00**

With the Fire Protection system in standby lineup, which of the following situations would cause an automatic start of a Fire Diesel?

A. Heat sensor actuation in the U2 Emergency Diesel Generator Room

B. Spurious actuation of the sudden pressure relay on T-22

C. Smoke detector actuation in the Main Control Room

D. A spurious closure signal to MO 1/2-3906, FIRE PROT SW SPLY VLV

Answer: B

Answer Explanation
A sudden pressure relay on the RAT will cause the deluge system to activate and cause a low fire header pressure and subsequently fire diesel start signals. The 'A' Fire Diesel will start at 70 psig and the 'B' Fire Diesel will start at 65 psig. Distractor 1: Plausible because a smoke detector in the Main Control is a fire protection instrument but incorrect because this would cause CREV to go on PURGE mode but not start a fire diesel. Distractor 2: Plausible because fire protection heat sensors can actuate deluge which would lead to a fire diesel start but incorrect because the sensors in the EDG rooms actuate the CARDOX system. Distractor 3: Plausible because the MO 1/2-3906 would isolate the SW system from the fire header which could lead to lower fire header pressure but incorrect because the bypass line around the MO 1/2-3906 would still maintain fire header pressure. Reference: QCOA 4100-11 Revision 34, Lesson plan LN-4100 Reference provided during examination: None. Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: Quad Cities Exam Bank (QDC.03-01 NRC RO 20) Question History: n/a 10 CFR Part 55 Content: 41.7 KA: 600000, AK2.01 - Knowledge of the interrelations between PLANT FIRE ON SITE and the following: Sensors / detectors and valves. (RO= 2.6) Comments:

20 **ID: 2120589** **Points: 1.00**

Both Units are operating at 100% Power in normal electric plant lineups and with Main Generator Voltage regulation in AUTO.

Due to extremely hot weather, QCOA 6000-02, MAIN GENERATOR ABNORMAL OPERATION, and QCOA 6000-03, LOW SWITCHYARD VOLTAGE, are entered.

On both Units, the Unit Supervisor directs the ANSO to raise VARS as allowed by the Generator Capability Curve.

What is the reason for this action?

A. maintain the operability of ECCS equipment.

B. reduce the reactive heat load of the other generators on the grid.

C. facilitate the adjustment of the RAT TAP settings in the manual mode of operation.

D. prevent an unnecessary automatic actuation of the Generator Core Monitor Sampler system.

Answer: A

Answer Explanation
Raising Generator Voltage is Subsequent Operator Action Step D.2.a in QCOA 6000-02. If voltage cannot be raised to >348.2kV, Step D.2.c directs operators to QCOA 6000-03, which starts the process of determining offsite sources. Distractor 1: Plausible because raising generator voltage will increase the VAR load at Quad Cities and tend to lower the VAR load at other locations on the grid but is incorrect because it is not the stated purpose for this operator action. Distractor 2: Plausible because adjusting the TAP setting is a potential subsequent action for this situation but incorrect because raising Unit 1 Generator voltage does nothing to facilitate TAP adjustment. Distractor 3: Plausible because the Generator Core Monitor Sampler system operation is described in QCOA 6000-01, which is closely related to QCOA 6000-02 & 03 but incorrect because this system automatically actuates on a Stator Cooling Panel Trouble alarm and not low grid voltage. Reference: QCOA 6000-02 Revision 20, QCOA 6000-03 Revision 22 Reference provided during examination: None. Cognitive level: Memory Level (RO/SRO): RO Tier: 1 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.4/41.5/41.7/41.10 KA: 700000, AK3.02 - Knowledge of the reasons for the following responses as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: Actions contained in abnormal operating procedure for voltage and grid disturbances. Comments:

21 **ID: 2123986** **Points: 1.00**

During a Loss of Main Condenser Vacuum, the turbine bypass valves will close automatically.

What is the Turbine Bypass Valve closure setpoint and the reason for it?

A. 23 in. Hg Backpressure

Limit heat input to the main condenser

B. 9 in. Hg Backpressure

Ensure APLHGR is not exceeded

C. 9 in. Hg Backpressure

Limit heat input to the main condenser

D. 23 in. Hg Backpressure

Ensure APLHGR is not exceeded

Answer: A

Answer Explanation
UFSAR 10.4.1.5 Loss of condenser vacuum is an indication of loss of normal heat sink. Therefore, loss of condenser vacuum initiates a closure of the turbine stop valves and turbine bypass valves which eliminates heat input to the condenser. Reactor scram occurs in the run mode at greater than or equal to 21.6 in. Hg vacuum per Technical Specifications, stop valve closure occurs at 20 in. Hg vacuum, and bypass valve closure occurs at 7 in. Hg vacuum. 7 in. Hg vacuum is equal to 23 in. backpressure. Distractor 1: Plausible because 9 in Hg backpressure is the scram setpoint and is to limit heat input to the condenser but incorrect because the setpoint for bypass valves is 23 in Hg. Distractor 2: Plausible because the setpoint for bypass valve closure is 23 in. Hg but incorrect because MCPR is the limit related to a loss of condenser vacuum, not APLHGR. Distractor 3: Plausible because the reason to limit heat input into the condenser is correct but incorrect because 9 in. Hg corresponds to the scram setpoint. Reference: UFSAR Section 10.4.1.5 and QOA 3300-02 Revision 40. Reference provided during examination: None. Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 1 Group: 2 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.5/45.6 KA: 295002, AK3.04 Knowledge of the reasons for the following as they apply to LOSS OF MAIN CONDENSER VACUUM: Bypass Valve Closure. (RO= 3.4) Comments:

22 **ID: 2120590** **Points: 1.00**

Unit 1 was operating at 100% power when a transient occurred resulting in a Reactor scram. After 1 minute:

• The Main Turbine and Generator are on-line
• The NSO reports that Reactor water level is at +50 inches and rising
• the 'C' RFP is running

What action, if any, is required?

A. manually TRIP the Reactor Feed Pumps ONLY

B. manually TRIP the Main Turbine AND Reactor Feed Pumps.

C. No action required

D. manually TRIP the Main Turbine ONLY

Answer: B

Answer Explanation
RPV water level is currently +50 inches, the RFP and Turbine should have tripped at +48 inches. Per QCAN 901(2)-6 F-11, MAIN TURBINE/RFP HIGH LEVEL TRIP, **AUTOMATIC ACTIONS** 1. **IF** Reactor high level is sensed by sensors A or C **AND** B or D, (one-out-of-two twice), **THEN**: a. Main Turbine and Generator trip. and, **IF** Reactor water level is confirmed to be > 50 inches, **THEN**: a. **Verify** automatic actions occurred. Therefore level in the QGA's (when known, and able to be controlled) is always maintained up to +48" as a maximum value. Distractor 1: Plausible but incorrect because the Turbine and the RPF should be tripped based on failing to auto trip at +48 inches. Distractor 2: Plausible because the main turbine should have tripped at +48 inches but incorrect because the RFP should have tripped as well and should be secured. Distractor 3: Plausible because the Reactor Feed pumps should have tripped at +48 inches but incorrect because the Main Turbine should have tripped as well and should be manually tripped. Reference: QCAN 901(2)-6 F-11, MAIN TURBINE/RFP HIGH LEVEL TRIP, Revision 9 Reference provided during examination: None. Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 1 Group: 2 Question Source: Quad Cities Exam Bank (QDC.10-01 COMP RO 22) Question History: n/a 10 CFR Part 55 Content: 41.7/45.6 KA: 295008, AA1.07 - Ability to operate and/or monitor the following as they apply to HIGH REACTOR WATER LEVEL: Main turbine: Plant-Specific. (RO= 3.4) Comments:

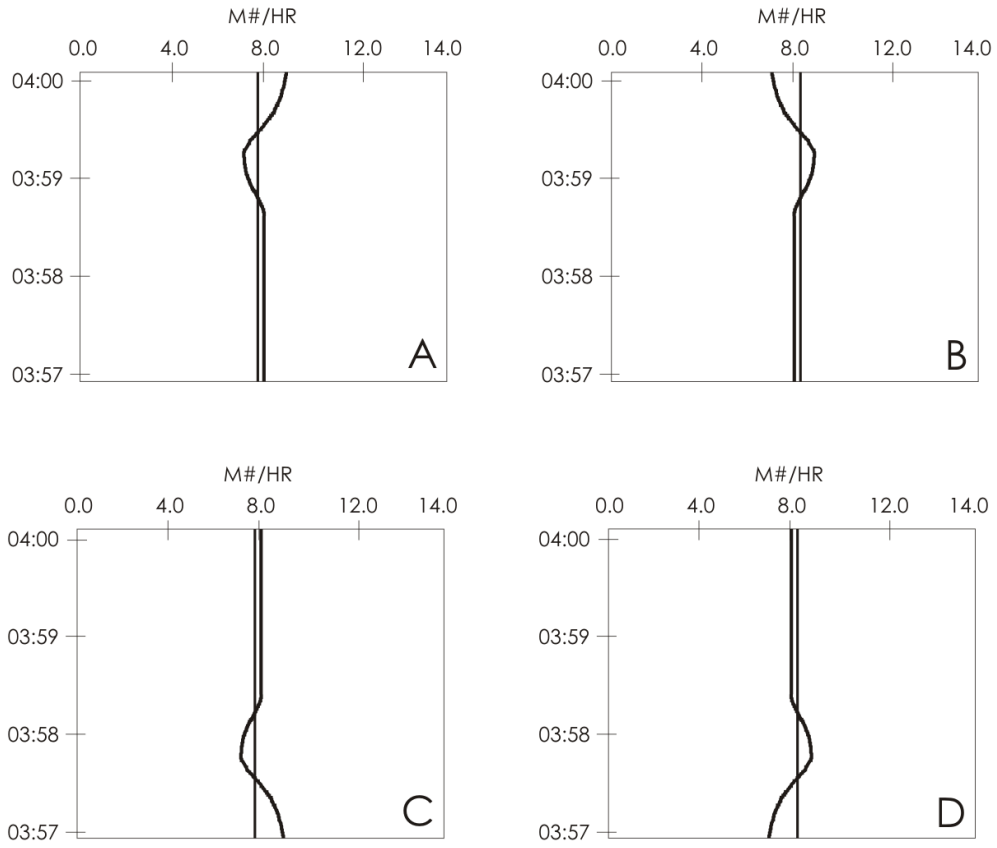
23 **ID: 2120591** **Points: 1.00**

Unit 1 is at 70% power when LT 1-0263-23A (ATWS LEVEL TRANSMITTER, ECCS CH. A) slowly fails upscale.

DFWLC is in SINGLE-ELEMENT throughout the transient and steam flow remains constant.

The following traces show feed flow and steam flow as viewed on UR 1-0640-26, TURB STM FLOW, RX LVL AND FW FLOW

Which of the following traces shows that Reactor Water Level is rising?



A. A

B. B

C. C

D. D

Answer: A

Answer Explanation
A level transmitter (inputting to DFWLC) failing upscale will cause DFWLC to see a high level and the FRVs to close and actual Reactor water level to lower. The UR 1-640-26 is a Yokogawa DX100 recorder that shows a vertical trend. The current conditions appear at the top of the trace and the parameter value increases from the left to the right. To establish a rising water level trend, steam flow must be less than feed flow. Therefore, trace A shows a current trend of rising RPV level. Distractor 1: Steam flow is greater than feed flow, therefore showing a current trend of lowering RPV level. Distractor 2: Current trend is at the top of the recorder, therefore RPV level is steady. Distractor 3: Current trend is at the top of the recorder, therefore RPV level is steady. (Note: Since CRD flow is also adding to the RPV, steam flow and feed flow will not be the same. Therefore, feed flow will be slightly lower than steam flow even though RPV water level is constant. If DFWLC is in single-element and feed flow is constant, RPV level must be constant at 30".) Reference: Picture of UR 1-640-26 vertical trend Reference provided during examination: Data trends embedded in question. Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 2 Question Source: Quad Cities Exam Bank (QDC.ILT.15541) Question History: n/a 10 CFR Part 55 Content: 41.10/43.5/45.13 KA: 295009, AA2.02 - Ability to determine and/or interpret the following as they apply to LOW REACTOR WATER LEVEL: Steam flow/feed flow mismatch. (RO= 3.6) Comments:

24 **ID: 2123989** **Points: 1.00**

Unit 1 was operating at 100% power when a spurious Group 1 Isolation and Hydraulic ATWS occurred. The crew is taking actions per QGA 101, RPV CONTROL(ATWS) to intentionally lower RPV water level.

The following annunciators are in alarm.

901-4 G-17 TORUS WATER HIGH TEMP

901-5 A-8 GROUP II ISOL CH TRIP

901-5 F-8 RX VESSEL LOW LEVEL

901-7 H-3 CONDENSER LO VACUUM 24 IN. HG

Drywell pressure is 1.6 psig and steady.

Which annunciator has the HIGHEST priority to report to the Unit Supervisor and why?

A. 901-7 H-3 CONDENSER LO VACUUM 24 IN. HG, because the condenser is needed for Feed/Condensate to restore RPV water level.

B. 901-4 G-17 TORUS WATER HIGH TEMP, because high torus temperature is a QGA 200, PRIMARY CONTAINMENT CONTROL, entry condition.

C. 901-5 A-8 GROUP II ISOL CH TRIP, because QGA actions require a verification of isolations and actuations.

D. 901-5 F-8 RX VESSEL LOW LEVEL, because low RPV water level is a QGA 100, RPV CONTROL, re-entry condition.

Answer: B

Answer Explanation
Torus Water High Temp is due to heat input from relief valves opening after MSIV closure. 901-4 G-17 is a "yellow boarder" alarm and is a QGA 200 entry condition, which has not been entered at this point. All other annunciators are expected for the current plant conditions. GROUP II ISOL CH TRIP de to Low RPV water level, RX VESSEL LOW LEVEL due to "terminate and prevent injection", CONDENSER LO VACUUM due to MSIVs being closed. Distractor 1: Plausible because verifying actuations and isolations is a step covered in the EOP but incorrect because it has already been addressed if level is being lowered per QGA 101. Distractor 2: Plausible because RX vessel low level is an EOP entry condition but incorrect because this is an expected alarm, QGA 100 has already been entered to get to QGA 101 and RPV water level is being lowered intentionally. Distractor 3: Plausible because the condenser is required to use Feed/Condensate but incorrect because RFPs were secured for "terminate and prevent injection" because water level is being lowered intentionally and MSIVs are closed. Reference: QCAP 0200-10. Reference provided during examination: None. Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 1 Group: 2 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.10/43.5/45.3/45.12 KA: 295013 High Suppression Pool Temperature, Generic K/A 2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm. (RO=4.1) Comments:

25 **ID: 2124056** **Points: 1.00**

Unit 2 is in a refueling outage in Mode 4.

- Shutdown Cooling is in operation on the 'A' loop
- Busses 11 and 12 are OOS for cubicle inspections
- RPV Water Level is in band (+50 to +60 inches)
- RPV Water Temperature is 195°F

An inadvertent Group II Isolation occurs.

What is the PRIMARY operational concern in this condition?

A. RPV metal temperature will lag actual RPV water temperature resulting in a shell to flange differential temperature exceeding 140°F.

B. Recirc loop temperatures may approach the 50°F differential temperature limit

C. Reactor vessel temperature stratification may occur and result in RPV re-pressurization.

D. Maintaining RPV water level in the current band to allow for natural circulation flow

Answer: C

Answer Explanation
Per QCOP 1000-05 SHUTDOWN COOLING OPERATION, D.8. "**WHEN** both Reactor Recirc Pumps are off, **THEN** temperature stratification may occur **AND** may result in Reactor re-pressurization. Consider using a level band of 85”-95” to allow for natural circulation to supplement shutdown cooling." Distractor 1: Plausible because with a loss of Shutdown Cooling and no Recirc pumps operating RPV water temperatures will rise causing a ΔT but incorrect because there are no Recirc pump running or Shutdown Cooling flow and thus would not be a priority. Distractor 2: Plausible because the 50°F ΔT is a restrictive limit for starting a Recirc Pump which could remedy the problem but incorrect because busses 11 and 12 are OOS and the Recirc pumps do not have power Distractor 3: Plausible because allowing for natural circulation would aid in keeping temperatures equalized and cool the core but incorrect because the prescribed band for natural circulation is 85 - 95 inches. Reference: QCOP 1000-05, QCOA 1000-02 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.8/41.10 KA: 295020 Inadvertent Containment Isolation, AK1.04 Knowledge of the operational implications of the following concepts as they apply to INADVERTENT CONTAINMENT ISOLATION: Bottom head thermal stratification. (RO= 2.5) Comments:

26 **ID: 2124093** **Points: 1.00**

Unit 1 is in Mode 5 with fuel moves in progress when the following annunciators alarm:

• 901-3 G-16, FUEL POOL CHANNEL "A" HI RADIATION
• 901-3 H-16, FUEL POOL CHANNEL "B" HI RADIATION

The Reactor Building vent fans are running, and the isolation dampers are open with the 1/2 B Standby Gas Treatment System train running.

What action is required and why?

A. Leave both systems RUNNING to ensure the Secondary Containment pressure remains negative.

B. TRIP the RB supply and exhaust fans and CLOSE the isolation dampers to prevent an unfiltered release of radioactive particles.

C. STOP the 1/2 B SBGTS train because running it in conjunction with the RB vents may cause damage to the train.

D. TRIP the RB supply and exhaust fans and leave the isolation dampers OPEN to ensure all effluent is processed through SBGTS.

Answer: B

Answer Explanation
Per QCAN 901(2)-3 G-16 / H-16 state Fuel Pool radiation monitors 1-1705-16A/B provide initiation signals at for Reactor Building ventilation to isolate and Standby Gas Treatment System to start. The stem indicates that while SBGTS started, the isolation of Reactor Building ventilation failed to occur. Distractor 1: Plausible but incorrect because the SBGTS should be left running with an initiation signal present. Distractor 2: Plausible because SBGTS is enough to maintain the Reactor Building differential pressure negative but incorrect because the Reactor Building ventilation system should be isolated because it exhausts unfiltered, non-elevated air. Distractor 3: Plausible because leaving the Reactor Building ventilation system dampers open creates an additional inflow of air but incorrect because it may not allow the SBGTS to maintain a negative Reactor Building different pressure. Reference: QCAN 901(2)-3 G-16 rev 8, QCAN 901(2)-3 H-16 rev 8 Reference provided during examination: None Cognitive level: High Level (RO/SRO): RO Tier: 1 Group: 2 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.7 K/A: 295033, EK2.03 - Knowledge of the interrelations between HIGH SECONDARY CONTAINMENT AREA RADIATION and the following: Secondary containment ventilation: Plant-Specific (RO=3.7) Comments:

27 **ID: 2120592** **Points: 1.00**

Unit 1 was at 100% power when a large steam leak developed in the MSIV room.

The MSIVs failed to respond to the isolation signal, and the NSO was unsuccessful at closing the MSIVs.

If steam continues to be released in the MSIV room, one possible consequence is that:

A. the reactor building ventilation system will isolate on high reactor building pressure, terminating any potential release.

B. the ventilation door between the MSIV room and reactor building may be blown open.

C. the reactor building to torus vacuum breakers may open, causing Nitrogen to be released into the reactor building.

D. the reactor building blowout panels may blow out, causing an uncontrolled release.

Answer: D

Answer Explanation
Answer Explanation: When the reactor is at power, the MSIV room is part of the reactor building, (i.e. the MSIV room to reactor building ventilation door is open and MSIV room door interlocks are operable). If a large steam leak occurs in the MSIV room, the reactor building will pressurize making it possible for the reactor building blowout panels to actuate. (design positive pressure is 70 lbs. / ft^2 or ~.48 lbs./ in^2) Distractor 1: Plausible because the vacuum breakers will actuate with a reactor building pressure 0.2 psi > torus pressure. Incorrect because the result would be air flow into the Torus not Nitrogen flow out. Distractor 2: Plausible because Reactor Building Supply fans may trip on the low d/p and possibly followed by Reactor Building Exhaust fans if the d/p spikes high. Incorrect because the Reactor Building Vent Isolation Dampers do not close as a result of Supply and/or Exhaust Fans tripping. Distractor 3: Plausible because the door opens into the Reactor Building from the MSIV room. Incorrect because the door is opened and kept open when the MSIV room is made part of the Reactor Building, (i.e. secondary containment). This is the normal configuration. Reference: QOP 0020-02, rev.19 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 1 Group: 2 Question Source: Quad Cities Exam Bank (QDC.ILT.01-01-47.1) Question History: n/a 10 CFR Part 55 Content: (41.5 / 45.6) KA:295035, EK3.01 - Knowledge of the reasons for the following responses as they apply to SECONDARY CONTAINMENT HIGH DIFFERENTIAL PRESSURE: Blow-out panel operation: Plant-Specific. (RO= 2.8) Comments:

28 **ID: 2120593** **Points: 1.00**

Unit 2 is at 100% power with the Unit 2 EDG OOS.
Bus 24 trips on overcurrent.

With regard to the following valves,

- MO 2-1001-28A/B, OUTBD LPCI INJ VLV
- MO 2-1001-29A/B, INBD LPCI INJ VLV

All LPCI injection valves will _____.

A. momentarily lose power but will re-energize immediately.

B. lose power but will re-energize after a 17 second time delay.

C. lose power and will remain de-energized.

D. remain energized.

Answer: B

Answer Explanation
Unit 2 LPCI injection valves are powered from MCC 28/29-5, which is normally powered from Bus 29 (due to Bus 29 being fed by the associated Unit 2 EDG will should be available on a loss of off-site power). When Bus 24 trips with the Unit 2 EDG OSS, Bus 29 will remain de-energized. Since the EDG does not re-energize Bus 29, MCC 28/29-5 transfers to Bus 28 after a 17 second time delay. The surveillance acceptance criteria is 15 to 19 seconds for the auto-transfer. The ILT students are taught 17 seconds as a nominal value. Distractor 1: Plausible but incorrect because Bus 28 is the normal feed to MCC 28/29-5. Distractor 2: Plausible but incorrect because the transfer to Bus 28 requires manual operator action. Distractor 3: Plausible but incorrect because MCC 28/29-5 will immediately transfer to Bus 28 if the EDG is loaded onto Bus 29 AND an undervoltage condition is present for 2 seconds. Reference: QOA 6700-05, QCOS 6700-02 Reference provided during examination: None. Cognitive level: High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.LORTB.0558) Question History: n/a 10 CFR Part 55 Content: 41.7/45.7 KA: 203000, K6.03 - Knowledge of the effect that a loss or malfunction of the following will have on the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC): Emergency generator. (RO= 3.7) Comments:

29 **ID: 2124087** **Points: 1.00**

Unit 2 is in Mode 4 with RHR "B" loop in Shutdown Cooling.

- RHR "B" system flow is 3000 gpm
- One RHR pump is running with a discharge pressure of 207 psig
- RHRSW is in operation
- Reactor coolant temperature is 190ºF
- Cooldown rate is 15ºF/hr

The operator throttles OPEN the MO 2-1001-28B, B LPCI LOOP UPSTREAM SV for 3 seconds.

As a result of throttling MO 2-1001-28B open, cooldown rate will _____(1)_____ and the DIFFERENCE between RHRSW heat exchanger outlet pressure and RHR pump discharge pressure will _____(2)_____.

A. (1) lower
(2) rise

B. (1) rise
(2) rise

C. (1) rise
(2) lower

D. (1) lower
(2) lower

Answer: B

Answer Explanation
Opening the 28B injection valve will increase injection into the RPV, raising cooldown rate. Although SDC flow rises, discharge pressure of the pump will lower due to less resistance of the system. Distractor 1 is incorrect: Plausible if candidate assumes that RHR system pressure is maintained higher than RHRSW pressure or that the 28B valve is located upstream of the RHR heat exchanger. Distractor 2 is incorrect: Combination of distractor 1 and 3. Distractor 3 is incorrect: Plausible because this is the behavior of the SDC parameters when the RHR HX bypass valve is throttled open (second method of controlling cooldown rate). Reference: QCOP 1000-05 Rev 61 Reference provided during examination: None. Cognitive level: High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.15571) Question History: n/a 10 CFR Part 55 Content: 41.5/45.5 KA: 205000, A1.06 - Ability to predict and/or monitor changes in parameters associated with operating the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) controls including: Reactor temperatures (moderator, vessel, flange). (RO= 3.7) Comments:

30 **ID: 2124072** **Points: 1.00**

Unit 2 was operating at 100% power.

A fault in the ESS UPS and failure of the ABT switch to operate results in a loss of the Essential Service Bus.

The Essential Service Bus power supply was manually transferred to MCC 28-2.

(1) How will the HPCI system respond to an initiation signal?

(2) What action, if any, is required to restore HPCI to automatic operation?

A. (1) HPCI will inject at approximately 5600 gpm.
(2) Depress the AUTO pushbutton on the HPCI FLOW CONTROLLER.

B. (1) HPCI will NOT inject.
(2) Depress the AUTO pushbutton on the HPCI FLOW CONTROLLER.

C. (1) HPCI will inject at approximately 5600 gpm.
(2) No operator action is required.

D. (1) HPCI will NOT inject.
(2) Position the MOTOR SPEED CHANGER to the High-Speed Stop to allow the MOTOR GEAR UNIT to automatically control flow.

Answer: A

Answer Explanation

Answer Explanation: Per QOA 6800-03, 120/240 VAC Essential Service Bus Failure, the HPCI Flow Controller fails to MANUAL and must be placed back into AUTO on a loss of power.
In the standby lineup, the HPCI steam flow control valves are closed, (MSC at Low Speed Stop). With an initiation signal present, the valves will align for injection and the MSC will run to the High-Speed Stop (HSS) even with the Flow Controller in Manual. The HPCI turbine will have full steam flow and the pump will inject at approx. 5600 gpm with the MGU remaining at the High-Speed Stop (HSS) as its position is controlled by the Flow Controller which is presently in Manual.

Distractor 1: Plausible because the HPCI Flow Controller is in Manual and must be placed in Auto after the loss of ESS. Incorrect because the MSC is not controlled by the HPCI Flow Controller and will run to the HSS opening the steam flow control valves allowing HPCI to inject.
Distractor 2: Plausible because HPCI will inject. Incorrect because the AUTO pushbutton on the HPCI Flow Controller must be depressed to return to AUTO operation.
Distractor 3: Plausible because operating the MSC will change HPCI flow. Incorrect because with the Flow Controller in Manual the MGU will not automatically come off the HSS and automatically control flow if setpoint changes are made.

Reference: QOA 6800-03, 120-240 VAC ESSENTIAL SERVICE BUS FAILURE, Revision 49
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): RO
Tier: 2 Group: 1

Question Source: New
Question History: n/a

10 CFR Part 55 Content: 41.5/45.6

KA: 206000, A2.14 - Ability to (a) predict the impacts of the following on the HIGH PRESSURE INJECTION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Flow controller failure: BWR-2,3,4. (RO= 3.3)

Comments:

31 **ID: 2124058** **Points: 1.00**

Unit 1 was operating at 100% power when a "B" Main Steam Line break inside containment occurs.

- RPV pressure is 800 psig
- RPV water level is +30 inches
- Drywell pressure is 3.1 psig
- Drywell temperature is 169°F
- Torus pressure is 1.5 psig

Which of the following annunciators will be in alarm?

(1) 901-3 C-15, AUTO BLOWDOWN INTERLOCK CORE SPRAY/RHR
(2) 901-3 D-3, CORE SPRAY PUMP AREA HI TEMP
(3) 901-3 B-16, CS DISCH HDR HI/LO PRESSURE
(4) 901-3 E-4, CORE SPRAY PUMP 1401A OVERLOAD

A. 1 and 2

B. 1 and 3

C. 2 and 4

D. 3 and 4

Answer: B

Answer Explanation
QCAN 901(2)-3 C-15, the alarm is actuated from pressure switches PS 1(2)-1462A-D at 119-127 psig. Any running core spray pump will actuate the alarm. The Core Spray pumps will start at 2.5 psig Drywell pressure. QCAN 901(2)-3 A-5, the alarm is actuated from PS 1(2)-1471A/B or PS 1(2)-1467A/B which is again at the pump discharge. This alarm will initially actuate and then clear when the core spray minimum flow valve opens (set point $\geq$ 350 psig) thereby lowering the discharge pressure. Distractor 1: Plausible because 901-3 C-15, AUTO BLOWDOWN INTERLOCK CORE SPRAY/RHR would be in alarm due to DW pressure above 2.5 psig but incorrect because no condition is listed that would cause 901-3 D-3, CORE SPRAY PUMP AREA HI TEMP. Distractor 2: Plausible but incorrect because no conditions are listed to cause 901-3 D-3, CORE SPRAY PUMP AREA HI TEMP or 901-3 E-4, CORE SPRAY PUMP 1401A OVERLOAD. Distractor 3: Plausible because 901-3 B-16, CS DISCH HDR HI/LO PRESSURE will alarm based on CS pump discharge pressure when the CS pumps start at 2.5 psig DW pressure but incorrect because no condition is listed to cause 901-3 E-4, CORE SPRAY PUMP 1401A OVERLOAD Reference: QCAN 901(2)-3 C-15 Revision 7, QCAN 901(2)-3 B-16 Revision 18 Reference provided during examination: None. Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.7/45.7 KA: 209001, A3.06 - Ability to monitor automatic operations of the LOW PRESSURE CORE SPRAY SYSTEM including: Lights and alarms. (RO= 3.6) Comments:

32 **ID: 2124051** **Points: 1.00**

Unit 1 is experiencing an ATWS.

The NSO completes immediate operator actions and places the SBLC "1A AND 1B PUMP SELECT" switch in the "SYS 1" position.

- Reactor Pressure is 800 psig.
- RWCU has isolated.
- SBLC Squib 'A' light is LIT.
- SBLC Squib 'B' light is LIT.
- SBLC Pump 1 light is LIT.
- SBLC Pump 2 light is OUT.
- SBLC TANK LVL, 1-1140-2, is at 85%
- SBLC PMP DISCH PRESS, 1-1140-1, reads 1600 psig.

What is the status of the SBLC Flow Indicating Light?

Is SBLC injecting to the RPV?

A. ON; No

B. OFF; Yes

C. OFF; No

D. ON; Yes

Answer: C

Answer Explanation
The Squib lights extinguish when SBLC is initiated. With Squib A and B lights on and the discharge pressure at 1600 psig, the system pressure is being controlled by the relief valve as it cycles back to the tank. The Relief valve setpoint is 1554-1650 (1602 ± 48) psig. The Flow Indicating light is downstream of the explosive valves and would be OFF since the squib valves did not fire. Distractor 1: Plausible because SBLC will NOT be injecting into the RPV but incorrect because the SBLC Flow indicating light will be ON. Distractor 2: Plausible because SBLC will NOT be injecting to the RPV, but incorrect because the SBLC Flow light will be ON. Distractor 3: Plausible but incorrect because the SBLC Flow light will be ON and SBLC will NOT be injecting into the RPV. Reference: P&ID M-40 Revision AZ Reference provided during examination: None. Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.1742211) Question History: n/a 10 CFR Part 55 Content: 41.7/45.5/45.8 KA: 211000, A4.02 - Ability to manually operate and/or monitor in the control room: SBLC control switch. (RO= 4.2) Comments:

33 **ID: 2124107** **Points: 1.00**

Unit 1 was operating at 40% power when a pneumatic supply line failure causes Outboard MSIVs AO-1-203-2A and AO-1-203-2B to slowly drift closed over 30 seconds.

What is the response, if any, of the Reactor Protection System?

A. Half scram on RPS 'A', ONLY

B. Full scram

C. None

D. Half scram on RPS 'B', ONLY

Answer: A

Answer Explanation
RPS logic is arranged such that it takes at least 2 different MSIVs for a half scram to occur and 3 lines for a full scram to occur based on MSIV position alone. The trip logic is as follows: RPS A1 = A+B RPS A2 = C+D RPS B1 = A+C RPS B2 = B+D The stem states that lines A and B close, which then trip ONLY RPS channel A1. Therefore, a half scram on RPS A will be received. Distractor 1: Plausible because a Group 1 isolation will cause a scram on MSIV position, but incorrect because the MSIVs going closed will not cause a Group 1 isolation. Distractor 2: Plausible because it is correct if the RPC logic is misapplied for RPS trips. Distractor 3: Plausible because there are two combinations of valve closures that will not cause a half or full scram but incorrect because MSIV closure logic listed causes a half scram. Reference: E-print 4E-1465 Revision AT Reference provided during examination: None Cognitive level: High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.907232) Question History: n/a 10 CFR Part 55 Content: 41.5 K/A: 212000, K5.02 - Knowledge of the operational implications of the following concepts as they apply to REACTOR PROTECTION SYSTEM: Specific logic arrangements. (RO=3.3) Comments:

34 **ID: 2124004** **Points: 1.00**

Which of the following would place the Unit in a one hour Technical Specification action statement?

A. Installing jumpers per QCOP 0500-07, BYPASSING "A" CHANNEL OF THE REACTOR MODE SWITCH TO SHUTDOWN SCRAM in Mode 2.

B. Installation of jumpers per QCOP 7000-03, UNIT 1 REACTOR PROTECTION SYSTEM MG SETS, to bypass the Channel ‘A’ OPRM scram function in Mode 1.

C. Removal of the SRM Shorting Links in Mode 5.

D. RPS MG Set EPA unit trip on overvoltage in Mode 1.

Answer: A

Answer Explanation
When the unit is in MODE 1 or 2, TS 3.3.1.1 Condition C requires FUNCTION 11 of scramming when placing the Mode Switch to Shutdown. This is NOT maintained with the jumpers installed. Condition C allows 1 hour to restore RPS trip capability. Distractor 1: Plausible because the RPS scram logic is changed, however, it does not bypass any existing function. Distractor 2: Plausible because it is a TS 72 hour action statement. Distractor 3: Plausible because a scram function is bypassed, and TS has an action statement to restore the function to operable status. Reference: Quad Cities Technical Specifications Reference provided during examination: None. Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.7/41.10/43.2/45.13 KA: 212000, G2.2.39 - Knowledge if less than or equal to one hour Technical Specification action statements for systems. (RO= 3.9) Comments:

35 **ID: 2123999** **Points: 1.00**

Unit 1 is performing a startup.

All IRM's are on Range 4.
The Reactor Mode switch is in STARTUP.
IRM 16 indicating 115/125 of full scale.

Which of the following automatic actions, if any, will occur?

A. There is NO effect on RPS or RMCS.

B. Half scram ONLY.

C. Rod Block ONLY.

D. Half scram AND a rod block.

Answer: C

Answer Explanation
Rod Block ONLY. A rod block will occur when an IRM is high (112/125 of scale) and the mode switch is not in RUN. Distractor 1: Plausible but incorrect. A Rod Block will occur on RPS A when a channel 'A' IRM is HIGH (112/125 of scale). Distractor 2: Plausible because the rod block will occur at 112/125 of scale but incorrect because half scram is set at 125/125 (IRM HIGH-HIGH. Distractor 3: Plausible but incorrect because the half scram will not occur until 125/125 of scale. Reference: QCAN 901(2)-5 A-5, rev.6 Reference provided during examination: None Cognitive Level: High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.688437) Question History: n/a 10 CFR Part 55 Content: 41.2-41.9/45.7/45.8 KA: 215003, K1.03 - Knowledge of the physical connections and/or cause effect relationship between INTERMEDIATE RANGE MONITOR (IRM) SYSTEM and the following: Rod control and information system: Plant-Specific. (RO= 3.1) Comments:

36 **ID: 2120595** **Points: 1.00**

Unit 2 was operating at 100% power when Bus 28 tripped on overcurrent.

The reactor scrammed shortly after Bus 28 tripped.

What is the position of the Intermediate Range Monitors (IRMs) two minutes after the scram?

A. All IRMs are fully inserted

B. All IRMs are fully withdrawn

C. ONLY half of the IRMs are driving into the core.

D. All IRMs are driving into the core

Answer: C

Answer Explanation
The motors for IRM 11, 12, 13, and 14 are powered from MCC 28-1A-1, and motors for IRM 15, 16, 17 and 18 are powered from MCC 29-1-1. Therefore, with stated conditions 1/2 of the IRMs will be driving into the core and 1/2 will not. Per the procedure it takes 3.5 minutes to drive the detectors into the core. Distractor 1: Plausible because the IRMs drive into the core automatically but incorrect because 2 minutes is not long enough for them to drive in. Full drive time is approximately 3.5 minutes. Distractor 2: Plausible because the detector drives are powered from two different sources but incorrect because half of the IRM's drive motors are deenergized. Distractor 3: Plausible because some IRM drive motors are powered from MCC 28 but incorrect because half of the IRM drive motors are powered from MCC 29 and would drive in automatically. Reference: QOM 2-6800-T08 rev. 9 Reference provided during examination: None Cognitive level: High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.1244932) Question History: 2016 ILT NRC Exam 10 CFR Part 55 Content: 41.7/45.7 KA: 215003, K6.03 - Knowledge of the effect that a loss or malfunction of the following will have on the INTERMEDIATE RANGE MONITOR (IRM) SYSTEM: Detector drive motor. (RO= 2.8) Comments:

37 **ID: 2120596** **Points: 1.00**

On Unit 1, which of the following, if de-energized for an extended period (≥ 8 hours), will result in the loss of Source Range Monitor (SRM) channel 21?

A. U1 120 VAC Instrument Bus

B. U1 Essential Service Bus

C. MCC 19-2

D. MCC 18-2

Answer: A

Answer Explanation
The direct power supply to SRM 21 is the 24/48 VDC Battery Bus 1A. The chargers for the 'A' 24/48 VDC batteries are powered by the Instrument Bus. Upon a loss of the Instrument Bus, the 24/48 VDC batteries will discharge until they are depleted. The 24/48 VDC station batteries are only designed to carry full load for 8 hours without recharging. When the 'A' 24/48 VDC batteries are depleted, SRM 21 will lose power, causing a loss of indication on that channel (as well as SRM 22). Distractor 1: Plausible because MCC 18-2 powers the Division 1 battery chargers for 125 VDC station batteries and 250 VDC station batteries and is selectable to power the swing charger for the 250 VDC station batteries but incorrect because there is no effect on 24/48 VDC batteries. Distractor 2: Plausible because MCC 19-2 powers the Division 2 battery chargers for 125 VDC station batteries and 250 VDC station batteries and is selectable to power the swing charger for the 250 VDC station batteries but incorrect because there is no effect on 24/48 VDC batteries. Distractor 3: Plausible because ESS powers the SRM recorder on the 901-5 panel but incorrect because the Essential Service Bus does not power any neutron monitoring system channels, nor any station battery chargers. Reference: QCOA 6800-01 Rev 5 Reference provided during examination: None Cognitive Level: High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.978623) Question History: n/a 10 CFR Part 55 Content: 41.7 KA: 215004, K2.01 - Knowledge of electrical power supplies to the following: SRM channels/detectors. (RO= 2.6) Comments:

38 **ID: 2120597** **Points: 1.00**

All SRMs are "SELECTED".

The SRM/IRM DETECTOR POSITION DISPLAY Switch is LATCHED (backlit green).

A scram occurs.

What is the response of the SRM detectors?

A. SRM detectors WILL NOT automatically insert until the scram is reset.

B. SRM detectors WILL fully insert into the core. Resetting the scram has NO effect.

C. SRM detectors WILL NOT insert until the DRIVE IN pushbutton is pressed.

D. SRM detectors WILL automatically insert.

Answer: D

Answer Explanation
The lights are inside of the pushbuttons (back lit). When the SRM/IRM DETECTOR POSITION DISPLAY light is lit (the latched position), if a scram occurs, all detectors will insert until fully inserted or the scram is reset. If not lit, and a scram occurs, all the detectors will insert until they reach the full in position. QCOP 0700-01 E.2: If the SRM/IRM DETECTOR POSITION display switch is in the selected condition, the SRMs will automatically insert until full in or until the scram is reset. Distractor 1: Plausible because the DRIVE IN pushbutton will cause the detectors to drive in but incorrect because the detectors will drive in automatically with no operator action. Distractor 2: Plausible but incorrect because the detectors will drive in and would stop if the scram was reset. Distractor 3: Plausible because the detectors will drive in automatically but incorrect because resetting the scram would stop the drives when the SRM/IRM DETECTOR POSITION DISPLAY is LATCHED. Reference: QCOP 0700-01 Revision 17 Reference provided during examination: None. Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.608271) Question History: n/a 10 CFR Part 55 Content: 41.5/45.5 KA: 215004, A1.01 - Ability to predict and/or monitor changes in parameters associated with operating the SOURCE RANGE MONITOR (SRM) SYSTEM control including: Detector position. (RO= 3.0) Comments:

39 **ID: 2123988** **Points: 1.00**

Which of the following will cause a Half Scram to be generated by the Reactor Protection System automatically?

A. Mode switch is in STARTUP

APRM Flow Converter #1 fails high with reactor power at 20%.

B. Mode switch is in RUN

IRM 12 fails upscale and APRM 4 fails downscale.

C. Mode switch is in RUN

IRM 12 Mode Switch is STANDBY; APRM 2 fails downscale

D. Mode switch is in STARTUP

SRM 23 indicates Hi-Hi

Answer: C

Answer Explanation

The IRM-APRM companion relationship is active with the Mode Switch in RUN. An IRM Hi-Hi or INOP and its companion APRM downscale will result in an RPS actuation, (i.e. 1/2 scram).

The companion relationship is:
IRM 11 APRM 1
IRM 12 APRM 2
IRM 13 APRM 3
IRM 14 APRM 3
IRM 15 APRM 5
IRM 16 APRM 6
IRM 17 APRM 4
IRM 18 APRM 4

Distractor 1: Plausible because a half scram will have to be inserted for this condition but incorrect because it has to be inserted manually.
Distractor 2: Plausible because if IRM/APRM companion trip with the mode switch in RUN it would generate a companion half scram but incorrect because this IRM 12 and APRM 4 are not companions.
Distractor 3: Plausible but because an SRM HI-HI would cause a scram if the shorting links were removed but incorrect because shorting links are normally installed.

Reference: 4E-1464 Sh.1
Reference provided during examination: None.

Cognitive level (High/Memory): Memory

Level (RO/SRO): RO
Tier: 2 Group: 1

Question Source: New
Question History: n/a

10 CFR Part 55 Content: 41.7/45.4

KA: 215005, K3.06 - Knowledge of the effect that a loss or malfunction of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM will have on the following: IRM: Plant-Specific. (RO= 3.5)

Comments:

40 **ID: 2120598** **Points: 1.00**

Power ascension is in progress with Unit 1 at 10% RTP in Mode 1, when a LPRM input to APRM Channel 1 fails DOWNSCALE.

- Annunciator 901-5 E-7 "LPRM DOWNSCALE is in alarm.
- Annunciator 901-5 C-6 "APRM DOWNSCALE is in alarm.
- APRM Channel 1 currently has 13 input LPRMs in OPERATE.

Which of the following identifies the impact of these conditions on rod withdrawal?

Per the nuclear instrumentation operating procedures, what action is required in order to continue with power ascension?

A. NO rod block exists.

   Bypass the failed LPRM ONLY to clear both downscale alarms.

B. A rod block exists.

   Bypass the failed LPRM ONLY to clear the rod block.

C. NO rod block exists.

   Bypass the failed LPRM and APRM Channel 1 to clear both downscale alarms.

D. A rod block exists.

   Bypass the failed LPRM and APRM Channel 1 to clear the rod block.

Answer: D

Answer Explanation
A rod block is issued when any APRM is downscale with the Reactor Mode switch in RUN. As soon as the LPRM is bypassed, only 12 LPRMs will be in OPERATE which will result in another rod block (due to < 13 LPRM inputs). Therefore, the APRM must be bypassed to continue rod withdrawal. Distractor 1: Plausible but incorrect because the rod block would clear when the LPRM is bypassed but incorrect because less than the required number of LPRMs (13) will be in operate therefore the rod block will not clear. Distractor 2: Plausible because less than 13 LPRMs results in an administratively inoperable APRM (similar to the < 2 LPRMs per level requirement) but incorrect because a rod block does exist. Distractor 3: Plausible because bypassing the LPRM could clear a rod block but incorrect because a rod block occurs with an APRM downscale and assumes that the APRM is operable. Reference: QCAN 901(2)-5 C-6 Rev 5, QCAN 901(2)-5 C-12 Rev 10, QCAN 901(2)-5 C-3 Rev 11 Reference provided during examination: None Cognitive level: High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.16456) Question History: n/a 10 CFR Part 55 Content: 41.5/45.6 KA: 215005.A2.08: Ability to (a) predict the impacts of the following on the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Faulty or erratic operation of detector/systems. (RO= 3.2) Comments:

41 **ID: 2120599** **Points: 1.00**

Unit 2 was operating at 100% power when a loss of all feedwater occurred.

The RCIC system was manually started and is currently injecting into the RPV for water level control.

If RPV water level reaches +48", the RCIC Turbine will trip by closing _____(1)_____.

The RCIC high RPV water level trip _____(2)_____.

A. (1) the MO 2-1301-61, STM TO TURB VLV
(2) AUTOMATICALLY resets

B. (1) the MO 2-1301-61, STM TO TURB VLV
(2) must be MANUALLY reset

C. (1) the 2-1303B, TRIP THROTTLE VLV
(2) must be MANUALLY reset

D. (1) the 2-1303B, TRIP THROTTLE VLV
(2) AUTOMATICALLY resets

Answer: A

Answer Explanation
Answer: The RCIC Steam Supply valve (1301-61) closes on a high RPV level trip. It auto-resets when the high RPV level condition clears. Distractor 1: Plausible because the RCIC Trip Throttle valve closes automatically but incorrect because its closure is on a RCIC trip from overspeed. Distractor 2: Plausible but incorrect because the RCIC Trip Throttle valve closes and must be manually reset. Distractor 3: Plausible because the MO 1301-61 closes but incorrect because it automatically resets, all other automatic RCIC trips must be manually reset. Reference: QCOP 1300-02 Rev 32, UFSAR Ch. 5.4.6.2 Rev 9 Reference provided during examination: None. Cognitive level: Memory Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.15523) Question History: n/a 10 CFR Part 55 Content: 41.7 KA: 217000, K4.02 - Knowledge of REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) design feature(s) and/or interlocks which provide for the following: Prevent over filling reactor vessel. (RO= 3.3) Comments:

42 **ID: 2123975** **Points: 1.00**

Unit 1 was at rated power when a scram occurred due to a loss of feedwater.

When the RCIC MAN INITIATION pushbutton is depressed and held, how will the following RCIC indications change 30 seconds later?

A. TRIP THROTTLE VALVE; RED (open) light will go OUT
GOVERNOR VALVE; GREEN (closed) light will go OUT

B. TRIP THROTTLE VALVE; RED (open) light will stay ON
GOVERNOR VALVE; RED (open) light will go OUT

C. TRIP THROTTLE VALVE; RED (open) light will go OUT
GOVERNOR VALVE; RED (open) light will go OUT

D. TRIP THROTTLE VALVE; RED (open) light will stay ON
GOVERNOR VALVE; GREEN (closed) light will go OUT

Answer: B

Answer Explanation
Answer Explanation: The TRIP THROTTLE VALVE is normally open and only closes on a turbine overspeed trip. The Governor valve is normally open and requires hydraulic oil pressure to close. When it starts to close, the red/open light goes out. The green closed light is normally off and does not come on as the governor valve throttles, leaving both lights off. Distractor 1: Plausible because the Governor valve throttles in the close direction to control turbine speed. Incorrect because the Trip Throttle Valve closes automatically on a turbine overspeed or if manually actuated with the local trip lever. Distractor 2: Plausible because Trip Throttle valve response is correct. Incorrect because it assumes the standby lineup for the Governor valve is closed and throttles open when the system is initiated. Distractor 3: Plausible because the Governor valve throttles to control turbine speed. Incorrect because the Trip Throttle valve does not throttle upon system initiation and the standby position of the Governor valve is open not closed. Reference: QCOP 1300-02 Rev 32, QCOP 1300-01 Rev 45 Reference provided during examination: None Cognitive level: Memory Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.7/45.7 KA: 217000, A3.06 - Ability to monitor automatic operations of the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) including: Lights and alarms. (RO=3.5) Comments:

43 **ID: 2120601** **Points: 1.00**

A LOCA with a reactor scram has occurred at time T= 0.

High pressure injection systems have failed to inject.

TIME (secs)	ACTION
T = 5	Drywell Pressure is 2.5 psig and rising.
T = 30	Low pressure ECCS pumps discharge pressure exceeds 100 psig.
T = 40	RPV water level is -59 in. and lowering 1"/min.
T = 60	Drywell pressure lowers to 2.0 psig and is steady.

How will the ADS system respond to this transient?

A. ADS system will actuate at T = 510 seconds.

B. ADS system will NOT actuate as a result of this transient.

C. ADS system will actuate at T = 150 seconds.

D. ADS system will actuate at T = 550 seconds.

Answer: C

Answer Explanation
Answer Explanation: The actuating signal is 2.5 psig DW pressure AND -59" RPV water level for 110 seconds with an ECCS pump running. The high Drywell pressure signal, 2.5 psig, seals in and must be reset using the DRYWELL PRESS RESET switch on the 901(2)-3 panel. The system initiates 110 seconds after T=40 because a LPECCS pump is running. Distractor 1: Plausible because the DW pressure is lowered below 2.5 psig. Incorrect because the DW pressure signal is a seal-in and does not automatically reset when the condition clears as does the -59 inches RPV water level. Distractor 2: Plausible because -59 inches RPV water level for 8.5 minutes, (510 seconds) with a pump running will initiate an ADS blowdown. Incorrect because the 8.5 min. (510 seconds) must be calculated from T=40 and the system initiates earlier on high DW pressure and low-low RPV water level for 110 seconds. Distractor 3: Plausible because -59 inches RPV water level for 8.5 minutes with a pump running will initiate an ADS blowdown. Incorrect because the DW pressure signal is a seal-in and does not automatically reset causing the ADS system to initiate earlier. Reference: 4E-1461 Sheet 1 Rev AW Reference provided during examination: None Cognitive Level: High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank (QDC.ILT.967644) Question History: n/a 10 CFR Part 55 Content: 41.5/45.3 KA: 218000, K5.01 - Knowledge of the operational implications of the following concepts as they apply to AUTOMATIC DEPRESSURIZATION SYSTEM: ADS logic operation. (RO=3.8) Comments:

44 **ID: 2123971** **Points: 1.00**

Unit 1 is operating at 100% power when a steam leak is reported on the 2201-10B rack.

Several differential pressure transmitters had to be isolated to secure the leak.

The 1B Main Steam Line Flow indicator on the 901-5 panel is downscale.

All "B" MSL Differential Pressure Indicating Switches in the Cable Spreading Room are reading 0 psid.

Which automatic isolations are affected by isolating the steam leak.

A. Group I
Control Room Ventilation

B. Group IV
Reactor Building Ventilation

C. Group I
Group IV

D. Reactor Building Ventilation
Control Room Ventilation

Answer: A

Answer Explanation
Answer Explanation: Per M 13-1 Sheet 1 and CID 13-1, the steam flow transmitters affected are: FT 1-0645-B DPT 1-0251-2E DPT 1-0251-2F DPT 1-0251-2G DPT 1-0251-2H 4E-1503A and 4E-1503B show contacts in each high steam flow channel of the PCI Trip Logic. At 0 psid these contacts will not open and therefore prevent the 595-102A-D and 595-106A-D relays from de-energizing. QOA 900-5 D-8, states any SBTS initiation signal or MSL high flow initiates a CREV isolation. Also 4E-1400A shows Control Room Ventilation isolation logic which is initiated by the 595-102A-D relays. Distractor 1: Plausible because high steam flow will cause a Group IV (HPCI) isolation and HPCI steam flow is from the B MSL. Incorrect because neither isolation is affected by the B MSL instrument failure. The Reactor Building Ventilation isolation is not initiated by high MSL flow. Distractor 2: Plausible because high MSL flow initiates a Control Room Ventilation (CREV) isolation. Incorrect because the Reactor Building Ventilation isolation is not initiated by high MSL flow. Distractor 3: Plausible because high MSL flow initiates a Group I isolation. Incorrect because the Group IV isolation is not initiated by high MSL flow. Reference: QCAP 0200-10 Rev.56 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: New Question History: n/a 10 CFR 55.41 Part 7: 41.7/45.7 K/A: 223002, K6.05 - Knowledge of the effect that a loss or malfunction of the following will have on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF: Containment instrumentation. (RO=3.0) Comments:

45 **ID: 2123886** **Points: 1.00**

A Unit 1 startup is in progress after a Refueling Outage.
RPV pressure is 300 psig
2 Main Turbine Bypass Valves are FULL OPEN
QCOS 0203-03, Main Steam Relief Valves Operability Test, is in progress.

When the 1-0203-3A, Relief Valve keylock switch is taken to the MAN position the following alarms are received at the 901-3 panel:

- 901-3 D-13, ELECT RELIEF VALVE 3A 3B OPEN
- 901-3 E-14, ACOUSTIC MON SAFETY RLF VALVES OPEN
- 901-3 E-16, VALVE LEAK DET SYS HIGH TEMP

What are the expected plant parameters?

(1) RPV pressure
(2) Main Turbine Bypass Valve response
(3) Tailpipe temperature

A. (1) 300 psig
(2) 2 valves full open
(3) ~355°F

B. (1) 280 psig
(2) >5% closure
(3) ~355°F

C. (1) 300 psig
(2) > 5% closure
(2) ~355°F

D. (1) 300 psig
(2) > 5% closure
(3) ~190°F

Answer: C

Answer Explanation
Answer Explanation: QCOS 0203-03 Performance Acceptance Criteria states that each Main Steam Relief Valve is manually opened and closed as verified by a compensating Turbine Bypass Valve closure of at least 5%. Tailpipe temperatures will rise due to steam flow and is also recorded during this surveillance. Distractor 1: Plausible because reactor pressure and bypass valve response are correct. Incorrect because tailpipe temperature is more consistent with valve seat leakage. Distractor 2: Plausible because reactor pressure and tailpipe temperature response are correct. Incorrect because bypass valves will close to maintain reactor pressure at setpoint. Distractor 3: Plausible because bypass valve and temperature response are correct. Incorrect because reactor pressure remains unchanged as bypass valve closure compensates for the relief valve opening. Reference QCOS 0203-03 Rev 28 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: New Question History: n/a 10 CFR 55.41 Part: 41.5/45.5 K/A: 239002 A1.03 Ability to predict and/or monitor changes in parameters associated with operating the RELIEF/SAFETY VALVES controls including: Air supply: Plant-Specific. (RO=2.8) Comments:

46 **ID: 2123870** **Points: 1.00**

Unit 2 is at 40% power with a startup in progress.

DFWLC in three-element control.

The 2A and 2B MSL flow indicators fail to zero.

Annunciator 901-5 F-8, RX VESSEL LOW LEVEL, alarms

RPV water level is at +26 inches and slowly lowering.

How will the Plant respond?

What action is required?

A. RPV water level will continue to lower to the scram setpoint.
Manually scram the reactor and enter QCGP 2-3, Reactor Scram.

B. RPV water level lowers then stabilizes at approximately +20 inches.
Raise the raise the RPV water level setpoint per QCOP 0600-21, Operation of the Feedwater Level Control System.

C. RPV water level lowers to approximately +26 inches then returns to +30 inches.
No action is required, DFWLC will auto-transfer to single-element control when the 2A and 2B MSL Flow Transmitters fail to zero.

D. RPV water level lowers then returns to approximately +30 inches.
Manually transfer to single-element control per QCAN 901(2)-5 F-8, Reactor Vessel Low Level.

Answer: D

Answer Explanation
Answer Explanation: DFWLC will deselect the 2A and 2B MSL flow inputs and use the other 2 to calculate an average steam flow value after the signal deviates by more than allowed. Level will initially drop as the DFWLC system thinks there is less steam flow but will return when the erroneous steam flow instrument is removed. QCAN 901(2)-5 F-8, Reactor Vessel Low Level, directs placing the DFWLC system in single-element control. Distractor 1: Plausible because RPV water level will initially lower but incorrect because it will not stabilize at a lower level. Distractor 2: Plausible because initially RPV water level does lower but incorrect because the system is level dominant and will eventually recover making a manual scram not a requirement. Distractor 3: Plausible because the predicted RPV water level response is correct but incorrect because the DFWLC system does NOT auto-transfer to single-element control until 3 MSL flow inputs are deselected. Reference: QCAN 901(2)-5 F-8, Rev.11, QCOP 0600-21, Rev 21. Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 1 10 CFR 55.41 Part 7: (41.5 / 45.6) K/A: 259002, A2.01 - Ability to (a) predict the impacts of the following on the REACTOR WATER LEVEL CONTROL SYSTEM; and (b) based on those predictions, use procedures to correct, or mitigate the consequences of those abnormal conditions or operations: Loss of any number of main steam flow inputs. (RO=3.3) Comments:

47 **ID: 2123845** **Points: 1.00**

SBGT is in a normal standby line-up when the "B" SBGT train is placed in START.

How will the SBGTS respond?

A. 1-7503 U1 RB INLET DMPR TO SBGTS will remain open.
2-7503 U2 RB INLET DMPR TO SBGTS will remain open.

B. 1-7503 U1 RB INLET DMPR TO SBGTS will remain open.
2-7503 U2 RB INLET DMPR TO SBGTS will close after 12 seconds.

C. 1-7503 U1 RB INLET DMPR TO SBGTS will close immediately.
2-7503 U2 RB INLET DMPR TO SBGTS will remain open.

D. 1-7503 U1 RB INLET DMPR TO SBGTS will close after 12 seconds.
2-7503 U2 RB INLET DMPR TO SBGTS will remain open.

Answer: A

Answer Explanation

Answer Explanation: When in a standby line-up, the 1-7503 and 2-7503 valves are both normally open. The inlet dampers (7503's) do not change position unless an auto initiation signal is present. In this question, the "B" train of SBGT is manually started by taking the control switch to start and the 7503's would both remain open.

Distractor 1: Plausible because an auto initiation will close one of the SBGT Inlet Dampers but incorrect because it was manually started and both SBGT Inlet Dampers remain open.
Distractor 2: Plausible because an auto initiation will close one of the SBGT Inlet Dampers but incorrect because it was manually started and both SBGT Inlet Dampers remain open.
Distractor 3: because an auto initiation will close one of the SBGT Inlet Dampers but incorrect because it was manually started and both SBGT Inlet Dampers remain open.

NOTE: Distractors are homogeneous combinations of answers which have either or SBGT inlet damper close and are plausible because which train is associated with each inlet damper or how the dampers would respond for an auto initiation signal is complex.

Reference: QCOP 7500-01, 4E-1400 sheets A through D show SBGT logic and damper control
4E-1400 sheets A through D show SBGT logic and damper control.
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): RO
Tier: 2 Group: 1

Question Source: Bank
Question History: n/a

10 CFR Part 55 Content: 41.7/45.7

KA: 261000, A3.03 - Ability to monitor automatic operations of the STANDBY GAS TREATMENT SYSTEM including: Valve operation. (RO=3.0)

Comments:

48 **ID: 2123829** **Points: 1.00**

Unit 2 is operating at 95% power with QCOS 6600-42, UNIT 2 EMERGENCY DIESEL GENERATOR LOAD TEST, in progress.

The DG Governor SPEED DROOP is set to 50, Unit 2 EDG is paralleled onto Bus 24-1 and is initially loaded to 250 KW.

How will the U2 DG respond as the governor control switch is taken to RAISE?

EDG frequency will _____(1)_____.
EDG KW loading will _____(2)_____.

A. (1) increase
(2) remain constant

B. (1) increase
(2) increase

C. (1) remain constant
(2) remain constant

D. (1) remain constant
(2) increase

Answer: D

Answer Explanation
Answer Explanation: QCOS 6600-42 directs the action to set the governor SPEED DROOP to 50. This allows load sharing capability with offsite power via Bus 24-1. When the EDG is paralleled with offsite power and the governor control switch is taken to INCREASE, frequency remains constant since it is controlled by offsite power. However, KW loading goes up due to the no load frequency setpoint going up (by taking the governor control switch to raise). Distractor 1: Plausible because DG KW loading will go up but incorrect because frequency remains constant. Distractor 2: Plausible if the EDG is not paralleled to Grid and new loads are NOT added. Incorrect because EDG is paralleled to the GRID. Distractor 3: Plausible because frequency remains constant but incorrect because DG KW loading would go up. Reference: QCOS 6600-02 Rev.22 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Bank Question History: n/a 10 CFR Part 55 Content: 41.7/45.5 to 45.8 KA: 262001, A4.04 - Ability to manually operate and/or monitor in the control room: Synchronizing and paralleling of different A.C. supplies. (RO=3.6) Comments:

49 **ID: 2124453** **Points: 1.00**

Unit 2 is in Mode 1.
During performance of QCOS 0005-09, UNIT TWO ELECTRICAL DISTRIBUTION BREAKER AND VOLTAGE VERIFICATION, the EO reports:

The "EMERGENCY SOURCE ACCEPTED " light on the ABT is not lit.

What is the status of the ESS Bus?

Is the Performance Acceptance Criteria of QCOS 0005-09 met?

A. Energized from Bus 28; Yes

B. Energized from Bus 28; No

C. Energized from 250 VDC; No

D. Energized from MCC 28-2; Yes

Answer: B

Answer Explanation
Answer Explanation: QCOS 0005-09 is a surveillance that verifies operability of the electrical distribution as required by TS 3.8.1, 3.8.2, 3.8.4, 3.8.7, and 3.8.8. The normal lineup for the ESS Bus is with the ESS UPS supplying load with the emergency supply MCC 28-2 lineup and available for auto-transfer as indicated by the "EMERGENCY SOURCE ACCEPTED " light being lit on the ASCO ABT switch in the Aux Electric room. The power supplies to the ESS UPS in order of preference are: Bus 28, 250VDC, and Bus 26. Distractor 1: Plausible because the Performance Acceptance Criteria is not met and 250VDC is a power supply to the ESS UPS. Incorrect because the UPS is powered from Bus 28 and will auctioneer off to 250VDC only if the voltage from the rectifier falls below 250VDC system voltage. Distractor 2: Plausible because Bus 28 is the normal supply to the ESS UPS. Incorrect because the Performance Acceptance Criteria is not met due to the unavailability of the emergency supply MCC 28-2. Distractor 3: Plausible because MCC 28-2 is a power supply to the ESS Bus. Incorrect because the Performance Acceptance Criteria is not met due to the unavailability of the emergency supply MCC 28-2 and the normal supply to the ESS UPS is Bus 28. References: QCOS 0005-09 Rev.47, QOP 6800-03 Rev.36 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.10/45.13 KA: 262002, Uninterruptable Power Supply (AC/DC): G2.2.12 - Knowledge of surveillance procedures. (RO=3.7) Comments:

Test Answer Key

2020 QDC NRC Exam RO Section
Test ID: 331006

50 **ID: 2120606** **Points: 1.00**

Which of the following DC Electrical system batteries have GROUND DETECTION circuitry and associated annunciators on the 901(2)-8 panels in the Control Room?

1 - 250 VDC Station
2 - 125 VDC Station
3 - 24/48 VDC Station

A. 1 and 2 only

B. 1 and 3 only

C. 2 and 3 only

D. 1, 2 and 3

Answer: A

Answer Explanation
The 24/48 VDC is a grounded system and does not have a ground detection circuitry. The Station 125 VDC and 250 VDC batteries are ungrounded systems with ground detection test circuitry installed. 250 VDC system uses annunciator 901(2) B-10, and 125 VDC system uses annunciator 901(2)-8 B-9. Distractor 1: Plausible because the 250 VDC battery has ground detection circuitry and alarms but incorrect because the 24/48 VDC battery has neither. Distractor 2: Plausible because the 125 VDC battery has ground detection circuitry and alarms but incorrect because the 24/48 VDC battery has neither. Distractor 3: Plausible because the 125 VDC and 250 VDC batteries have ground detection circuitry and alarms but incorrect because the 24/48 VDC battery has neither. Reference: QOA 900-8 B-9, Rev.2, QOA 900-8 B-10, Rev.6 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Quad Cities Exam Bank Question History: n/a 10 CFR Part 55 Content: 41.2 to 41.9/45.7/45.8 KA: 263000 K1.04 - Knowledge of the physical connections and/or cause effect relationships between D.C. ELECTRICAL DISTRIBUTION and the following: Ground detection. (RO=2.6) Comments:

51 **ID: 2123769** **Points: 1.00**

A scram and a loss of Transformer 12 occurred on Unit 1.
All automatic actions occur as expected.
Torus Cooling has been started on both RHR loops.

30 minutes later, a LOCA occurs on Unit 2.
All automatic actions for 2.5 psig Drywell pressure occur as expected.

With NO operator action, what is the status of the Unit 1 RHR pumps?

A. Division I are OFF, Division II are ON

B. Division I and Division II are ON

C. Division I are ON, Division II are OFF

D. Division I and Division II are OFF

Answer: A

Answer Explanation
Answer Explanation: With a LOCA on Unit 2 and the 1/2 DIESEL GEN OUTPUT ACB CONTROL keylock switches in OFF, the 1/2 EDG will be running unloaded and Unit 1 Div I pumps will not have power. Note: Since Unit 2 has not lost off-site power, Transformer 22 is supplying Busses 23-1 and 24-1. All Unit 2 RHR pumps are running due to the LOCA signal. Distractor 1: Plausible because one Division will lose power. Incorrect because it is Division I that will lose power Distractor 2: Plausible because Unit 2 does not lose power and does not require an EDG to supply any of the ECCS Busses. Incorrect because the 1/2 DIESEL GEN OUTPUT ACB CONTROL keylock switch is in OFF causing the 1/2 EDG to open its output breaker and run unloaded. Distractor 3: Plausible if incorrectly determines both EDGs respond the same to the Unit 2 LOCA signal. Incorrect because only the 1/2 EDG has the design feature to dedicate it to a Unit via the 1/2 DIESEL GEN OUTPUT ACB CONTROL switch. Reference: 4E-1345 and 4E-2345 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Bank Question History: Modified - Used on 10-1 Comp Exam 10 CFR Part 55 Content: 41.7/45.4 KA: 264000 K3.03 - Knowledge of the effect that a loss or malfunction of the EMERGENCY GENERATORS (DIESEL/JET) will have on following: Major loads powered from electrical buses fed by the emergency generator(s). (RO=4.1) Comments:

52 **ID: 2120608** **Points: 1.00**

Both Units are operating at 100% power.

1/2 IAC and 1/2B IAC are running.

The 1A IAC and U2 IAC are in standby with the control switches in PTL.

The feed breaker for Bus 18 trips.

What action is required and why?

A. Start a Standby Instrument Air Compressor because the 1/2B Instrument Air Compressor has tripped.

B. No immediate action is necessary because no running Instrument Air Compressors have tripped.

C. Start a Standby Instrument Air Compressor because the 1/2 Instrument Air Compressor has tripped.

D. Start a Standby Instrument Air Compressor because the 1A Instrument Air Compressor has tripped.

Answer: C

Answer Explanation
Answer Explanation: The normal lineup for Instrument Air Compressors is: 1/2 IAC and 1/2B IAC are running. The 1A IAC and U2 IAC are in standby with the control switches in PTL. The power supplies are: 1/2 IAC from Bus 18 compt. 6B. Reference QOM 1-6700-T04 Rev. 3 1A IAC from Bus 17 compt. 6B 1/2B IAC from Bus 28 compt. 6C. U-2 IAC from Bus 27 compt. 4C. Distractor 1: Plausible because a Standby Instrument Air Compressor (IAC) must be started. Incorrect because the power supply to the 1B IAC is Bus 28. Distractor 2: Plausible if the normal lineup is assumed to have the 1/2 IAC in standby. Distractor 3: Plausible because a Standby Instrument Air Compressor (IAC) must be started. Incorrect because the power supply to the 1A IAC is Bus 17. Reference: QOM 1-6700-T04, Rev.3 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Bank Question History: n/a 10 CFR Part 55 Content: 41.7 KA: 300000 K2.01 - Knowledge of electrical power supplies to the following: Instrument Air compressor. (RO=2.8) Comments:

53 **ID: 2120609** **Points: 1.00**

Both Units are operating at 100% power with the 1A and 2B Service Water pumps running.

Annunciator 912-1 B-3, SERVICE WATER LOW PRESSURE, alarms,

Service Water Pressure as indicated on PI 1/2-3940-4 on the 912-1 panel is 78 psig and slowly lowering.

Which plant response is expected NEXT if this trend continues?

A. 1/2 Service Water pump auto-starts

B. The 1/2A Diesel Fire Pump auto-starts

C. 1B Service Water Pump auto-starts

D. The 1/2B Diesel Fire Pump auto-starts

Answer: C

Answer Explanation
Answer: The 1B Service Water pump will auto-start when Service Water header pressure drops to 75 psig. The 1B Service Water pump is the only Service Water Pump between Unit 1 and Unit 2 that will auto-start. Distractor 1: Plausible because a Service Water pump auto-start feature and at 70 psig the 1/2A Diesel Fire Pump will start but incorrect because of the 1B Service Water pump autostart. Distractor 2: Plausible because there is not a Service Water pump auto-start feature and that the 1/2B Diesel Fire Pump setpoint (70 psig) is higher than the 1/2A (65 psig) but incorrect because of the 1B Service Water pump autostart. Distractor 3: Plausible because a SW pump can autostart but incorrect because the 1/2 Service Water pump is NOT the one that auto-starts. Reference: QCAN 912-1 B-3 Rev 7 Reference provided during examination: N/A Cognitive level: High Level (RO/SRO): RO Tier: 2 Group: 1 Question Source: Modified from Quad ILT Bank (QDC.ILT.05095) Question History: n/a 10 CFR Part 55 Content: 41.7 KA: 400000, K4.01 - Knowledge of CCWS design feature(s) and or interlocks which provide for the following: Automatic start of standby pump. (RO=3.4) Comments:

54 **ID: 2124417** **Points: 1.00**

While inserting control rods for an emergency power reduction on Unit 1,

Annunciator 901-5 D-3, TIMER MALFUNCT ROD SELECT BLOCK, alarms.

What action is required to continue control rod insertion?

A. Bypass the RWM AND insert control rods normally

B. Use ONLY the EMERG ROD IN switch to insert control rods

C. Swap to the standby sequence timer AND insert control rods normally

D. Reset the select block AND use the EMERG ROD IN switch to insert control rods

Answer: D

Answer Explanation
Answer Explanation: An Automatic Sequence Timer malfunction will result in a Reactor Manual Control System (RMCS) Select Block. A Select Block de-energizes the Rod Select Relays which de-selects and prevents selection of any control rods on the Rod Select Pushbutton Matrix. Other indications are annunciator 901(2)-5 D-3, TIMER MALFUNCT ROD SELECT BLOCK, alarms, SELECT BLOCK light on the 901(2)-5 panel illuminates, and white rod "select" light on the Full Core Display extinguishes. Per QCAN 901(2)-5 D-3, IF rod insertion is necessary to control reactor power, THEN: 1) Reset the Select Block, 2) Select desired rod, 3) Insert rod using Emergency Rod In. Distractor 1: Plausible because it is a procedural step if the Timer Malfunction Select Block does not reset. Incorrect because a reset should be attempted first. Distractor 2: Plausible because the RWM can prevent rod movement and it interacts with Reactor Manual Control system. Incorrect because an RMCS Select Block is in effect and the RWM does not bypass it. Distractor 3: Plausible because it is a procedural step to verify the Select Block has reset. Incorrect because it does not reset the Select Block. Reference: QCAN 901(2)-5 D-3 Rev.6, 4E-1415 Reference provided during examination: None. Cognitive level: High Level (RO/SRO): RO Tier: 2 Group: 2 Question Source: Quad Cities Exam Bank (QDC.ILT.01533) Question History: n/a 10 CFR Part 55 Content: 41.7/45.5 to 45.8 KA: 201002, A4.04 - Ability to manually operate and/or monitor in the control room: Timer malfunction test switch: Plant-specific. (RO=2.8) Comments:

55 **ID: 2123688** **Points: 1.00**

Which of the following is a stated purpose of the Traversing In Core Probe system?

A. To measure the axial thermal neutron flux profile within the reactor.

B. To calibrate the Source Range Monitoring (SRM) system.

C. To provide direct input to process computer thermal power calculation.

D. To calibrate the Intermediate Range Monitors (IRM's).

Answer: A

Answer Explanation
The Traversing In Core Probe (TIP) system has two purposes: 1. The TIP system is used to measure and record the axial thermal neutron flux profile at 41 radial locations within the reactor core. 2. The TIP system is used to calibrate the Local Power Range Monitors (LPRMs). Distractor 1: Plausible because the TIP system is used to calibrate other Nuclear Instruments, (LPRM / APRM). Distractor 2: Plausible because the TIP system is used to calibrate other Nuclear Instruments, (LPRM / APRM). Distractor 3: Plausible because the Process Computer uses LPRM data. Incorrect because LPRM data is not used in the thermal power calculation. Reference: UFSAR Rev.6, section 7.6.1.5.4 Reference provided during examination: None Cognitive level: Memory Level (RO/SRO): RO Tier: 2 Group: 2 Question Source: Quad Cities Exam Bank (QDC.ILT.00901) Question History: n/a 10 CFR Part 55 Content: 41.7 KA: 215001 G2.1.27 - Knowledge of system purpose and/or function. (RO=3.9) Comments:

56 **ID: 2123687** **Points: 1.00**

Unit 2 is operating at 100% power.

The variable leg for the NARROW RANGE and MEDIUM RANGE reactor water level instruments on the 2202-6 rack is leaking.

Which of the following describes the effect on indicated RPV water level and the resultant automatic actions?

A. Rising level and HPCI / RCIC Turbine trips only.

B. Lowering level and a 1/2 reactor scram only.

C. Lowering level and a full reactor scram.

D. Rising level and Reactor Feed Pump / Main Turbine trips only.

Answer: C

Answer Explanation
Answer Explanation: The 2206 rack houses LT 2-0263-58A and LT 2-0263-58B. LT 2-0263-58A actuates RPS A and LT 2-0263B actuates RPS B. The leak in the variable leg will reduce pressure on the low pressure side of the DP cell causing *indicated* level to lower. The reactor will scram at 0 inches RPV water level. Reference: 4E-2464 Sheets 1 and 2 show the relays actuating the RPS Low Reactor Water level scram are driven by MTUs 2-0263-146A and 2-0263-146B. 4E-7850 shows MTUs 2-0263-146A and 2-0263-146B receive input from LT 2-0263-58A and LT 2-0263-58B which are located on the 2202-6 Instrument rack. Distractor 1: Plausible because of the complexity of the prints and it could be determined that both transmitters input to the same RPS channel but incorrect. Distractor 2: Plausible because high RPV water level causes RFPs and the Main Turbine trip but incorrect because a variable leg leak causes lowering indicated RPV water level. Distractor 3: Plausible because high RPV water level causes the HPCI and RCIC Turbines to trip but incorrect because a variable leg leak causes lowering indicated RPV water level. Reference: 4E-2464 Sh, 1 & 2, 4E-7850 Reference provided during examination: None Cognitive level: Memory Level (RO/SRO): RO Tier: 2 Group: 2 Question Source: Quad Cities Exam Bank (QDC.ILT.883152) Question History: n/a 10 CFR Part 55 Content: 41.2 to 41.9/45.7/45.8 KA: 261000, K1.18 - Knowledge of the physical connections and/or cause effect relationships between NUCLEAR BOILER INSTRUMENTATION and the following: Analog trip system: Plant-Specific (RO=3.0) Comments:

57 **ID: 2123686** **Points: 1.00**

Unit 1 is operating at 100% power when Bus 17 trips.

Which of the following annunciators are expected to be in ALARM?

A. 912-5 E-2, CONTROL ROOM VENT/EXH FAN TRIP

B. 912-5 A-1, RX BLDG 1 SPLY/EXH FAN TRIP

C. 912-5 G-6, DW 1 VENT BOOSTER FAN TRIP

D. 901-54 C-3, FILTER BLDG HVAC TRBL

Answer: C

Answer Explanation
Answer Explanation: Normal Drywell cooling lineup is 3 coolers from Bus 18, 3 coolers from Bus 19 and the drywell booster fan running. Drywell booster fan power is supplied by MCC 17-1. Distractor 1: Plausible if candidate assumes that Bus 17 supplies the Offgas Filter Building HVAC system. Power supply is MCC 10-1. Distractor 2: Plausible if candidate assumes that Bus 17 supplies the Reactor Building supply and exhaust fans (similar to Turbine Building West ventilation). Power supply is Bus 18 and Bus 19. Distractor 3: Plausible if candidate assumes that Bus 17 supplies the Control Room Ventilation 'A' train supply or exhaust fan (similar to Turbine Building West ventilation). Power supply is MCC 16/26-6 for supply fan. Reference: QOA 912-5 G-6 Rev 4 Reference provided during examination: None Cognitive level: Memory Level (RO/SRO): RO Tier: 2 Group: 2 Question Source: Quad Cities Exam Bank (QDC.ILT.816103) Question History: n/a 10 CFR Part 55 Content: 41.7 KA: 223001, K2.09 - Knowledge of electrical power supplies to the following: Drywell cooling fans: Plant-Specific (RO=2.7) Comments:

58 **ID: 2121293** **Points: 1.00**

Unit 2 is in Mode 5 with fuel moves in progress.

A fuel bundle was being moved from the Fuel Pool to the core when a Reverse Motion Stop occurred.

What caused the Refuel Platform motion to stop?

A. Control rod is selected on the Rod Select Matrix

B. Loss of power to the Rod Position Indication System.

C. REFUEL INTERLOCK BRIDGE INTERLOCK BYPASS SWITCH is placed in NORMAL

D. RWM placed in Test

Answer: B

Test Answer Key

2020 QDC NRC Exam RO Section
Test ID: 331006

Answer Explanation

Per QCFHP 0100-03, Refueling Platform Operation, describes the interlock as follows:
Bridge Reverse Stop No. 1: This lamp indicates a condition which prohibits bridge travel towards the Reactor. This condition will be present if all of the following conditions exist:

- Mode switch in “REFUEL.”
- Platform is near or over the reactor.
- Control Room indicates all rods **not** full in.
- Any platform hoist loaded or grapple **not** full up.

The loss of power to RPIS for a control rod de-energizes the ALL ROD IN relays, (28/137A-B). References 4E-2410 and 4E 2413. Per QCFHP 0100-03, the Bridge Reverse Motion.

Distractor 1: Plausible because the Refuel Bridge Interlock Bypass Switch enforces the refueling interlocks. Incorrect because the proper position is in NORMAL when conducting refueling operations.

Distractor 2: Plausible because refuel interlocks are designed to prevent two simultaneous reactivity insertions, (i.e. insert a fuel bundle and withdraw a rod). Incorrect because a rod must be selected to energize one of the 28/131A-D relays to satisfy the refuel interlocks and allow Refuel Bridge Motion.

Distractor 3: Plausible because the RWM can initiate Rod Blocks. Incorrect because the RWM has no interplay with Refuel Interlocks or Refuel Bridge Motion.

Reference: QCFHP 0100-01 Rev.37, QCFHP 0100-03 Rev.9, 4E-2410, 4E-2413.
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): RO
Tier: 2 Group: 2

Question Source: New
Question History: n/a

10 CFR Part 55 Content: 41.7/45.4

KA: 234000 K3.03 Knowledge of the effect that a loss or malfunction of the FUEL HANDLING EQUIPMENT will have on following: Fuel handling operations. (RO=3.1)

Comments:

59 **ID: 2123684** **Points: 1.00**

Unit 1 is in COLD shutdown.

Select the correct valve alignment for the MSIVs and Main Steam Line Drains prior to Unit startup.

Refer to reference pictures of the valve line-ups.

A. A

B. B

C. C

D. D

Answer: A

Answer Explanation
Per QCGP 1-1, Prerequisite step C.9.p and C.9.q require all Main Steam Isolation and Main Steam Drain valves open and operable. Also, per step C.9.r, if reactor pressure is ≤ 100 psig, then MO 1-220-4, STM DRN TO CNDSR is open. The lineup allows moisture to gravity drain to the Main Condenser prior to admitting steam. Distractor 1: MSIVs closed / All Drain and Equalizing valves open. Plausible because this would have no effect until the Pressurization Phase. Distractor 2: MSIVs open / All Drain and Equalizing valves closed. Plausible because this is the lineup for a Hot/Fast restart. Distractor 3: MSIVs open / All Drain valves closed / Equalizing valves open. Plausible if it is assumed there is a drain path through the Equalizing valves. Reference: QCGP 1-1 Rev.117 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 2 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.7 KA: 239001, K4.09 - Knowledge of MAIN AND REHEAT STEAM SYSTEM design feature(s) and/or interlocks which provide for the following: Moisture removal from steam lines prior to admitting steam. (RO=3.3) Comments:

60 **ID: 2123671** **Points: 1.00**

Unit 1 is operating at 100% power when annunciator 901-7 A-5, MAJOR TROUBLE TURB CONTROL, alarms.

The following alarm message is active on the DEHC OWS:

"S1_P410 <Q> SLOT 7 - CV1 MULTIPLE SERVO LOOPS SUICIDED"

What is the status of the Turbine Pressure Control system and what action is REQUIRED?

A. Control Valve #1 has "fast" CLOSED

Scram the reactor and enter QCGP 2-3

B. Control Valve #1 has "slow" CLOSED

Initiate an Emergency Power Reduction

C. Stop Valve #1 has "fast" CLOSED

Scram the reactor and enter QCGP 2-3.

D. Stop Valve #1 has "slow" CLOSED

Initiate an Emergency Power Reduction

Answer: B

Answer Explanation

Answer Explanation: IOA of QOA 5650-02 and QCOA 0201-03, "IF Reactor pressure is ≥ 1010 psig, THEN initiate Emergency Power Reduction to reduce Reactor Pressure."

At this power level, the reactor will not scram on high pressure as the Main Turbine Bypass valves will open, however reactor pressure will stabilize at a pressure ≥ 1010 psig because of the "suicide failure mode.

From QOA 5650-02 Discussion section step E.3:
Control valves can fail closed for a number of reasons. Loss of DEHC signal to the servo will cause the valve to ramp closed (also called valve suicide). No half scram will be expected. Activation of the fast acting solenoid will cause the valve to rapidly close, and a half scram is expected in this case.

Distractor 1: Plausible because an Emergency Power Reduction would be required if a Stop or Control Valve closes at rated power. Incorrect because a Control Valve has closed.
Distractor 2: Plausible because first part is correct. Incorrect because the immediate operator action does not require inserting a scram.
Distractor 3: Plausible if assumed reactor pressure will reach the scram setpoint. Incorrect because Control Valve closes and immediate operator action is an emergency power reduction.

Reference: QOA 5650-02 Rev.15
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): RO
Tier: 2 Group: 2

Question Source: New
Question History: n/a

10 CFR Part 55 Content: 41.5/45.3

KA: 241000, K5.03 - Knowledge of the operational implications of the following concepts as they apply to REACTOR/TURBINE PRESSURE REGULATING SYSTEM: Reactor power vs. reactor pressure. (RO=3.5)

Comments:

61 **ID: 2123644** **Points: 1.00**

Unit 1 is at 100% power with the 1B Gland Exhauster out of service when the following annunciators alarm:

- 901-7 C-14, GLAND STM CON DRN HDR 1A HIGH LEVEL
- 901-7 A-12, GLAND STEAM CONDENSER A HIGH LEVEL
- 901-7 E-12, GLAND STM EXH MOTOR TRIP

What will result from continued operation of the Main Turbine?

A. Increased airborne radioactivity

B. Loss of Main Condenser vacuum

C. Plant operation wil be unaffected

D. A Main Generator Stator ground

Answer: A

Answer Explanation

Per QCOA 5600-09, Loss of Both Gland Steam Exhausters, the caution note states that the loss of both Gland Steam Exhausters will result in the following:

- Possible water in the Turbine lube oil system due to steam leakage and condensation in the oil deflectors.
- Potential H2 accumulation in the low pressure FW heaters, Turbine casing, Turbine Building, and Turbine Oil

Step E.1. of the Discussion section states:
Loss of Gland Seal Exhausters will cause gland steam to issue past the Turbine seals into the Turbine Building. This may create an airborne radioactivity problem.
The Turbine seals do not lose steam flow and result in air in-leakage, ie. loss of vacuum.

Distractor 1: Plausible because a loss of gland seal would provide a path for steam to escape but incorrect because Turbine seal steam does not escape from Main Condenser even with loss of Gland Exhauster.
Distractor 2: Plausible because Condenser vacuum will be unaffected but incorrect because if a Gland exhauster can NOT be restored in a timely fashion, THEN a Unit shutdown may be required.
Distractor 3: Plausible because if Generator sealing was lost then moisture could form in the Main Generator but incorrect because a loss of gland exhausters does not affect Generator H_2 seal oil.

Reference: QCOA 5600-09 Rev.5
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): RO
Tier: 2 Group: 2

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.7 / 45.7)

KA: 245000 K6.01 - Knowledge of the effect that a loss or malfunction of the following will have on the MAIN TURBINE GENERATOR AND AUXILIARY SYSTEMS: Gland seal. (RO=2.8)

Comments:

62 **ID: 2121296** **Points: 1.00**

Unit 1 is at 100% power.

MO 1-3303, COND DEMIN BYPASS VLV, is opened.

How will the following condensate system parameters respond?

1. PI 1-3340-49, COND BOOST PMP SUCT PRESS, on the 901-6 panel.
2. CR 1-3340-8, CONDENSATE CONDUCTIVITY, on the 901-7 panel.

A. 1. Lower
   2. Rise

B. 1. Rise
   2. Rise

C. 1. Lower
   2. Lower

D. 1. Rise
   2. Lower

Answer: B

Answer Explanation
Answer Explanation: If the Condensate Demin bypass valve is opened, d/p across the demineralizers will drop. Since there is less d/p across the demins, Condensate Booster pump suction pressure will rise. When the demins are bypassed, total dissolvable solids (TDS) will rise and conductivity will increase. Distractor 1: Plausible but incorrect because the presence of TDS would not raise the resistivity of a solution. Therefore, conductivity would actually Rise. Distractor 2: Plausible but incorrect because the bypass valve is NOT downstream of the Condensate Booster pumps. Distractor 3: Plausible but incorrect, Combination of Distractor 1 and 2. Reference: QCAN 901(2)-7 H-12 Rev 4 Reference provided during examination: None. Cognitive level: High Level (RO/SRO): RO Tier: 2 Group: 2 Question Source: Quad Cities Exam Bank (QDC.ILT.686417) Question History: 2009 ILT NRC Exam 10 CFR Part 55 Content: 41.5/45.5 KA: 256000, A1.08 - Ability to predict and/or monitor changes in parameters associated with operating the REACTOR CONDENSATE SYSTEM controls including: System water quality. (RO=2.7) Comments:

63 **ID: 2123635** **Points: 1.00**

Unit 1 is operating at 85% power.

An Instrument Air Leak in the D Heater Bay results in a loss of air to the Normal and Emergency Level Control Valves for the 1D1, 1D2, and 1D3 Feedwater Heaters.

How will the plant respond?

D Heater outlet temperature, as indicated on the 901-7 panel, will ___(1)___ and reactor power will ___(2)___.

A. (1) remain constant
   (2) remain constant

B. (1) lower
   (2) rise

C. (1) rise
   (2) lower

D. (1) lower
   (2) remain constant

Answer: B

Answer Explanation
Answer Explanation: On a loss of instrument air Normal LCVs fail closed and Emergency LCVs fail open. The effect is a loss of feedwater heating as the D Heater drain flow is routed to the Main Condenser and not to the downsteam heaters. The lower feedwater inlet temperature is a positive reactivity addition which raises reactor power. Distractor 1: Plausible if it is assumed Heater level remains constant because valves fail in opposite direction and extraction steam continues to provide heat input to the feedwater. Distractor 2: Plausible if the failure mode is incorrect, (i.e. Normal LCVs fail open), extraction steam flow and Heater Drain flow increases resulting in a negative reactivity addition and lower reactor power. Distractor 3: Plausible because lower feedwater temperature lowers but incorrect because reactor power increases due to reactivity addition. Reference: QOA 4700-06 Rev.28 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 2 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.7/45.7 KA: 259001 A2.05 - 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 applicable plant air systems. (RO=3.0) Comments:

64 **ID: 2124209** **Points: 1.00**

Unit 1 is operating at 100% power when a leak develops in a low pressure turbine boot.

The leak will cause Off Gas system flow to _____(1)_____, requiring the NSO to _____(2)_____.

A. (1) lower
(2) swap to the other train of air ejectors

B. (1) lower
(2) initiate an Emergency Power Reduction

C. (1) rise
(2) swap to the other train of air ejectors

D. (1) rise
(2) initiate an Emergency Power Reduction

Answer: D

Answer Explanation
A leak in a low pressure turbine boot results in air in-leakage (non-condensible) to the condenser. This air is removed and results in higher offgas flow. The addition of non-condensible gases in the condenser will result in a loss of vacuum. Immediate operator action is to perform an emergency power reduction per QOA 3300-02. Distractor 1: Plausible because Off-Gas flow rises. Incorrect because the on-line train is functioning as designed. Distractor 2: Plausible but incorrect because Off-Gas flow rises due to air inleakage and the on-line train is functioning as designed. Distractor 3: Plausible because an LP turbine boot leak results in loss of vacuum and requires an emergency power reduction. Incorrect because Off-Gas flow rises. Reference: QOA 3300-02 Rev.40 Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): RO Tier: 2 Group: 2 Question Source: Quad Cities Exam Bank (QDC.ILT-C-1, Q.61) Question History: n/a 10 CFR Part 55 Content: 41.7/45.7 KA: 271000, A3.02 - Ability to monitor automatic operations of the OFFGAS SYSTEM including: System flows. (RO=2.9) Comments:

65 **ID: 2125091** **Points: 1.00**

The ANSO is in the process of re-establishing Reactor Building Ventilation which tripped and isolated as a result of a Unit ONE (1) scram.

- Two Supply and two Exhaust fans have been restarted.
- Reactor Building D/P is -0.25 inches H_2O.
- The NSO secures the running SBGT.
- The Reactor Building to Atmosphere D/P is indicating +0.05 inches H_2O.

What action must be taken?

A. Close the Reactor Building Isolation Dampers.

B. Start both SBGTS trains.

C. Start another Reactor Building Exhaust Fan.

D. Trip a Reactor Building Exhaust Fan.

Answer: C

Answer Explanation
Answer Explanation: Per QCOP 5750-02: Normal operating configuration of the RB ventilation system uses two supply fans and two exhaust fans on each unit. The exhaust fans are higher volume by design and together with flow damper control maintain the RB pressure -0.1 to -0.70" H2O relative to atmosphere. Alternate fan configurations may sometimes be needed during unusual wind conditions, equipment breakdown, etc. Starting an additional exhaust fan in this instance will lower the DP. Distractor 1: Plausible because closing the Reactor Building Isolation Dampers seals the Reactor Building. Incorrect because closing the Isolation Dampers will trip the Supply and Exhaust Fans thereby causing the Reactor Building D/P to become more positive. Distractor 2: Plausible because securing a fan will affect the D/P. Incorrect because the securing an Exhaust fan will result in a more positive D/P. A Reactor Building Supply Fan should be tripped. Distractor 3: Plausible because restarting the SBGTS would restore Reactor Building D/P. Incorrect because the procedural guidance per QOA 912-5 C-1, for a low reactor building D/P is to start additional exhaust fans. Reference: QCOP 5750-02 Rev. 27, QOA 912-5 C-1 Rev. 8 Reference provided during examination: None Cognitive level: High Level (RO/SRO): RO Tier: 2 Group: 2 Question Source: Bank Question History: 10 CFR Part 55 Content: (41.9) KA: 288000 A4.01 Ability to manually operate and/or monitor in the control room: Start and stop fans. Comments:

66 **ID: 2123581** **Points: 1.00**

Per OP-AA-103-102, WATCH STANDING PRACTICES, the Unit NSO is REQUIRED to perform a Main Control Room Panel walkdown (front and back) every ...

A. 120 min.

B. 30 min.

C. 60 min.

D. 15 min.

Answer: C

Answer Explanation
OP-AA-103-102, Watch-Standing Practices, step 4.4.1: The Unit Reactor Operator shall: Perform an hourly walk-down of the unit (including front and back panels, nuclear instrumentation drawers, radiation monitoring, computer displays, etc.). The Assist Reactor Operator is expected to assist and share this responsibility. Distractor 1: Plausible because a periodic panel walkdown is required. Incorrect because the requirement is hourly. Distractor 2: Plausible because a periodic panel walkdown is required. Incorrect because the requirement is hourly. Distractor 3: Plausible because a periodic panel walkdown is required. Incorrect because the requirement is hourly. Reference: OP-AA-103-102 Rev.18 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 3 Question Source: Quad Cities Exam Bank (QDC.ILT.12002) Question History: n/a 10 CFR Part 55 Content: 41.10/45.13 KA: G2.1.1 - Knowledge of conduct of operations requirements. (RO=3.8) Comments:

67 **ID: 2123576** **Points: 1.00**

The on-coming NSO has just completed the shift turnover and relieved the off-going NSO.

Per OP-AA-112,101, Shift Turnover and Relief, which of the following activities should be performed after relief?

A. Notify Operational Health Services (OHS) of any medical changes

B. Read the Control Room logs for the preceding four days

C. Discuss planned shift activities with the Unit Supervisor

D. Tour the Main Control Boards and back panels.

Answer: C

Answer Explanation
Per OP-AA-112-101, Rev. 14, Shift Turnover and Relief, step 4.8.4: After relief, the on-coming RO's should PERFORM the following: • ANNOUNCE shift turnover and relief to the Unit Supervisor. • CONFER with the Unit Supervisor to determine the scope of planned shift activities and their responsibilities for that shift. • REVIEW Daily Orders. • REVIEW Standing Orders for new entries. All other actions are performed before relieving the off-going NSO per step 4.8.3 Distractor 1: Plausible because a panel walkdown is a turnover activity but incorrect because it is performed with the off going NSO prior to relief. Distractor 2: Plausible because a review of the Control Room logs is a turnover activity but incorrect because it is performed with the off going NSO prior to relief. Distractor 3: Plausible because notification of medical changes is done as part of a turnover but incorrect because it is done before assuming the shift watch. Reference: OP-AA-112-101, Rev.14 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: Group: 3 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.10/45.13 KA: G2.1.3 - Knowledge of shift or short-term relief turnover practices. (RO=3.7) Comments:

68 **ID: 2123566** **Points: 1.00**

The primary responsibility of ensuring core alterations are conducted in accordance with the Fuel Move Sheet while monitoring nuclear instrumentation during refueling activities is assigned to the ...

A. Nuclear Station Operator (NSO)

B. Unit Supervisor (US)

C. Qualified Nuclear Engineer (QNE)

D. Fuel Handling Supervisor (FHS)

Answer: A

Answer Explanation
Per NSO responsibilities in OP-AA-300, step 4.9.3: COORDINATES the conduct of refueling activities and monitors nuclear instrumentation during refueling activities that could affect the reactivity of the core so that abnormal reactivity events can be mitigated. Also, per QCFHP 0100-01, step E.16.b.(3): The NSO approves performance of each step during core alterations in accordance with the Move Sheet. Distractor 1: Plausible because the QNE prepares the Move Sheet but incorrect because the NSO must authorize the performance each individual step of the NCTL. Distractor 2: Plausible because the Fuel Handling Supervisor oversees the Refueling Bridge operations and is also responsible for execution of the Move Sheet but incorrect because the NSO must authorize the performance each individual step of the Move Sheet. Distractor 3: Plausible because the Unit Supervisor has overall responsibility for control room and reactivity manipulations but incorrect because the "approval" for the Fuel Handling Team to make reactivity additions via fuel moves lies with the NSO. Reference: QCFHP 0100-01, Rev.37, OP-AA-300 Rev.13 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 3 Question Source: Quad Cities Exam Bank (QDC.ILT.12011) Question History: n/a 10 CFR Part 55 Content: 41.1/43.6/45.6 KA: G2.1.37 - Knowledge of procedures, guidelines, or limitations associated with reactivity management. (RO=4.3) Comments:

69 **ID: 2123548** **Points: 1.00**

While performing a SPECIAL TEST; the Test Director determines that the changes are needed in the performance acceptance criteria.

To allow the test to continue, the Test Director must...

A. process the requested change as a Procedure Revision so that it can go through On Site Review.

B. perform a pen and ink change to the procedure and continue the test.

C. submit the change as an Interim Procedure Change which does not require an On Site Review.

D. submit a Temporary Change as it does not involve a change of intent.

Answer: A

Answer Explanation
Answer Explanation: Per AD-AA-101, Processing of Procedures and T&RMs, Temporary and Interim procedure changes are non-permanent. A change to the Performance Acceptance Criteria requires a permanent procedure change and must go through the approval process per AD-AA-101-1003 and obtain the proper approvals. Temporary, Interim, and Field changes are non-permanent. Distractor 1: Plausible because a pen and ink change can be made tp procedures if it is editorial in nature but incorrect because the change required is a "change of intent" and requires review. Distractor 2: Plausible because an Interim procedure change can be used for a "change of intent" but incorrect because Interim procedure changes must obtain On-Site approval per AD-AA-101-F-01. Distractor 3: Plausible because Temporary procedure changes are used but incorrect because Temporary procedure changes can NOT contain a "change of intent". Reference: AD-AA-101, Rev.29 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 3 Question Source: Quad Cities Exam Bank (QDC.ILT.338060) Question History: n/a 10 CFR Part 55 Content: 41.10/43.3/45.13 KA: G2.2.6 - Knowledge of the process for making changes to procedures. (RO=3.0) Comments

70 **ID: 2123547** **Points: 1.00**

Which of the following meets the requirements of the Clearance and Tagging program?

A. A fail closed AOV is used as part of the clearance boundary with its air isolated, vented, and an Information Tag on the air supply.

B. A Clearance Order using a single valve to isolate an energy source > 200°F is marked exceptional.

C. A mechanical maintenance technician improves a boundary by tightening a valve with a Danger Tag attached.

D. A non-licensed field supervisor authorizes a Clearance Order that makes the 2A Core Spray pump inoperable.

Answer: B

Answer Explanation
Per OP-AA-109-101, Attachment 2, Examples of Exceptional Clearances states: Lack of dual valve isolation when isolating >500 psig or >200□F. Distractor 1: Plausible because a non-licensed person can challenge a clearance order. Incorrect because only a licensed individual can authorize a clearance order (tagout) on safety related equipment. Distractor 2: Plausible because equipment with C/O or WTO tags attached can be manipulated with exceptions. Incorrect because ONLY Qualified Operations personnel or Qualified FM Technicians with permission can do so. Distractor 3: Plausible because a fail closed AOV may be used as a clearance boundary if its air supply is isolated and bled off. Incorrect because when the AOV is part of the boundary, a Danger Tag must be used on the air supply. Reference: OP-AA-109-101, Rev.12 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier:3 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.10/45.13 KA: G2.2.13 - Knowledge of tagging and clearance procedures (RO=4.1) Comments:

71 **ID: 2123532** **Points: 1.00**

A Maintenance and Operations team are performing a simple troubleshooting plan when the team reports the problem is more extensive than originally thought.

What is required before allowing an increase in the scope of troubleshooting activities?

A. The Work Week Manager must be contacted prior to continuing with the plan.

B. Stop work, place system in a safe condition, and contact the First Line Supervisor for resolution.

C. Obtain approval from the Technical Team Lead (TTL) before continuing with troubleshooting efforts.

D. Verify that no Technical Specification LCOs will be entered, then continue with the revised plan.

Answer: B

Answer Explanation
Per MA-AA-716-004, Conduct of Troubleshooting, step 4.1.8. states: ENSURE whenever a discrepancy is discovered (including extended troubleshooting scope) between as found actual conditions and the expected conditions discussed in the pre-job brief or documents being utilized for troubleshooting, to stop, place the effected equipment in a safe condition, and contact First Line Supervisor for resolution. Distractor 1: Plausible because entry into a Technical Specification LCO is an impact on plant operation and is reviewed prior to work authorization by the WEC SRO. Incorrect because the troubleshooting procedure requires an FLS concurrence at a minimum. Distractor 2: Plausible because per MA-AA-716-004, the Work Week Manager evaluates On-Line Risk for scheduled troubleshooting activities. Incorrect because the Unit Supervisor can assess, if necessary any increase in On-Line Risk. Distractor 3: Plausible because the TTL communicates troubleshooting status and coordinates field execution. Incorrect because TTLs are only required for Complex Troubleshooting plans. Reference: MA-AA-716-004, Rev.16 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 3 Question Source: Quad Cities Exam Bank (QDC.LWQ.366643) Question History: n/a 10 CFR Part 55 Content: 41.10/43.5/45.13 KA: G2.2.20 - Knowledge of the process for managing troubleshooting activities. (RO=2.6) Comments:

72 **ID: 2123529** **Points: 1.00**

Which of the following identifies the Emergency Action Level that, if exceeded, requires entry into QGA-400, Radioactivity Release Control?

A. Unusual Event (4.38 E+05 µCi/sec)

B. Alert (3.84 E+07 µCi/sec)

C. Site Area Emergency (3.84 E+08 µCi/sec)

D. General Emergency (3.84 E+09 µCi/sec)

Answer: B

Answer Explanation
>3.84 E+07 µCi/sec is the ALERT EAL classification threshold value and is the entry condition into QGA 400. Distractor 1: Plausible because 4.38 E+05 µCi/sec is an EAL classification level. Incorrect because it is the Unusual Event EAL classification threshold value. and is below the value for entry into QGA 400. Distractor 2: Plausible because 3.84 E+08 µCi/sec is an EAL classification level. Incorrect because it is the Site Area Emergency EAL threshold value and is above the value for entry into QGA 400. Distractor 3: Plausible because 3.84 E+09 µCi/sec is an EAL classification level. Incorrect because it is the General Emergency EAL threshold value and is above the value for entry into QGA 400. Reference: QGA 400 Rev 8, EP-AA-1006 Addendum 3 Rev 5 Reference provided during examination: None Cognitive level: Memory Level (RO/SRO): RO Tier: 3 K/A: G2.3.11 - Ability to control radiation releases. (RO=3.8) 10 CFR Part 55 Content: 41.11/43.4/45.10 Question Source: Quad Cities Exam Bank (QDC.ILT.15664) Question History: 2012 ILT NRC Exam Comments:

73 **ID: 2123530** **Points: 1.00**

Which of the following describes the purpose of the Area Radiation Monitor system?

A. Provides continuous monitoring of area radiation levels during normal and abnormal conditions.

B. Provides automatic actions to contain radioactive releases in their entirety.

C. Prevents radioactive releases from leaving the plant structures without being filtered and treated first.

D. Ensure that radiation releases to the general public is within permissible limits.

Answer: A

Answer Explanation
Per UFSAR Section 12.3.4, The area radiation monitoring system continuously monitors and records the radiation level in accessible work areas of the plant. If the radiation level in any area exceeds that determined by site health-physics requirements, an alarm is annunciated to alert personnel to the hazard potential. Distractor 1: Plausible because process monitoring radiation detectors do initiate isolations, ie. RB Vent rad monitors, Off Gas radiation monitors. Incorrect because the Area Radiation monitoring system is used to monitor area radiation levels and initiate alarms when conditions are abnormal. Distractor 2: Plausible because radiation detectors are used to ascertain release levels, (i.e. Main Chimney rad monitors). Incorrect because the Area Radiation monitoring system is used to monitor area radiation levels and initiate alarms when conditions are abnormal, not for use in determining regulatory compliance for releases. Distractor 3: Plausible because process monitoring radiation detectors do initiate isolations, (i.e. RB Vent rad monitors, Off Gas radiation monitors). Incorrect because the Area Radiation monitoring system is used to monitor area radiation levels and initiate alarms when conditions are abnormal. Reference: UFSAR Section 12.3.4, Rev.15 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 3 Question Source: Quad Cities Exam Bank (QDC.ILT.00997) Question History: n/a 10 CFR Part 55 Content: 41.12/43.4/45.9 KA: G2.3.15 - Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (RO=2.9) Comments:

74 **ID: 2124136** **Points: 1.00**

Which of the following statements describes Level 1 procedure use?

A. Read each step prior to performance and perform each step in the specified sequence.

B. Procedure is available but NOT required at the work location allowing the activity to be performed from memory.

C. Refer to the procedure periodically during performance to confirm all segments of the activity have been completed.

D. Procedure is available and REQUIRED at the work location, but the activity may be performed from memory and confirmed after.

Answer: A

Answer Explanation
Per HU-AA-104-101, PROCEDURE USE AND ADHERENCE, the definition of Level 1 use is as follows: "Reading each step of the procedure prior to performing that step, performing each step in the sequence specified and placekeeping each step as complete before proceeding to the next step." The distractors describe Level 2 and Level 3 use or a combination of both. Distractor 1: Plausible because it describes a procedure level of use category. Incorrect because it describes Level 2-Reference Use. Distractor 2: Plausible because it describes a procedure level of use category. Incorrect because it describes Level 3-Information Use. Distractor 3: Plausible because it describes a procedure level of use category with an additional requirement of having the procedure at the work site which is an option. Incorrect because it still is categorized as Level 3-Information Use. Reference: HU-AA-104-101, Procedure Use and Adherence, Rev.7 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 3 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.10/43.5/45.13 KA: G2.4.5 - Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions. (RO=3.7) Comments:

75 **ID: 2123475** **Points: 1.00**

The Emergency Phones, located in-plant, are designed for use ...

A. during an Appendix R fire as the QCARPs are being performed.

B. during a plant shutdown with the Control Room inaccessible.

C. during an emergency to simultaneously notify the Control Room, Security, and Radiation Protection.

D. in the event of a total loss of AC power on both Units.

Answer: B

Answer Explanation
QOP 9000-05, Rev. 8, Emergency Telephones for Plant Shutdown with Control Room Inaccessible describes the use and operation of the emergency phone system. Distractor 1: Plausible because AC powered phone/communication systems will be lost. Incorrect, because the Emergency Phone system will also be unavailable as it is powered from the Unit 2 Instrument Bus. Distractor 2: Plausible because the control room is evacuated during QCARP execution. Incorrect, because communications are established using hand held radios and plant phones. Distractor 3: Plausible because an emergency phone number is used for plant emergencies such as fires, personnel injury, etc. which require immediate control room notification. Incorrect because the emergency phone system is designed specifically for communication wit the control room evacuated. Reference: QOP 9000-05, Rev.8 Reference provided during examination: None Cognitive level (High/Memory): Memory Level (RO/SRO): RO Tier: 3 Question Source: Quad Cities Exam Bank (QDC.ILT.181953) Question History: n/a 10 CFR Part 55 Content: 41.10/45.13 KA: G2.4.43 - Knowledge of emergency communications systems and techniques. (RO=3.2) Comments:

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

76 **ID: 2122925** **Points: 1.00**

Unit 1 is at 100% power.
Unit 2 is in Mode 5.
The Unit 2 125Vdc Battery Discharge Test and fuel moves are in progress.
The Unit 2 125Vdc Alternate Battery has been on-line for 6 days to support the Battery Discharge Test.

The Test Director has just informed the shift that the Unit 2 125Vdc Battery has failed to meet the Performance Acceptance Criteria of the Battery Discharge Test. Electrical Maintenance has estimated a 10 day repair time to replace cells and retest the battery.

What effect does this have on the operating and shutdown Units?

A. Unit 1 has no operational concerns, Unit 2 may continue Fuel Moves.

B. Unit 1 will enter a 7 day LCO, Unit 2 must stop Fuel Moves immediately.

C. Unit 1 has no operational concerns, Unit 2 must stop Fuel Moves immediately.

D. Unit 1 will enter a 7 day LCO, Unit 2 may continue Fuel Moves.

Answer: D

Answer Explanation
Answer Explanation: For Unit 1, TS 3.8.4 Condition C applies as 125Vdc Division 2 is inoperable. The Alternate Battery is already on line satisfying Required Action C.1. Entering a 7 day LCO satifies C.2 For Unit 2, TS LCO 3.8.5 is satisfied as only one 125 VDC electrical power subsytem is required for a shutdown Unit. Therefore, fuel moves can continue. Distractor 1: Plausible because a shutdown Unit requires only one 125Vdc subsystem operable. Incorrect because an operating Unit requires both 125Vdc subsystems and fuel moves may continue as a shutdown Unit only requires one operable 125 VDC electrical power subsytem. Distractor 2: Plausible because Unit 1 is required to enter a 7 day LCO. Incorrect because Unit 2 may continue fuel moves. Distractor 3: Plausible because Unit 2 can continue fuel moves. Incorrect because Unit 1 must enter a 7 day LCO. Reference: Quad Cities Technical Specifications sections 3.8.4 and 3.8.5 Reference provided during examination: Tecnical Specification sections 3.8.4 and 3.8.5 Cognitive level (High/Memory): High Level (RO/SRO): SRO Tier: 1 Group: 1 Question Source: New Question History: n/a 10 CFR Part 55 Content: 41.10/43.2/45.13 SRO Justification: Can the question be answered *solely* by knowing the following? “Systems knowledge” (i.e., how the system works, flowpath, logic, component location): No Immediate operator actions: No Entry conditions for AOPs or plant parameters that require direct entry into major EOPs: No The purpose, overall sequence of events, or overall mitigative strategy of a procedure: No KA: 295004 Partial or Total Loss of DC Power, Generic K/A 2.2.36; Ability to analize the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (SRO= 4.2) Comments:

77 **ID: 2125026** **Points: 1.00**

Unit 1 was at 100% power when supply breaker 125 Vdc Bus 1A-2 trips and a spurious Main Turbine trip occurs.

What action will the SRO direct FIRST?

A. Locally trip the Main Generator and Exciter field breakers.

B. Transfer annunciator power to the reserve feed.

C. Transfer control power for Bus 11 to the reserve feed.

D. Transfer control power for Bus 15 to the reserve feed.

Answer: A

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

With a loss of 1A-2, the Main Gen Field Breaker control power is lost. Remote control of the field breaker at the 901-8 panel would be ineffective and the breaker must be opened locally. Opening of the Man Gen Field Breaker after a generator trip is required to prevent damage to generator components from overcurrent. As the generator speed drops, AVR will increase the current to the field to try to maintain voltage resulting in an excessive current draw to the generator field.

Distractor 1: Plausible because the transfering Bus 11 control power is an action in QOA 6900-02. Incorrect because Bus 11 and any loads can be tripped locally if neccessary. No impending equipment damage will occur as a result of the loss of control power.
Distractor 2: Plausible because the transfering Bus 15 control power is an action in QOA 6900-02. Incorrect because Bus 15 loads can be tripped locally if neccessary. No impending equipment damage will occur as a result of the loss of control power.
Distractor 3: Plausible because the transfering annunciator control power is an action in QOA 6900-02. Incorrect because a failure to promptly trip the main generator and exciter field breakers may damage the Turbine-Generator system.

Reference: QOA 6900-02 Rev. 25
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 1 Group: 1

Question Source: New
Question History: n/a

10 CFR Part 55 Content: 41.10/43.5/45.13

SRO Justification: Can the question be answered *solely* by knowing the following?
“Systems knowledge” (i.e., how the system works, flowpath, logic, component location): No
Immediate operator actions: No
Entry conditions for AOPs or plant parameters that require direct entry into major EOPs: No
The purpose, overall sequence of events, or overall mitigative strategy of a procedure: No

KA: 295005 Main Turbine Generator Trip, Generic K/A 2.4.35; Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects. (SRO= 4.0)

Comments:

78 **ID: 2122948** **Points: 1.00**

Unit 1 was operating at 100% power when a rupture occurred in the TBCCW system.

Current plant status:

- Reactor Mode Switch in SHUTDOWN
- Reactor pressure is 900 psig and steady
- Several control rods did NOT insert due to a hydraulic ATWS
- Reactor power is 5% and lowering at 0.25% per minute
- Annunciator 912-1 E-2, TURB BLDG COOLING WATER HIGH TEMP, is in alarm
- Annunciator 912-1 D-2, TURB BLDG COOLING WATER LOW PRESS, is in alarm

The Unit Supervisor is directing the ANSO to remove equipment cooled by TBCCW from operation per QCOA 3800-03, "Loss of TBCCW."

Which of the following TBCCW system loads WILL be removed LAST?

A. EHC Pumps

B. CRD Pump

C. Circulating Water Pumps

D. Reactor Feed Pumps

Answer: B

Test Answer Key

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Answer Explanation

The question poses plant conditions where the only equipment the procedure allows to remain in service are the CRD pumps. QCOA 3800-03, Loss of TBCCW, directs all loads cooled by TBCCW to be tripped. The CRD pump cannot be secured since all control rods are NOT inserted to position 00.

Distractor 1: Plausible because the examinee may determine the Main Condenser is needed as a heat sink and delay removing the Circ Water Pumps from service. Incorrect because RPV pressure can be controlled by relief valves, HPCI, RCIC, etc.
Distractor 2: Plausible because the examinee may determine the Main Turbine and BPVs are needed as a heat sink and delay removing the EHC Pumps from service. Incorrect because RPV pressure can be controlled by relief valves, HPCI, RCIC, etc.
Distractor 3: Plausible because the examinee may determine RFPs are essential for RPV level control and delay removing them from service. Incorrect because HPCI, RCIC, and SSMP can provide adequate RPV makeup for the given plant conditions.

Reference: QCOA 3800-03 Rev.4
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 1 Group: 1

Question Source: Quad Cities Exam Bank (QDC.ILT.1244454)
Question History: ILT 14-1 Cert Exam

10 CFR Part 55 Content: 41.10/43.2/45.13

SRO Justification: Can the question be answered solely by knowing“systems knowledge”, i.e., how the system works, flowpath, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: 295018 Partial or Complete Loss of CCW, AA2.02; Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: Cooling water temperature. (SRO= 3.2)

Comments:

79 **ID: 2122951** **Points: 1.00**

Unit 1 is currently at 15% power with a startup in progress when the 1/2B Instrument Air Compressor trips and following annunciators alarm:

- 912-1 D-7, UNIT 1/2B INST AIR FDR BKR TRIP
- 912-1 D-11, UNIT 1/2B INST AIR LOW PRESS
- 912-1 A-11, UNIT 1A INST AIR LOW PRESS
- 912-1 A-12, 1A SERV AIR BACKUP VLV OPEN
- 912-1 A-8, UNIT 1A DRYER BYPASS VLV OPEN

All available Instrument Air and Service Air Compressors were started.

- Annunciator 901-5 A-1, SCRAM VALVE AIR SUPPLY LOW PRESSURE, alarms
- Control rods K-6 and M-8 are drifting in
- RPV water level is slowly rising

Which of the following actions should be DIRECTED FIRST?

A. Locate and isolate the leak.

B. Dispatch an EO to close the Low Flow Feed Reg Valve.

C. Scram the reactor.

D. Bypass the RWM and insert control rods K-6 and M-8 to position 00.

Answer: C

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Per QOA 4700-06, the Reactor should be scrammed when Instrument air pressure is < 55 psig. The 1/2B and 1A Instrument Air Receiver alarms are set at 85 psig. Two Rods are difting with all SCRAM lights lit, this is a SCRAM Criteria per QOA 4700-06.

Distractor 1, 2 and 3 are incorrect: Plausible because they increase the air supply to the Instrument Air Header and or to insert drifting control rods. However, they require some amount of time and indications support scramming the Reactor.

Distractor 1: Plausible because isolating the leak would potentially recover instrument air pressure but incorrect because procedurally the direced action is IF two or more rods start to drift, THEN scram the Reactor. Enter and perform QCGP 2-3.
Distractor 2: Plausible because closing the LFFRV is an action in QOA 4700-06 but incorrect because the action, IF two or more rods start to drift, THEN scram the Reactor. Enter and perform QCGP 2-3, is prior to it in the procedure.
Distractor 3: Plausible because the QCOA 0300-11, CONTROL ROD DRIFT, directs IF any control rod continues to drift without latching, THEN insert that control rod to position 00, but incorrect because the procedures also states, IF two or more control rods start to drift AND all RPS scram solenoid lights are lit, THEN scram the Reactor.

Reference: QOA 4700-06, QCOA 0300-11, QCAN 901(2)-5 A-1
Reference provided during examination: None.

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 1 Group: 1

Question Source: Quad Cities Exam Bank (QDC.ILT.15533)
Question History: ILT 08-1 NRC Exam

10 CFR Part 55 Content: (41.10 / 43.5 / 45.13)

SRO Justification: Can the question be answered solely by knowing“systems knowledge”, i.e., how the system works, flowpath, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence

of events, or overall mitigative strategy of a procedure? No

KA: 295019 Partial or Complete loss of Instrument Air, AA2.02; Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LISS OF INSTRUMENT AIR: Status of safety-related instrument air system loads (see AK2.1 - AK2.19). (SRO= 3.7)

Comments:

80 **ID: 2121302** **Points: 1.00**

The U2 is operating at 100% power.

A failure results in a high RPV pressure transient.

Per the Technical Specification Bases for LCO 3.3.1.1. Reactor Protection System (RPS) Instrumentation, which scram signal is conservatively assumed to maintain RPV pressure within the RPV Pressure Safety Limit?

A. MSIV Closure scram setpoint.

B. Turbine Control Valve Closure scram setpoint.

C. RPV Low Level scram setpoint.

D. APRM Fixed Neutron Flux-High scram setpoint.

Answer: D

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Per Technical Specification B3.3.1.1, Reactor Vessel Steam Dome Pressure-High it is assumed in the Reactor overpressurization analysis, the reactor scram occurs on Average Power Range Monitor Fixed Neutron Flux-High signal and not the Reactor Vessel Steam Dome Pressure-High or the Main Steam Line Isolation Valve-Closure signals.

Distractor 1: Plausible because Main Steam Isolation Valve closure would cause a major pressure transient and the setpoint is listed in the Tech Spec bases discussion but incorrect because APRM High Flux is stated as the function that initiates a scram for transients that result in a pressure increase.
Distractor 2: Plausible because RPV water level will drop when voids collapse but incorrect because Reactor Vessel Steam Dome Pressure High is stated as the function that initiates a scram for transients that result in a pressure increase.
Distractor 3: Plausible because turbine control valves will close to control pressure and also could fast close on low oil pressure(assuming an oil leak is the failure), but incorrect because Reactor Vessel Steam Dome Pressure High is stated as the function that initiates a scram for transients that result in a pressure increase.

Reference: Quad Cities Technical Specifications Bases B3.3.1.1 Revision 4.
Reference provided during examination: None.

Cognitive level (High/Memory): Memory

Level (RO/SRO): SRO
Tier: 1 Group: 1

Question Source: New
Question History: n/a

10 CFR Part 55 Content: (41.10 / 43.5 / 45.13)

SRO Justification: Can the question be answered *solely* by knowing the following?
≤1-hour TS/TRM Actions: No
The LCO/TRM information listed “above the line”: No
The TS safety limits: No

KA: 295025 High Reactor Pressure, EA2.02; Ability to determine and/or interpret the following as they apply to HIGH REACTOR PRESSURE: Reactor power. (SRO= 4.2)

Comments:

81 **ID: 2122984** **Points: 1.00**

The reactor was at 15% power when a manual scram was inserted.

- All 8 RPS Scram Solenoid Lights are Lit on the 901-5 panel
- Reactor power 12% and lowering
- Manual ARI failed to actuate
- RPV water level is +25 inches and slowly lowering
- RPV pressure is 900 psig
- SBLC Tank level is 82% and lowering

What is the HIGHEST PRIORITY action to be directed in QGA 101, RPV CONTROL (ATWS)?

A. Terminate and Prevent Injection and lower RPV water level to at least -35 inches.

B. Pull the scram solenoid fuses per QCOP 0300-28, ALTERNATE CONTROL ROD INSERTION.

C. Bypass Low RPV water level MSIV isolations per QCOP 0250-02, BYPASSING MSIV GROUP I ISOLATION SIGNAL FROM LOW LOW REACTOR WATER LEVEL.

D. Start an RPV cooldown at < 100 deg.F/hr

Answer: B

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Per OP-QC-103-102-1002, Quad Cities Strategies for Successful Transient Mitigation:
Both procedures (QCOP 0300-28 and QCOP 0250-02) can be ordered at the same time with a priority based on which procedure is likely to have greater effect on controlling the plant. The US will make this decision based on plant conditions such as type of ATWS and status of the Main Condenser. In this case, the Main Condenser is available and RPV pressure is being controlled by DEHC preventing heat input into the containment. There is ample time to remove ARI fuses and terminate the transient.

Distractor 1: Plausible because bypassing the Low RPV water level MSIV isolation is a QGA 101 level leg action. Incorrect because the indications are showing an Electric ATWS and all control rods can be rapidly inserted by de-energizing the sram solenoids.
Distractor 2: Plausible because lowering RPV water level lowers reactor power and is a QGA 101 action. Incorrect because the indications are showing an Electric ATWS and all control rods can be rapidly inserted by de-energizing the sram solenoids.
Distractor 3: Plausible because an RPV cooldown is a QGA 101 action. Incorrect because the Cold Shutdown Weight of Boron must be injected before a cooldown can be started and the transient is terminated more quickly by de-energizing scram solenoids.

Reference: Per OP-QC-103-102-1002, Quad Cities Strategies for Successful Transient Mitigation, QGA 101, RPV CONTROL(ATWS)
Reference provided during examination: None.

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 1 Group: 1

Question Source: New question developed for ILT 18-1 NRC Exam
Question History: None.

10 CFR Part 55 Content: 41.10/43.5/45.2/45.6
SRO Justification: Can the question be answered *solely* by knowing the following?
“Systems knowledge” (i.e., how the system works, flowpath, logic, component location): **No**
Immediate operator actions: **No**
Entry conditions for AOPs or plant parameters that require direct entry into major EOPs: **No**

The purpose, overall sequence of events, or overall mitigative strategy of a procedure: **No**

KA: 295037 Scram condition present and reactor power above APRM downscale or unknown, Generic K/A 2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation. (SRO= 4.4)

Comments:

82 **ID: 2123043** **Points: 1.00**

Unit 1 is at full power and Unit 2 is in a refueling outage when the folllowing events occur:

1300 -- Outside EO reports a fire in the ISFSI Protected Area. Several of the High Integrity Casks (HIC) appear to be on fire.
1315 -- Fire Brigade Leader contacts the control room and reports fire fighting efforts are initiated.
1335 -- Fire Brigade Leader requests off-site assistance from the Cordova Fire Department.
1345 -- Cordova Fire Department arrives and assists in fire fighting efforts.
1355 -- Fire Brigade Leader reports the fire is OUT.

What reporting requirements, if any, are required?

A. NRC notification ONLY

B. State and NRC notifications

C. State notification ONLY

D. None

Answer: B

Answer Explanation
The conditions for EAL HU3 are met requiring a NARS notification to Iowa and Illinios within 15 minutes. In addition, an NRC notification within 1 hour is required per 10CFR50.72(a)(1)(i) due to the declaration of an Emergency Classification. Distractor 1: Plausible because the fire is extinguished in < 60 minutes. Incorrect because offsite fire fighting assistance was required. Distractor 2: Plausible because a State notification is required. Incorrect because an NRC notification is also required. Distractor 3: Plausible because a NRC notification is required. Incorrect because an State notification is also required. Reference: EP-AA-1006 Addendum 3, Rev.5 Reference provided during examination: EAL pages: QC 2-9, 2-11, 2-13 Cognitive level (High/Memory): High Level (RO/SRO): SRO Tier: 1 Group: 1 Question Source: New question developed for ILT 18-1 NRC Exam Question History: None. 10 CFR Part 55 Content: 41.10/43.5/45.11 SRO Justification: Can the question be answered *solely* by knowing the following? “Systems knowledge” (i.e., how the system works, flowpath, logic, component location): **No** Immediate operator actions: **No** Entry conditions for AOPs or plant parameters that require direct entry into major EOPs: **No** The purpose, overall sequence of events, or overall mitigative strategy of a procedure: **No** KA: 295038 High offsite radioactivity release rate, Generic K/A 2.4.30 - Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. (SRO= 4.1) Comments:

83 **ID: 2123047** **Points: 1.00**

Unit 2 was operating at 100% power when a large LOCA occurred. QGA 100 and QGA 200 actions are in progress. All systems responded as designed.

- RPV water level -30 inches and rising
- Drywell temperature 330°F and rising
- Torus temperature 110°F and rising
- Torus level -5 inches and stable
- Drywell pressure 20 psig
- Torus pressure 15 psig
- Low Pressure ECCS pumps are injecting
- Torus sprays are ON

Which of the following actions has the HIGHEST PRIORITY?

A. Enter QGA 500-1, RPV Blowdown

B. Start Drywell Sprays

C. Raise Torus level

D. Start Torus Cooling

Answer: B

Test Answer Key

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Answer Explanation

Containment sprays, ie. Drywell and Torus Sprays, are required to be established prior to entering QGA 500-1 to prevent exceeding PSP or Drywell high temperature limits if they are available. Raising Torus level or starting Torus Cooling are required actions but NOT the priority since the containment design temperature is being approached. Therefore, establishing Drywell Sprays is the next required action.

Distractor 1: Plausible because it is a required action in QGA 200. Incorrect because Drywell temperature has exceeded the Containment design limit (280°F) and is appraoching the ADS operability limit (338°F) and requires a higher priority.
Distractor 2: Plausible because the conditions for entering QGA 500-1 are met. Incorrect because all mitigation systems, ie. Drywell sprays are to be used and assessed even if a blowdown parameter is exceeded.
Distractor 3: Plausible because it is a required action in QGA 200. Incorrect because Drywell temperature has exceeded the Containment design limit (280°F) and is appraoching the ADS operability limit (338°F) and requires a higher priority.

Reference: OP-QC-103-102-1002, Rev.25
Reference provided during examination: QGA 200

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 1 Group: 2

Question Source: New question developed for ILT 18-1 NRC Exam
Question History: None.

10 CFR Part 55 Content: 41.10/43.5/45.13

SRO Justification: Can the question be answered *solely* by knowing the following?
“Systems knowledge” (i.e., how the system works, flowpath, logic, component location): No
Immediate operator actions: No
Entry conditions for AOPs or plant parameters that require direct entry into major EOPs: No
The purpose, overall sequence of events, or overall mitigative strategy of a procedure: No
KA: 295012 High Drywell temperature, 2.4.6 - Knowledge of EOP mitigation strategies. (SRO= 4.7)

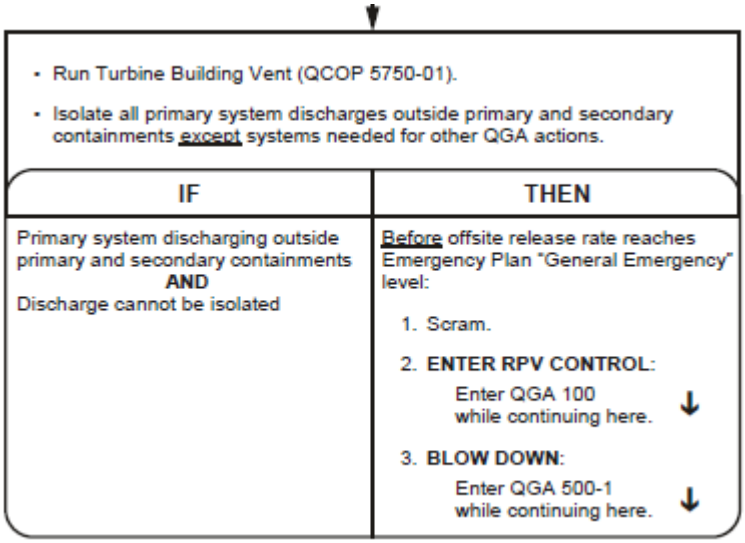
Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Comments:

84 **ID: 2123049** **Points: 1.00**

Which of the following unisolable leaks, with offsite radiation release rates approaching the General Emergency level, would require you to select QGA 500-01 as the appropriate procedure to protect the general public?



- Run Turbine Building Vent (QCOP 5750-01).
- Isolate all primary system discharges outside primary and secondary containments except systems needed for other QGA actions.

IF	THEN
Primary system discharging outside primary and secondary containments **AND** Discharge cannot be isolated	Before offsite release rate reaches Emergency Plan "General Emergency" level: 1. Scram. 2. **ENTER RPV CONTROL:** Enter QGA 100 while continuing here. ↓ 3. **BLOW DOWN:** Enter QGA 500-1 while continuing here. ↓

A. Fuel Pool cooling discharging into Radwaste Valve-Alley

B. HPCI steam inlet piping discharging into the Torus area

C. The Main Turbine Bypass Valves discharging into the Turbine Building

D. RWCU piping discharging into the RWCU Demin room

Answer: C

Answer Explanation
Answer Explanation:The answer is the only choice in which the SOURCE of the leak meets the criteria for RPV blowdown in QGA 400. Main Steam leaking in the Turbine Building is a PRIMARY system discharging outside the primary AND secondary containment. Distractor 1: Plausible because the Radwaste Valve-Alley is outside secondary containment. Incorrect because Fuel Pool cooling is not a primary system. Distractor 2: Plausible because the RWCU is a primary system. Incorrect because the RWCU Demin room is not outside secondary containment. Distractor 3: Plausible because the HPCI steam inlet supply is a primary system. Incorrect because the Torus area is not outside secondary containment. Reference: P&IDs, M-3 and M-4A Sh.1 Reference provided during examination: QGA 400 (embedded image) Cognitive level (High/Memory): High Level (RO/SRO): SRO Tier: 1 Group: 2 Question Source: Quad Cities Exam Bank (QDC.03-01 NRC SRO 85) Question History: ILT 03-1 NRC Exam 10 CFR Part 55 Content: 55.43(b) (5) SRO Justification: Can the question be answered solely by knowing“systems knowledge”, i.e., how the system works, flowpath, logic, component location? No Can the question be answered solely by knowing immediate operator actions? No Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No KA: 295017 Abnormal offsite release rate, AA2.03 - Ability to determone and/or interpret the following as they apply to HIGH OFF SITE RELEASE RATE: Radiation levels: Plant-Specific. (SRO= 3.1) Comments:

85 **ID: 2123050** **Points: 1.00**

The SAMGs have been entered and the TSC is providing SAMG decision-making.

- Drywell Hydrogen: 7%
- Drywell Oxygen: 6%
- Torus Hydrogen: 5%
- Torus Oxygen: 5%

WHICH BLOCKS of SAMG-2 should be followed to control Hydrogen and Oxygen?

DRYWELL

		Drywell O_2			
		< 5%	≥ 5% or unknown		
			Torus H_2		
			None	< 6%	≥ 6% or unknown
Drywell H_2	None	No action	No action	⑫	⑬
	< 6%	⑪			
	≥ 6% or unknown				

TORUS

		Torus O_2			
		< 5%	≥ 5% or unknown		
			Drywell H_2		
			None	< 6%	≥ 6% or unknown
Torus H_2	None	No action	No action	⑮	⑯
	< 6%	⑭			
	≥ 6% or unknown				

A. 13 and 15

B. 13 and 16

C. 12 and 16

D. 12 and 15

Answer: B

Answer Explanation
Answer Explanation: The correct Drywell Block Action is derived by intersecting a horizontal line drawn from Drywell H_2 ($\geq$ 6% or unknown) with a vertical line from Torus H_2 (< 6%). The Torus Block Action is derived by intersecting a horizontal line from Torus H_2 (< 6%) with a vertical line from Drywell H_2 ($\geq$ 6% or unknown). Distractor 1: Plausible because Drywell and Torus H_2 levels are close to the limits for blocks 13 and 16. Incorrect because the H_2 levels have exceeded the Block 12 and 15 limits. Distractor 2: Plausible because the Torus block actions are correct. Incorrect because the Drywell block actions are wrong. Distractor 3: Plausible because the Drywell block actions are correct. Incorrect because the Torus block are wrong. Reference: Technical Support Guidelines (TSG) Reference Manual, Rev.5 Reference provided during examination: SAMG-2 Drywell and Torus H2/O2 charts. (embedded image) Cognitive level (High/Memory): High Level (RO/SRO): SRO Tier: 1 Group: 2 Question Source: Bank Question History: 10 CFR Part 55 Content: (41.10 / 43.5 / 45.13) SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No Can the question be answered solely by knowing immediate operator actions? No Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No KA: 500000 EA2.03 Ability to determine and/or interpret the following as they apply to HIGH PRIMARY CONTAINMENT HYDROGEN CONCENTRATIONS: Combustible limits for drywell. (SRO=3.8) Comments:

86 **ID: 2123066** **Points: 1.00**

A large LOCA with a Group I isolation has occurred. QGA 100 and QGA 200 have been entered.

- Reactor pressure 750 psig and lowering
- RPV water level is -130 inches and lowering
- Drywell pressure is 8 psig and steady
- Torus pressure is 6 psig and steady
- Torus Cooling is running on both RHR loops
- Drywell and Torus Sprays are operating on RHR Loop 'A'.
- B Loop RHR is selected for injection

QGA 500-1, RPV BLOWDOWN is entered on RPV water level.
All 5 ADS valves are opened and RPV pressure is 500 psig and lowering.

What is the next action the Unit Supervisor will direct?

A. Split RHR Loops and maintain Torus Cooling and Containment sprays on 'A' RHR Loop ONLY.

B. Secure ALL Containment Cooling and Sprays.

C. Split RHR Loops and secure Containment Sprays only.

D. Continue operating Containment Cooling and Sprays.

Answer: B

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: Per QCAP 0200-10, the four viable mechanisms of core cooling in order of preference are core submergence, spray cooling, steam cooling with injection, and steam cooling without injection. When a blowdown is initiated at TAF, core submergence is lost. The direction to NOT divert RHR flow to torus cooling or containment sprays is to insure all RHR injection is into the RPV and therefore to restore core submergence as quickly as possible to prevent core damage. Also, per QCOP 1000-30, Limitations and Actions step E.6, An RHR Pump can be used for Containment Cooling only if it is **NOT** required to assure adequate core cooling by continuous operation in the LPCI mode, unless directed by QGA or SAMG procedures.

Distractor 1: Plausible because establishing Torus Cooling and Containment sprays are required actions in QGA 200. Incorrect because QGA 500-1 was entered at TAF and all flow is to be directed to the reactor to maintain core cooling via submergence.
Distractor 2: Plausible because establishing Torus Cooling is a required action in QGA 200. Incorrect because QGA 500-1 was entered at TAF and all flow is to be directed to the reactor to maintain core cooling via submergence.
Distractor 3: Plausible because establishing Torus Cooling and Containment sprays are required actions in QGA 200. Incorrect because QGA 500-1 was entered at TAF and all flow is to be directed to the reactor to maintain core cooling via submergence.

Reference: QGA 500-1 Rev.16,
Reference provided during examination: QGA 200, QGA 500-1

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 2 Group: 1

Question Source: Bank
Question History:

10 CFR Part 55 Content: (41.10 / 43.5 / 45.12)

SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No

Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: 203000 G2.1.20 - RHR/LPCI: Ability to interpret and execute procedure steps. (SRO=4.6)

Comments:

87 **ID: 2123095** **Points: 1.00**

Unit 1 is in Mode 4.

- RPV Head Vents are open
- RPV water level is +30 inches
- RPV water temperature band is 140°F to 160°F
- RPV water temperature 150°F and rising approx. 10°F/hr
- Shutdown Cooling lined up for a subsequent restart on A Loop
- Both Recirc Pumps are off
- RWCU system is in operation

MCC 18/19-5 tripped.

What actions will the Unit Supervisor direct in order to maintain RPV water temperature in band?

A. Establish a Feed and Bleed per QCOA 1000-02, Loss of Shutdown Cooling.

B. Restart the 1B Recirc Pump per QCOP 0202-43, Reactor Recirculation System Startup.

C. Realign and restart Shutdown Cooling on B RHR Loop per QCOP 1000-05, Shutdown Cooling Operation.

D. Restart Shutdown Cooling on A RHR Loop per QCOP 1000-05, Shutdown Cooling Operation.

Answer: A

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: The loss of MCC 18/19-5 prevents operation of Shutdown Cooling (SDC) on either loop as it is the power supply to both loops' injection valves. Since there is no indication of stratification, starting a Recirc pump will only add heat as it does work on the system. Since the RWCU system is available, a feed and bleed with CRD or Condensate can be readily established to control RPV water temperature.

Distractor 1: Plausible because a Recirc pump provides forced circulation and a more accurate assessment of bulk temperature. Incorrect because the pump will add heat.
Distractor 2: Plausible because RHR Shutdown Cooling is designed to control RPV water temperature. Incorrect because the RHR injection valves on both RHR Loops are unavailable due to the loss of MCC 18/19-5.
Distractor 3: Plausible because RHR Shutdown Cooling is designed to control RPV water temperature. Incorrect because the RHR injection valves on both RHR Loops are unavailable due to the loss of MCC 18/19-5.

Reference: QCOA 1000-02, LOSS OF SHUTDOWN COOLING, Rev.21
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 2 Group: 1

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.5 / 45.6)

SRO Justification: Can the question be answered solely by knowing "systems knowledge", i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: 205000 A2.03 - Ability to (a) predict the impacts of the following on the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE); and (b) based on those predictions, use procedures to correct, control, or mitigate

the consequences of those abnormal conditions or operations: A.C. failure. (SRO=3.2)

Comments:

88 **ID: 2123109** **Points: 1.00**

A LOCA has occurred on Unit 2.
The 2B Core Spray pump and the RHR system are injecting and maintaining RPV water level.
The 2A Core Spray pump is in PTL for RPV water level control.

- 2B Core Spray pump flow, discharge pressure, and current are lowering.
- All other Low Pressure ECCS pumps are operating normally.
- An EO reports that the 2B Core Spray pump sounds as if it were cavitating and the casing is hot.

What action will the Unit Supervisor direct next?

A. Start the 2A Core Spray pump and secure the 2B Core Spray pump.

B. Throttle OPEN the 2B Core Spray pump discharge valve fully to maintain rated flow.

C. Throttle CLOSED the 2B Core Spray pump discharge valve to stabilize discharge pressure and flow. .

D. Swap the 2B Core Spray pump suction to the CCSTs.

Answer: A

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: Since all other ECCS pumps are operating normally, Suction Strainer clogging is not the cause of the 2B Core Spray pump degraded flow. Therefore, swapping the pump suction to the CCSTs is not a correct action. Throttling the pump discharge valve may stabilize flow, but based on the EO report, pump damage is inevitable. Securing an ECCS pump must be directed by the Unit Supervisor.

Distractor 1: Plausible because throttling a discharge valve open increases flow. Incorrect because the pump is cavitating and flow becomes more unstable.
Distractor 2: Plausible because the symptoms of cavitation are like suction strainer clogging for which the corrective action is to swap suction to the CCSTs. Incorrect because all other running ECCS pumps are operating normally. Suction strainer clogging would have affected all the ECCS pumps.
Distractor 3: Plausible because throttling the discharge valve closed will stabilize pressure and flow. Incorrect because pump flow will be reduced and RPV water level will not be maintained.

Reference: QCOP 1000-30 Rev.32
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 2 Group: 1

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.5 / 45.6)

SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: 209001 A2.06 - 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: Inadequate system flow. (SRO=3.2)

Comments:

89 **ID: 2123126** **Points: 1.00**

Unit 1 is in Mode 1 when annunciator 901-4 F-18, TARGET ROCK VALVE 3A BELLOWS FAILURE, alarms.

Target Rock Valve indications:
- Acoustic Monitor CLOSED green light is LIT
- Amber MEMORY light is OFF
- Tailpipe temperature is steady

The Target Rock Valve bellows is confirmed to be leaking.

Continued plant operation...

A. IS permitted for 14 days. After which the plant must be in Mode 3 in 12 hours.

B. IS permitted. Restore relief valve function within 12 hours OR be in Mode 3 in 24 hours.

C. is NOT permitted. Be in Mode 2 in 12 hours.

D. is NOT permitted. Be in Mode 3 in 12 hours and in Mode 4 in 36 hours.

Answer: D

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: The 203-3A is considered a Relief valve and a Safety valve. The Safety valve portion is the most limiting in Tech Specs. The question states that the 3A Target Rock Valve bellows is leaking. This would prevent the Safety Valve Mode from actuating on high reactor pressure. Tech Spec 3.4.3 Condition C is applicable for "one or more safety valves inop". There is no 14 days of operation allowed.

Distractor 1: Plausible because the valve is inoperable. Incorrect because it is the Safety valve function that is inoperable, not the Relief valve function. Also the application the 12 and 24 hours is incorrect. Twelve (12) hours to be in Mode 3, not to restore operability and the next 24 hours to be in Mode 4, not Mode 3.
Distractor 2: Plausible because "continued operation is not permitted" is correct. Incorrect because the requirement is to be in Mode 3 in 12 hours.
Distractor 3: Plausible because the valve is inoperable. Incorrect because it is the Safety valve function not the Relief valve function that is inoperable. The action statement is for the Relief valve inoperability.

Reference: Technical Specification 3.4.3 Safety and Relief Valves
Reference provided during examination: TS 3.4.3

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 2 Group: 1

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.7 / 43.5 / 45.12)

SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: 239002 G2.2.37 - Safety Relief Valves: Ability to determine operability and/or availability of safety related equipment. (SRO=4.6)

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Comments:

90 **ID: 2123127** **Points: 1.00**

Unit 1 is at 100% power when the following annunciators alarm:

- 901-8 C-2, RESERVE AUX TRANS 12 TROUBLE
- 901-8 E-2, RESERVE TRANS 12 TRIP
- 901-8 G-2, RES AUX TRANS 12 LOW VOLTAGE

Moments later the NSO reports:

- Transformer 12 has tripped
- The reserve feed breakers for Bus 12 and Bus 13 from Transformer 11 have auto closed
- Reactor power, pressure, and water level are stable.

What action will the Unit Supervisor direct?

A. Enter TS LCO 3.8.2 AC Sources-Shutdown, Condition A, One required offsite circuit inoperable.

B. Enter TS LCO 3.8.1 AC Sources-Operating, Condition C, Two required offsite circuits inoperable.

C. Reduce power to 2511 MWth per QCGP 3-1.

D. Maintain reactor power per QCGP 3-1.

Answer: C

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: QOA 6100-01, Loss of Reserve Auxiliary Transformer 12(22) During Power Operation, step 7.a.(2) requires reactor power reduced to ≤ 2511 MWth within 1 hour after the loss of RAT 12 due to the reduced operating margins for UAT 11 windings.

Distractor 1: Plausible because one offsite circuit is inoperable. Incorrect because two operable offsite circuits are available through the crossties from Unit 2.
Distractor 2: Plausible because one offsite circuit is inoperable. Incorrect because two operable offsite circuits are available through the crossties from Unit 2.
Distractor 3: Plausible because reactor power, pressure, and level are stable and Aux power auto-transferred as designed. Incorrect because reactor power must be lowered due to the reduced operating margins for UAT 11 windings.

Reference: QOA 6100-01, Rev.35
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 2 Group: 1

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.5 / 45.6)

SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: 262001 A2.04 Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Types of loads that, if deenergized, would degrade or hinder plant operation. (SRO=4.2)

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Comments:

91 **ID: 2123128** **Points: 1.00**

Unit 1 is at 100% power when the 1B Recirc ASD trips.

- NO operator action has been taken.
- Reactor Power is 67% and STEADY.
- Core flow is 49 Mlb/hr.
- 1A recirc is running at 94% speed.
- The STA has reported the reactor is above MELLLA and in Instability Region II.
- Core thermal /hydraulic oscillations have NOT been observed.

What is the FIRST ACTION the Unit Supervisor will direct?

A. Raise 1A Recirc pump speed to exit Instability Region II.

B. Reduce 1A Recirc pump speed to <78% and maintain pump motor current < 770 amps.

C. Scram the reactor to prevent thermal hydraulic instabilities.

D. Insert CRAM rods to exit Instability Region II

Answer: D

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: QCOA 0202-04 Section E, step E.6 states: "Control Rod insertion to put Reactor operation outside of Instability Region II as indicated in QCOA 0400-02 must receive priority over pump restart or other non-safety actions.

Distractor 1: Plausible because reducing the running pump speed is a required action per QCOA 0202-04. Incorrect because reducing Recirc flow before exiting the Instability Region drives reactor operation further into the Instability Region.
Distractor 2: Plausible because reactor operation is in Instability Region II. Incorrect because thermal hydraulic instabilities are not occurring.
Distractor 3: Plausible because increasing Recirc flow to exit Instability Region II is allowed if the OPRM system is operable per QCOA 0400-02. Incorrect because this method is not allowed if the Instability Region was entered as a result of a Recirc pump trip per QCOA 0202-04.

Reference: QCOA 0202-04, Rev.47
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 2 Group: 2

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.5 / 43.5 / 45.12 / 45.13)

SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: 202001 G2.1.7 - Recirculation: Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation. (SRO=4.7)

Comments:

92 **ID: 2123161** **Points: 1.00**

Unit 1 is at 50% power with a startup in progress.
When control rod D-8 is withdrawn to position 48, the following annunciators alarm:

- 901-5 A-3, ROD DRIFT
- 901-5 B-3, ROD WORTH MIN BLOCK

Indication for position 48 was lost on the Full Core, 4-Rod, and RWM Display screen.
Control rod coupling was verified, and stall flow was obtained.
When control rod D-8 is inserted to position 46, position indication returns and annunciators 901-5 A-3 and 901-5 B-3 reset.

To continue control rod withdrawal, the Unit Supervisor will direct the NSO to ...

A. leave control rod D-8 at position 46 and BYPASS the RWM.

B. insert control rod D-8 to position 00 and declare it INOPERABLE.

C. notch out control rod D-8 to position 48 and enter a SUBSTITUTE POSITION.

D. leave control rod D-8 at position 46 and insert an ALTERNATE LIMIT.

Answer: D

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: Inserting an ALTERNATE LIMIT will satisfy the sequence requirements on the RWM and allow control rod withdrawal to continue. Substitute positions are NOT allowed for a control rod whose position can NOT be determined from RPIS. The control rod is NOT inoperable solely due to a failed reed switch at position 48. Per QCGP 4-1, the RWM should only be bypassed if it has failed or for control rod testing, sequence changes, and special maneuvers.

Distractor 1: Plausible because coupling and stall flow checks were successful and the control rod can be determined to be at position 48. Incorrect because per QCOP 9950-07, substitute positions cannot be used for a rod whose position can NOT be determined from RPIS. The substitute position is used only if the RWM cannot process the information from RPIS.
Distractor 2: Plausible because bypassing the RWM would clear the RWM block and allow further control rod movement. Incorrect because per QCGP 4-1, the RWM should only be bypassed if it has failed or for control rod testing, sequence changes, and special maneuvers.
Distractor 3: Plausible because taking the control rod OOS mechanically and on the RWM will allow control rod movement to continue. Incorrect because removing the control rod from service is not required and would require a sequence change.

Reference: QCGP 4-1, Rev.50
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 2 Group: 2

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.5 / 45.6)

SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: 214000 A2.01 - Ability to (a) predict the impacts of the following on the ROD POSITION INFORMATION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Failed reed switches. (SRO=3.3)

Comments:

93 **ID: 2123198** **Points: 1.00**

A leak in the B Main Steam Line resulted in a reactor scram from 100% power.
QGA 100, RPV CONTROL and QGA 200, PRIMARY CONTAINMENT CONTROL have been entered.

- RPV pressure is 800 psig
- Drywell temperature is 265°F
- Drywell pressureis 10 psig
- Torus pressure is 8 psig
- Torus water temperature is 98°F

All automatic actuations and isolations for 0 inches RPV water level and 2.5 psig Drywell pressure have been verified.

The NSO attempts to initiate Torus Sprays then reports the following:

- The breaker for MO 1-1001-34B, TORUS TEST OR SPRAY VLV, has tripped.
- MO 1-1001-34A, TORUS TEST OR SPRAY VLV, will NOT open.

What action will the Unit Supervisor direct next?

A. Restart RBCCW and Drywell Coolers.

B. Vent the Torus through the SBGTS.

C. Dispatch EOs to manually open valves to establish Torus Sprays on RHR Loop A.

D. Place CNMT CLG 2/3 LVL AND ECC INIT BYP SWITCH 18 to MANUAL OVERRD.

Answer: C

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: The containment spray and cooling valves are interlocked closed on a LOCA signal, (i.e. 2.5 psig Drywell pressure or -59 in. RPV water level). Placing the S-17 switch to ON will bypass the interlock and allow opening of the valves, however, the valves can be manually opened if the logic has failed. The Torus cannot be vented through SBGT per QCOP 1600-02 as the procedure does not allow bypassing the Group II isolation. RBCCW should not be restarted as Drywell temperature is > 260°F. The S-18 switch bypass 2/3 core height (-191 inches) RPV water level interlock ONLY for containment spray and cooling valves.

Distractor 1: Plausible because Switch 18 overrides close interlocks on the containment spray and cooling valves. Incorrect because switch 18 bypasses the interlock associated with low-low reactor water level (-191 inches) which is not present.
Distractor 2: Plausible because containment venting is a QGA 200 action to reduce pressure. Incorrect because a Group II isolation signal is present and the procedures delineated in QGA 200 to vent the containment do not allow bypassing a Group II isolation signal.
Distractor 3: Plausible because restarting RBCCW and Drywell Coolers would reduce containment pressure. Incorrect because QCOP 5750-19 prohibits starting RBCCW if a LOCA has occurred and Drywell temperature is > 260°F.

Reference: QGA 200 Rev.12, QCOP 5750-19 Rev.11, QCOP 1600-02 Rev.16
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 2 Group: 2

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.5 / 45.6)

SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: 230000 A2.12 - Ability to (a) predict the impacts of the following on the RHR/LPCI: TORUS/SUPPRESSION POOL SPRAY MODE; and (b) based on those predictions, use procedures to correct, or mitigate the consequences of those abnormal conditions or operations: Valve logic failure. (SRO=3.3)

Comments:

94 **ID: 2123352** **Points: 1.00**

A plant shutdown is in progress per QCGP 2-1, NORMAL UNIT SHUTDOWN.

- Mode Switch in Shutdown
- All rods IN
- RPV pressure 800 psig and slowly lowering
- RPV water temperature is 520°F

The Outage Control Center (OCC) calls the Unit Supervisor and requests the RPV depressurized as soon as possible to allow Drywell work to start.
Current time is 0902
The Unit Supervisor should direct the NSO to ...

A. Depressurize to 300 psig the first hour, then continue at 100°F/hr.

B. Start an RPV cooldown at 80°F/hr.

C. Start an RPV cooldown with a target of 420°F by time 1000.

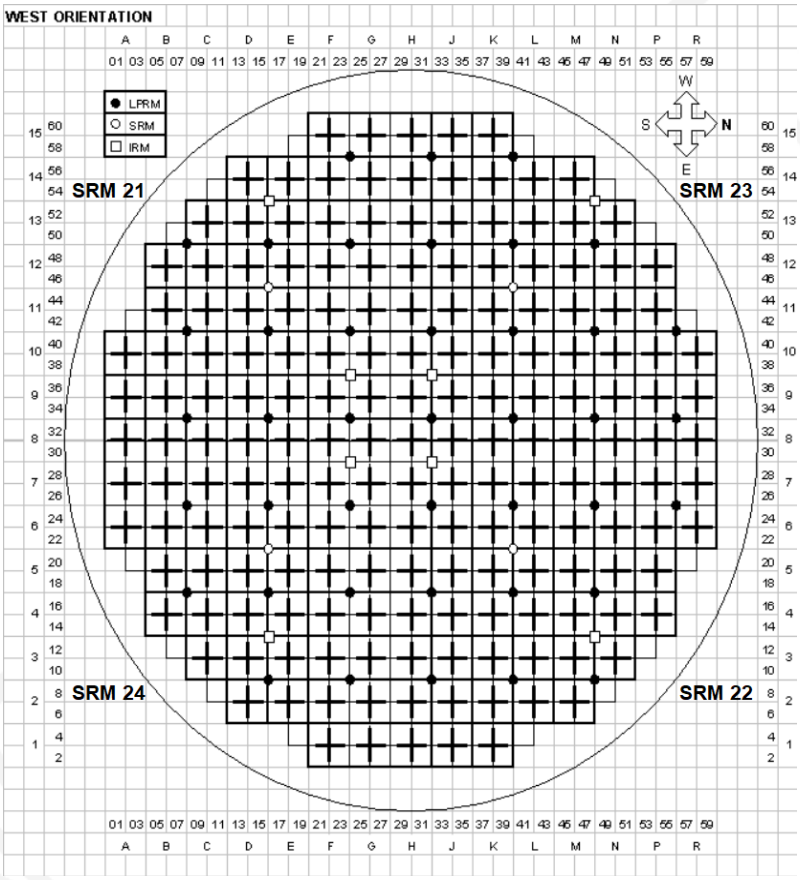
D. Depressurize to 0 psig, it's OK to exceed 100°F/hr.

Answer: B

Answer Explanation
Answer Explanation: A cooldown at 80°F/hr will allow sufficient margin to TS 3.4.9 RCS Pressure and Temperature Limits. Any cooldown rate at the 100°F/hr limit or exceeding it is a non-conservative decision. Distractor 1: Plausible because that is the highest allowable cooldown limit per TS 3.4.9. Incorrect because it does not allow margin for error and a Technical Specification violation may occur. Distractor 2: Plausible because it is a direction allowed in QGA 500-1. Incorrect because under the given conditions the maximum cooldown rate is 100°F/hr. A blowdown/rapid depressurization is only allowed if another higher priority limit is being challenged, (i.e. TAF, PSP, etc.) Distractor 3: Plausible because it does not violate the 100°F/hr limit. Incorrect because it does not allow margin for error and a Technical Specification violation may occur. Reference: TS 3.4.9 RCS Pressure and Temperature Limits Reference provided during examination: None Cognitive level (High/Memory): High Level (RO/SRO): SRO Tier: 3 Question Source: New Question History: N/A 10 CFR Part 55 Content: (41.10 / 43.5 / 45.12) SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No Can the question be answered solely by knowing immediate operator actions? No Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No KA: G2.1.39 - Knowledge of conservative decision making practices. (SRO=4.3) Comments:

95 **ID: 2123362** **Points: 1.00**

- Unit 1 is in a refueling outage with fuel offloading scheduled to begin this shift.
- SRM 21 is INOPERABLE and bypassed with its joystick.



Which of the following is true concerning the administrative requirements for fuel moves?

A. Fuel can NOT be offloaded from ANY quadrant.

B. Fuel can be offloaded from ALL quadrants.

C. Fuel can be offloaded from all quadrants EXCEPT the UPPER LEFT.

D. Fuel can be offloaded from the LOWER RIGHT quadrant ONLY.

Answer: C

Answer Explanation
QCFHP 0100-01, Step E.5.d, states that while you must have 2 operable SRMs, they must be in the quadrant you are performing the core alterations in and in a quadrant adjacent to where core alterations are being performed. Distractor 1: Plausible because the LOWER RIGHT quadrant meets the requirements for fuel moves. Incorrect because two other quadrants also meet the requirements. Distractor 2: Plausible because three quadrants meet the requirements for fuel moves. Incorrect because the UPPER LEFT quadrant does not have an operable SRM. Distractor 3: Plausible because one quadrant does not have an operable SRM. Incorrect because the requirement is: an operable SRM in the quadrant fuel moves are being performed and an adjacent quadrant. Fuel can be moved in all quadrants except the UPPER LEFT. Reference: QCFHP 0100-01 Rev 37 Reference provided during examination: None Cognitive level: High Level (RO/SRO): SRO Tier: 3 Group: N/A Question Source: Quad Cities ILT Exam Bank (QDC.ILT.15608) Question History: ILT 10-1 NRC Exam 10 CFR Part 55 Content: (41.2 / 41.10 / 43.6 / 45.13) SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No Can the question be answered solely by knowing immediate operator actions? No Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No KA: 2.1.41: Knowledge of refueling process. (SRO=3.7) Comments: None

96 **ID: 2123424** **Points: 1.00**

Which of the following Temporary Configuration Changes can be authorized prior to the completion of the Temporary Configuration Change Package documentation?

A. Installation of a patch on a pipe that has wall thinning.

B. Installation of a jumper on a faulty ground overcurrent relay on a RHR pump needed for core cooling.

C. Installation of jumpers to allow Rod Exercising.

D. Installation of a Blocking Device to maintain Div I Diesel Generator Ventilation Exhaust Damper open.

Answer: B

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: Per CC-AA-112, section 4.6, an Urgent Temporary Modification may be authorized prior to completion of the documentation. An Urgent Temporary Modification is one that must be needed immediately to eliminate a threat to the safety of personnel or facilities. Shift Manager approval and Site Engineering Director concurrence are required as well as a 50.59 review, by a qualified individual per LS-AA-104, prior to installation.

Distractor 1: Plausible because the jumper installation is an alteration of plant equipment. Incorrect because control rod exercising is not urgent, and the authorization is incorporated into the procedure.
Distractor 2: Plausible because the pipe patch requires Temporary Modification paperwork. Incorrect because it does not meet the definition of "urgent" as described in CC-AA-112.
Distractor 3: Plausible because installation of a blocking device on the EDG Exhaust Damper is a TCC. Incorrect because it does not meet the definition of "urgent" as described in CC-AA-112.

Reference: CC-AA-112 Rev.27
Reference provided during examination: None

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 3

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.10 / 43.3 / 45.13)

SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: G2.2.11 - Knowledge of the process for controlling temporary design changes. (SRO=3.3)

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Comments:

97 **ID: 2123438** **Points: 1.00**

Which of the following personnel could be assigned as a "Designated Operator" for a task inside the Protected Area as defined by WC-AA-101, On-Line Work Control Process?

A. An Equipment Operator assigned attendant duties for a Permit Required Confined Space per SA-AA-114, CONFINED SPACE ENTRY.

B. A Dedicated Equipment Operator supporting QCOS 1100-07, SBLC PUMP FLOW RATE TEST.

C. The Unit Equipment Operator performing QOS 0005-01 OPERATIONS DAILY SURVEILLANCES.

D. The Outside Equipment Operator at the H2 farm receiving a truck.

Answer: C

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Per WC-AA-101, On-Line Work Control Process, section 2.12: "The dispatching supervisor **must** ensure that collateral duties do not interfere with the designated operator response.
If, as described in the Station's licensing basis, the allowed time to complete the action is greater than 30 minutes, a designated operator may be assigned to perform the action."

Distractor 1: Plausible because the EO is inside the Protected Area. Incorrect because per SA-AA-114, the Confined Space Attendant must remain outside of the Permit Required Confined Space at all times.
Distractor 2: Plausible because the EO can leave the H2 farm if relieved. Incorrect because the EO is outside of Protected Area and the response time is excessive due to turnover and distance.
Distractor 3: Plausible because the EO is inside the Protected Area. Incorrect because the EO is already a "Dedicated Operator" assigned to the surveillance test.

Reference: WC-AA-101 Rev.29
Reference provided during examination: WC-AA-101, pages 1-3.

Cognitive level (High/Memory): High

Level (RO/SRO): SRO
Tier: 3

Question Source: New
Question History: N/A

10 CFR Part 55 Content: (41.10 / 43.5 / 45.13)

SRO Justification: Can the question be answered solely by knowing "systems knowledge", i.e., how the system works, flow path, logic, component location? No
Can the question be answered solely by knowing immediate operator actions? No
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No

KA: G2.2.17 Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator. (SRO=3.8)

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Comments:

98 **ID: 2123441** **Points: 1.00**

Both Units are operating at 100% power.

Which of the following conditions can the Shift Manager WAIVE the requirement for Verification in accordance with HU-AA-101, Human Performance Tools and Verification Practices?

A Danger Tag is to be hung on a...

A. LP Heater Drain valve located in LP Heater Bay.

B. Stator Cooling Water valve when Stator Cooling Water is posted as Protected Equipment.

C. Service Air isolation valve located 8 feet off the floor in the Turbine Building Mezzanine level.

D. 1/2 Diesel Generator 'A' Starting Air Compressor control switch for the air start motor that will be replaced.

Answer: A

Test Answer Key

2020 QDC NRC Exam SRO Section
Test ID: 330949

Answer Explanation

Answer Explanation: Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.
The Shift Manager may waive verification requirements for ALARA concerns in accordance with HU-AA-101 section 4.3.2.1. With the unit at power (and Hydrogen injection taking place), a valve in the Heater Bay would be of a dose concern.

Distractor 1 is incorrect: With a system protected, ensuring the right equipment is taken out of service is key to sustained operation and would be verified. Plausible because work is not normally allowed on protected equipment per OP-AA-108-117, Protected Equipment Program.

Distractor 2 is incorrect: A component (safety related) in the EDG room also does not meet the criteria for waiving IV.

Distractor 3 is incorrect: The valve located above 7' [where RP would not normally survey for contamination] is not a valid reason to waive IV. As part of the original hanging, RP would have surveyed the area.

Reference: HU-AA-101 Rev 10
Reference provided during examination: None

Cognitive level: Memory

Level (RO/SRO): SRO
Tier: 3

Question Source: Quad Cities ILT Exam Bank
Question History: N/A

10 CFR Part 55 Content: 41.10/43.5/45.11

SRO Justification: Can the question be answered *solely* by knowing the following?
“Systems knowledge” (i.e., how the system works, flow path, logic, component location): No
Immediate operator actions: No
Entry conditions for AOPs or plant parameters that require direct entry into major EOPs: No
The purpose, overall sequence of events, or overall mitigative strategy of a procedure: No

KA: G2.3.14 - Knowledge of radiation or contamination hazards that may arise

during normal, abnormal, or emergency conditions or activities. (SRO= 3.8)

Comments:

99 **ID: 2123458** **Points: 1.00**

Unit 1 has experienced a reactor scram and a loss of off-site power.

A fire is reported in the U-1 cable tunnel.

The Unit Supervisor has determined that normal and emergency plant procedures are insufficient to control the event.

Which Safe Shutdown Procedure, in accordance with QCOA 0010-12, Attachment D, should be DIRECTED by the Unit Supervisor?

A. QCARP 0050-01

B. QCARP 0060-01

C. QCARP 0060-02

D. QCARP 0030-01

Answer: B

Answer Explanation
Answer Explanation: From QCOA 0010-12 attachment D, the Unit 1 cable tunnel is in area CT-1. QCARP 0060-01 addresses a fire in CT-1. Distractor 1: Plausible because the U-1 cable tunnel is in the Turbine Building area (TB-III). Incorrect because a fire in the cable tunnel is a separate area (CT-1). Distractor 2: Incorrect but plausible since this would be correct for the cable spreading room, a common misconception. Distractor 3: Plausible because it would be correct for Unit 2. Incorrect because the answer choice is for the opposite unit. Reference: QCOA 0010-12 Revision 51 Reference provided during examination: QCOA 0010-12 Revision 51, Attachment D. Cognitive level (High/Memory): High Level (RO/SRO): SRO Tier: 3 Question Source: New Question History: n/a 10 CFR Part 55 Content: (41.10 / 43.5 / 43.13) SRO Justification: Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flow path, logic, component location? No Can the question be answered solely by knowing immediate operator actions? No Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? No Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? No KA: G2.4.27 - Knowledge of "fire in the plant" procedures. (SRO=3.9) Comments:

100 **ID: 2123466** **Points: 1.00**

At 12:00 the threshold value for an UNUSUAL EVENT was exceeded, with indications available in the control room.

At 12:08 the Shift Emergency Director classified an UNUSUAL EVENT based on the associated control room indications.

Which of the following is the LATEST time at which COMPLETE notification of the UNUSUAL EVENT can be made to the State/Local agencies per EP-AA-114, NOTIFICATIONS?

A. 12:15

B. 13:08

C. 13:00

D. 12:23

Answer: D

Answer Explanation
The Nuclear Accident Reporting System (NARS) is a telecommunication network and form used to transmit information to appropriate state and local agencies. This notification must be initiated within 15 minutes of the DECLARATION of an emergency. Distractor 1: Plausible because the event must be classified within 15 minutes but incorrect because the time is 15 minutes from threshold value being exceeded. Distractor 2: Combination of distractor 1 and 2. Distractor 3: Plausible because this is when the NRC must be notified (ENS) but incorrect because state and local agencies must be notified within 15 minutes. Reference: EP-AA-114 Rev 15 Reference provided during examination: None Cognitive level: High Level (RO/SRO): SRO Tier: 3 Question Source: Quad Cities Exam Bank (QDC.ILT.16406) Question History: LaSalle 2008 ILT NRC Exam 10 CFR Part 55 Content: 41.10/43.5/45.11 SRO Justification: Can the question be answered *solely* by knowing the following? “Systems knowledge” (i.e., how the system works, flow path, logic, component location): No Immediate operator actions: No Entry conditions for AOPs or plant parameters that require direct entry into major EOPs: No The purpose, overall sequence of events, or overall mitigative strategy of a procedure: No KA: G2.4.29 - Knowledge of the emergency plan. (SRO= 4.4) Comments: