Davis Besse 1LOT20 NRC Written Exam Rev. 1

1. The plant was at 18% power preparing to synchronize the Main Generator to the grid.

   An event occurs and the following conditions are noted immediately:
   - All Power Range NIs indicate 0%
   - IR SUR is -0.3 dpm
   - The Zero percent light on the ROD POSITION INDICATION PANEL for Rod 2-2 is not lit
   - Reactor Trip Breakers A & C are closed
   - Reactor Trip Breakers B & D are open
   - Annunciator 1-3-D, Bus C1 VOLTAGE is in alarm
   - Annunciator 1-4-H, Bus D1 VOLTAGE is in alarm
   - Buses C1 and D1 indicate 0 volts

   Which of the following is the **FIRST** action required to be taken?

A. GO TO DB-OP-02521, Loss of AC Bus Power Sources

B. Initiate Emergency Boration until adequate Shutdown Margin is restored

C. Attempt to start EDG 1 and EDG 2 from the control room

D. Momentarily de-energize 480 Volt unit Substations E2 & F2

Answer: C

Explanation/Justification: KA match- diagnosing vital system status implicates loss of power and determining required actions to restore based on indication and annunciator alarms

A. Incorrect - Plausible because DB-OP-02521 does provide guidance for loss of C1 and D1, but OP2000 does not provide guidance to REFER TO DB-OP-02521 until both essential busses remain deenergized after performing attachment 28

B. Incorrect - Plausible because Specific Rule 1 actions would have higher priority than Specific Rule 6, however with indications provided that the reactor is shutdown and power is lowering in the Intermediate Range, Specific Rule 1 actions are not required (SDM remains adequate with one stuck rod and power lowering).

C. Correct - Per Specific Rule 6 RNO for verification that EDGs are running, any EDGs that failed to start should be attempted to start from the control start pushbuttons

D. Incorrect - Plausible because OP2000 immediate action RNO for the reactor not shutdown (power not lowering in the Intermediate Range) would have priority over Specific Rules, however, indications given state power range indications are 0% with Intermediate Range Startup Rate at -0.3 dpm which indicate the reactor is shutdown. Even though Reactor Trip Breakers A & C are closed the reactor tripped due to the LOOP which deenergized E2 and F2

Sys #	System	Category	KA Statement
BW E02	Vital System Status Verification	EK1 – Knowledge of the operational implications of the following concepts as they apply to the (Vital System Status Verification):	Annunciators and conditions indicating signals, and remedial actions associated with the (Vital System Status Verification)

K/A# EK1.3 **K/A Importance** 3.8 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02000 Specific Rule 6

Question Source: Bank 288101 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.8 / 41.10 / 45.3

Objective: GOP-301

2. Initial conditions:

   - 100% power
   - #2 Makeup Pump running

   The following occurs:

   - Reactor trip
   - Large break LOCA

   Current conditions:

   - RCS Pressure = 100 psig
   - Incore Thermocouples = 325 °F
   - Containment Pressure = 28 psia
   - EDG 1 did not start
   - All other safety equipment actuated as designed
   - **NO Operator actions have been completed**

   For these current plant conditions, what will be the status of the Makeup, HPI, and LPI pumps?

A. No Makeup Pumps will be running
   Both HPI Pumps will be running
   Both LPI Pumps will be running

B. Only #2 Makeup Pump will be running
   Only #2 HPI Pump will be running
   Only #2 LPI Pump will be running

C. No Makeup Pumps will be running
   Only #2 HPI Pump will be running
   Only #2 LPI Pump will be running

D. Only #2 Makeup Pump will be running
   Both HPI Pumps will be running
   Both LPI Pumps will be running

Answer: D

Explanation/Justification: KA match – interrelation requires the Operator to know status of pumps due to a Large Break LOCA

A. Incorrect. Plausible since running Makeup Pump trips on LOOP and SA signal to LPI pumps. LPI and HPI running due to SA

B. Incorrect. Plausible since EDG #1 did not start as required by SA signal but C1 is still powered by offsite power

C. Incorrect. Plausible since running Makeup Pump trips on LOOP and SA signal to LPI pumps and EDG #1 did not start as required by SA2 signal but C1 is still powered by offsite power

D. Correct. An SFAS (SA) Level 3 has actuated on low RCS pressure (<450 psig) and offsite power is supplying power to the essential electrical busses. SA level 2 starts the HPI Pumps and SA level 3 starts the LPI Pumps. The previous running MU pump will continue to run because a LOOP has not occurred

Sys #	System	Category	KA Statement
011	Large Break LOCA	EK2 Knowledge of the interrelations between the large break LOCA and the following:	Pumps

K/A# EK2.02 **K/A Importance** 2.6* **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02000 Table 2, pg 454 & 456

Question Source: Bank DB 2011 NRC Exam Q4 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.7 / 45.7

Objective: GOP-309

3. The plant is operating at 100% power with all systems in normal alignment for this power level.

   Which of the following abnormal conditions requires an **IMMEDIATE** power reduction and stopping the affected Reactor Coolant Pump to prevent potential damage?

A. MU59A, RCP 2-1 Seal Return Isolation Valves fails closed.

B. Computer Point L828, 2-1 Motor Lower Bearing Low Oil Level Alarm with stable bearing temperatures.

C. Computer Point T828, 2-1 Motor Stator Temperature Alarm with indicated temperature 350 ºF.

D. Computer Points for 2-1 Seal Cavity Pressure P833 (second stage) reads 1100 psig, and P834 (third stage) reads 50 psig

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Answer: C

Explanation/Justification: KA match based on knowledge of the reason for stopping the RCP based on recognizing potential damage of the RCP when in operation with stator temperature outside of required specification

A. Incorrect – Shutdown is required within 30 minutes, not immediately.

B. Incorrect – Shutdown is required if bearing temperatures are rising with low oil level, not immediately.

C. Correct – Power reduction and Shutdown is immediately required per DB-OP-02515 Step 4.6.1 RNO.

D. Incorrect – Values provided indicated a single RCP Seal Stage is failed. Immediate Shutdown is not required for single stage failure per DB-OP-02515, Step 4.1.1

Sys #	System	Category	KA Statement
015	Reactor Coolant Pump Malfunctions	AK3 Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunction (Loss of RC Flow):	Potential damage from high winding and/or bearing temperatures

K/A# AK3.01 **K/A Importance** 2.5 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02515 step 4.6.1

Question Source: Bank DB 2013 NRC Exam Q4 **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.5 / 41.10 / 45.6 / 45.13

Objective: GOP-115

4. Current conditions:

- Reactor Power 95% stable
- RCS pressure 2150 psig stable
- PRZR level 220 inches and slowly LOWERING
- MU TK LEVEL LO 2-2-C ALARM
- MU FLOW HI TRN 2 2-4-C ALARM
- RCP seal flow NORMAL

- No operator actions have been taken

These current plant conditions indicate which of the following?

A. MU 32 failed open

B. Letdown is isolated

C. Normal MU injection line leak

D. Loss of suction to running MU pump

Answer: C

Explanation/Justification: KA Match – Requires the Operator have the ability to determine location of loss of reactor coolant makeup capability using available indications

A. Incorrect. Plausible because seal injection flow would be normal and high MU flow alarm would be received but PZR level would be rising if MU32 was failed open.

B. Incorrect - Plausible because MUT low level alarm would be received but PZR level would be rising with letdown isolated.

C. Correct – Pressurizer and Makeup tank level lowering indicates a loss of RCS volume. High flow is indication of loss of flow restriction.

D. Incorrect - Plausible because PZR level would be lowering and MUT low level alarm would be received but would not have normal seal injection flow and high MU flow if MUP lost suction

Sys #	System	Category	KA Statement
022	Loss of Reactor Coolant Makeup	AA1 - Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Makeup:	CVCS letdown and charging

K/A# AA1.01 **K/A Importance** 3.4 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02522 Section 2.1

Question Source: Bank 286221 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.7 / 45.5 / 45.6

Objective: GOP - 112

5. The following plant conditions exist
   - The plant is in MODE 5
   - The Reactor Coolant System is at a reduced inventory

   The following occurs:
   - The running Decay Heat Pump is stopped due to indications of cavitation

   With these current Plant conditions which of the following would require the standby Decay Heat Pump to be vented with pump suction aligned to the BWST prior to starting?

   DH11 RCS TO DH SYSTEM
   DH12 RCS TO DH SYSTEM
   DH21 RCS TO DH SYSTEM ISOLATION BYPASS
   DH23 RCS TO DH SYSTEM ISOLATION BYPASS

A. DH 21 and DH 23 are open with DH 11 and DH 12 closed

B. Suction pressure for the standby Decay Heat Pump is 25 psig

C. Reactor Coolant System temperature increases from 125°F to 160°F

D. Reactor Coolant System level is at 26 inches for nozzle dam installation

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Answer: D

Explanation/Justification: KA match – How pump cavitation applies to loss of DHR: must have the ability to determine the requirements for restoration of Decay Heat Removal when the DHR pump was stopped due to indications of cavitation

A. Incorrect – plausible since below 48 inches direction is to close DH21 and DH23 if open prior to venting

B. Incorrect – plausible since suction pressure from the BWST is normally 30 psig when at tech spec required level

C. Incorrect – plausible since temperature rise may be in be in conjunction with steam voids

D. Correct – direction is given to vent from the BWST if RCS level is below 48 inches if indications of cavitation or air binding are evident per caution prior to DB-OP-2527, step 6.0 of Attachment 1

Sys #	System	Category	KA Statement
025	Loss of Residual Heat Removal System	AA2 - Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System:	Pump cavitation

K/A# AA2.07 **K/A Importance** 3.4 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02527 steps 4.1 and Attachment 2 step 4

Question Source: Bank DB 2018 NRC Exam Q6 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 43.5 / 45.13

Objective: GOP127

6. Initial conditions;
   - 100% Power
   - CCW Surge tank level 55”

   The following occurs:
   - An Equipment operator reports a CCW leak on the bottom of the CCW Surge tank

   Current conditions:
   - CCW leak has been determined to be unisolable
   - CCW leak rate is controlled at 10 gallons per minute (gpm)

   With these current plant conditions which of the following identifies how long before a Reactor trip will be **required** per DB-OP-02523, Component Cooling Water System Malfunctions?

   REFERENCE PROVIDED

A. 103 minutes

B. 90 minutes

C. 80 minutes

D. 43 minutes

Answer: B

Explanation/Justification: KA match based on recognizing trend and using tank curve reference material to diagnose effect of trend

A. Incorrect – plausible since this when isolation of leaking essential header is required (33 inches)

B. Correct – Tripping the Reactor is directed at 35 inches per DB-OP-02523. Per Component Cooling Surge Tank (T-12) curve provided from DB-PF-06705, 55 inches = 2250 gallons and 35 inches = equals 1350 gallons for a difference of 900 gallons. At 10 gpm it will take 90 minutes to reach 35 inches from 55 inches

C. Incorrect – plausible since this will be when the CCW Surge Tank Lo-Lo alarm occurs (37 inches)

D. Incorrect – plausible since this will be when the first automatic valve closure occurs (45 inches) per DB-OP-02523

Sys #	System	Category	KA Statement
026	Loss of Component Cooling Water	Generic	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.

K/A#	2.4.47	**K/A Importance**	4.2	**Exam Level**	RO
References provided to Candidate		DB-PF-06705, Tank Level Calibration Curves, Component Cooling Surge Tank (T-12)	**Technical References:**		DB-PF-06705, Component Cooling Surge Tank (T-12), DB-OP-02523, Step 4.1.1
Question Source:	New		**Level Of Difficulty: (1-5)**		
Question Cognitive Level:	High		**10 CFR Part 55 Content:**		41.140 / 43.5 / 45.12
Objective:	GOP-123				

7. Initial conditions:
   - 100% power.

   The following occurs:
   - 4-1-D PZR RLF VLV OPEN alarm
   - Containment Air Cooler 1 Suction Temperature TI1356 is 160 ºF
   - Containment Air Cooler 2 Suction Temperature TI1357 is 155 ºF
   - Computer alarm T770 RC PRZR PRESS RLF OUT TMP, RC12-2 high

   Which of the following describes:

   (1) the event that has occurred?
   (2) its effect, if any, on indicated Pressurizer (PZR) level?

A. (1) Partially open PZR Power Operated Relief Valve
   (2) No effect on PZR level

B. (1) Partially open PZR Power Operated Relief Valve
   (2) PZR level indicates higher than actual

C. (1) Partially open PZR Code Safety Relief Valve
   (2) No effect on PZR level

D. (1) Partially open PZR Code Safety Relief Valve
   (2) PZR level indicates higher than actual

Answer: D

Explanation/Justification: KA match based on implication of expansion of liquids as temperature increases due to pressurizer pressure control malfunction

A. Incorrect – Safety valve open indicated by computer alarm. PORV open would have T773 computer alarm. PZR level reads high due to reference leg heat up. Elevated CAC suction temperatures indicate reference leg heat up. Plausible because of similarities in computer alarm nomenclature; PORV leak symptoms step lists no change in PZR level.

B. Incorrect – Safety valve open indicated by computer alarm. See DB-OP-02513 R13 step 2.5.2. PORV open would have T773 computer alarm. See DB-OP-02513 R13 step 2.2.4. Plausible because of similarities in computer alarm nomenclature. Part 2 is correct.

C. Incorrect – PZR level reads high due to reference leg heat up. Elevated CAC suction temperatures indicate reference leg heat up. See DB-OP-06003 R34 PZR Operating Procedure step 2.2.9. Plausible because DB-OP-02513 R13 section 2.5 symptoms for leaking safety is silent on PZR level. Part 1 is correct.

D. Correct – Safety valve open indicated by computer alarm. See DB-OP-02513 R13 step 2.5.2. PZR level reads high due to reference leg heat up. See DB-OP-06003 R34 PZR Operating Procedure step 2.2.9.

Sys #	System	Category	KA Statement
027	Pressurizer Pressure Control System Malfunction	AK1 - Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions:	Expansion of liquids as temperature increases

K/A# AK1.02 **K/A Importance** 2.8 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02513 step 2.5.2; DB-OP-06003 step 2.2.9

Question Source: Bank DB 2015 NRC Exam Q2 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.8 / 41.10 / 45.3

Objective: GOP-113

8. Current Conditions:
   - DB-OP-02000, Section 8, Steam Generator Tube Rupture is in progress
   - 4 RCPs in Operation
   - RCS Loop 2 Tcold = 440°F lowering

   With these current plant conditions, which of the following describes the reason DB-OP-02000, Section 8, Steam Generator Tube Rupture directs minimizing core Subcooling Margin (SCM) per the Bases and Deviation Document for DB-OP-02000?

A. Raises High Pressure Injection flow which raises boron concentration, thus raising shutdown margin

B. Reduces differential pressure across the SG tubes, reducing the primary to secondary leak rate

C. Allows Steam Generator tube-to-shell differential temperature limits to be met, reducing tube stresses

D. To comply with the required actions in Specific Rule 5, Pressurized Thermal Shock Requirements

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Answer: B

Explanation/Justification: KA match – knowledge of reason for reducing pressure by reducing to minimum subcooling margin during a SGTR

A. Incorrect – plausible since lowering pressure would increase HPI flow which introduces more Boric Acid from the BWST into the RCS

B. Correct – per DB-OP-02000 Bases and Deviation document Step 8.42, using PZR spray to reduce RCS pressure to maintain minimum adequate subcooling margin is to minimize the differential pressure between the RCS and the affected SG thus minimizing the tube leak flow rate

C. Incorrect – plausible since there are tube to shell differential requirements to be met during an RCS cooldown

D. Incorrect – plausible since minimizing SCM is a PTS required action

Sys #	System	Category	KA Statement
038	Steam Generator Tube Rupture	EK3- Knowledge of the reasons for the following responses as they apply to the SGTR:	Equalizing pressure on primary and secondary sides of ruptured S/G

K/A# EK3.01 **K/A Importance** 4.1 **Exam Level** RO

References provided to Candidate None **Technical References:** Bases and Deviation Document for DB-OP-02000 Step 8.42

Question Source: 288469 **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.8 / 41.10 / 45.3

Objective: GOP-307

9. Initial conditions:
   - 100% power
   - SP6A, Main Feedwater Control Valve to SG 2 is in HAND

   The following occurs:
   - A steam line rupture occurs upstream of the Main Steam Isolation Valve on SG 1
   - SG 1 pressure rapidly lowers to 500 psig.

   Which of the following indicates how SP6A, Main Feedwater Control Valve will respond?

   SP6A will _____

A. CLOSE because of a close signal from SFRCS Actuation Channel 1 due to the SG 1 low pressure trip

B. CLOSE because of a close signal from Rapid Feedwater Reduction due to the Reactor trip

C. remain OPEN since the valve is in HAND

D. remain OPEN since SP6A is a train 2 component and only SFRCS Actuation Channel 1 actuated

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Answer: A

Explanation/Justification: KA match based on knowledge of the interrelation between a Main Steam Line Rupture and an existing Sensor/Detector sending a resultant low pressure signal to trip the SFRCS System. Knowing that a trip point is reached and the resulting effect on equipment related to that trip

A. Correct – SG Isolation trip affects both steam generators

B. Incorrect – plausible because this would be correct if SP6A is in automatic

C. Incorrect – plausible since some manual operations overrides automatic

D. Incorrect - plausible since SP6A is a train 2 component and it is common for equipment to be train specific

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Sys #	System	Category	KA Statement
040	Steam Line Rupture: Excessive Heat Transfer	AK2 - Knowledge of the interrelations between the Steam Line Rupture and the following:	Sensors and detectors

K/A# AK2.02 **K/A Importance** 2.6* **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02000 Table 1 SH 1 of 2

Question Source: Bank 296725 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.7 / 45.7

Objective: SYS-523

10. Initial conditions:
    - 100% Power

    The following occurs:
    - Reactor trip
    - Main Feedwater Pumps 1 & 2 Trip
    - Auxiliary Feedwater Pumps 1 & 2 Trip

    Current conditions:
    - SG 1 and SG2 are at 20 inches and lowering
    - SG 1 and SG2 are at 1000 psig and lowering
    - The Motor Driven Feed Pump (MDFP) is available

    With these current plant conditions which of the following list the correct starting sequence and flow limits when placing the MDFP in service per DB-OP-02000, Attachment 5: Guidelines for Restoring Feedwater?

A. (1) Enable and close both MDFP discharge valves
   (2) Start the MDFP
   (3) Limit flow to 1000 gpm on MDFP Flow Indicator FI 5876

B. (1) Enable and close both MDFP discharge valves
   (2) Start the MDFP
   (3) Limit flow to 1200 gpm on MDFP Flow Indicator FI 5876

C. (1) Start the MDFP
   (2) Enable both MDFP discharge valves
   (3) Limit flow to 1000 gpm on MDFP Flow Indicator FI 5876

D. (1) Start the MDFP
   (2) Enable both MDFP discharge valves
   (3) Limit to flow 1200 gpm on MDFP Flow Indicator FI 5876

Answer: A

Explanation/Justification: The KA match based on the ability to correctly perform manual start and proper operation of the electric feedwater pump in the auxiliary feedwater mode

A. Correct – both discharge valves are de-energized until enabled and are failed open. They are procedurally directed to be enabled and closed prior to starting the MDFP and flow is limited to 1000 gpm to prevent runout

B. Incorrect – plausible since the start sequence is correct and 1200 gpm is the run out limit. The indicated flow is limited to 1000 gpm since it does not indicate the additional 200 gpm recirc flow

C. Incorrect – plausible since many pumps are started with their flowpaths unisolated and the flow limit is correct

D. Incorrect – plausible since many pumps are started with their flowpaths unisolated and1200 gpm is the run out limit.

Sys #	System	Category	KA Statement
054	Loss of Main Feedwater	AA1 - Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater:	Manual startup of electric and steam-driven AFW pumps

K/A#	AA1.02	**K/A Importance**	4.4	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02000 Attachment 5 Section A
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.5 / 45.6
Objective:	GOP-305				

11. Initial conditions:

- Bus C1 is OOS for maintenance

The following occurs:

- Loss of Offsite Power
- A lockout of Bus D1 due to a ground fault
- The Station Blackout Diesel Generator fails to start

Current conditions:

- Emergency Diesel Generator 2 has been tripped using the emergency shutdown pushbutton
- The cause of the ground fault has been located and corrected

With these current plant conditions which of the following will be the result of resetting the D1 bus lockout?

A. Emergency Diesel Generator 2 will start, but the output breaker will NOT AUTO CLOSE until Emergency Diesel Generator 2 lockout relay is manually reset

B. Emergency Diesel Generator 2 will start and the output breaker will AUTO CLOSE and energize the bus

C. No equipment actuations will occur until the Emergency Diesel Generator Lockout Relay is manually reset

D. The ALTERNATE supply breaker will immediately AUTO CLOSE and energize the bus

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Answer: C

Explanation/Justification: KA Match – must be able to determine EDG lockout needs to be reset before power can be restored

A. Incorrect - plausible since EDG 2 will auto start if EDG lockout is reset

B. Incorrect - plausible because a lockout is reset but EDG will not start and breaker will not close until the EDG lockout is reset.

C. Correct – EDG emergency shutdown actuates the EDG lockout relay. The EDG Lockout Relay must be manually reset before EDG 1 will start

D. Incorrect - plausible since there is an alternate bus breaker but its bus is de-energized. C1 is OOS which renders EDG unavailable, the SBODG failed to start and offsite power is lost

Sys #	**System**	**Category**	**KA Statement**
055	Station Blackout	EA2 - Ability to determine and interpret the following as they apply to a Station Blackout:	Faults and lockouts that must be cleared prior to re-energizing buses

K/A#	EA2.06	**K/A Importance**	3.7	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	SD-003B Page 2-21 step 2.6.2.11
Question Source:	Bank 294718 modified			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	43.5 / 45.13
Objective:	SYS-406				

12. Initial conditions:
    - 35% power
    - 5-3-F ARTS TG-TRIP BYPASSED alarm is in

    The following occurs:
    - Loss of offsite power

    Current conditions:
    - DB-OP-02520, LOAD REJECTION has been entered

    Which of the following alarms is consistent with this current plant condition?

A. 1-5-J BUS F7 TRBL

B. 4-2-C HOT LEG TOTAL FLOW LOW

C. 15-1-E TURBINE TRIP

D. 16-5-B VOLTS/HZ HI

Answer: D

Explanation/Justification: KA match based on ability to determine alarm consistent with existing plant condition during a loss of offsite power

A. Incorrect – plausible since this alarm is consistent with a loss of offsite power and a reactor trip due to loss of power to F7

B. Incorrect – plausible since this alarm is consistent with a loss of offsite power and a reactor trip due to loss of power to RCPs

C. Incorrect – plausible since reactor power is below 40 percent where the turbine could trip (5-3-F in alarm) without a reactor trip and alarm is consistent with a turbine trip

D. Correct – this is an alarm consistent with a loss of offsite power in which the reactor and generator remain on line supplying house power

Sys #	**System**	**Category**			**KA Statement**
056	Loss of Offsite Power	Generic			Ability to verify that the alarms are consistent with the plant conditions
K/A#	2.4.46	**K/A Importance**	4.2	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02520 step 2.1.1
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.10 / 43.5 / 45.3 / 45.12
Objective:	GOP-120				

13. Current Conditions:
    - 100% Power

    The following occurs:
    - Uninterruptible Bus YAU is lost
    - DB-OP-02541, Loss of YAU is implemented

    With these plant conditions which of the following describes the required action and the reason for taking the action?

A. Trip the Reactor due to attempting to keep the plant on line would place non-conservative and unwarranted burden on the operating crew

B. Trip the Reactor due to ICS11A and ICS11B, Steam Generator Atmospheric Vent Valves failing to 50% open

C. Reduce Reactor power to maintain Condenser pressure less than 5.0 inches HgA due to PIC1061, Vacuum System Pressure Indicating Controller failing open

D. Stabilize the plant at 55% power due to ICS runback, numerous annunciators failing in the alarm state, and a large number of plant control and indicating equipment fails

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Answer: A

Explanation/Justification: KA Match: This question matches the KA by requiring knowledge of the reasons for actions taken in the EOP for a loss of Uninterruptible AC Instrument Bus YAU

A. Correct – DB-OP-02541 directs a reactor trip due to severe plant transient placing a non-conservative and unwarranted burden on the operating crew as explained in attachment 7 Background information

B. Incorrect – plausible since action is required for loss of ICS

C. Incorrect – plausible since PIC does fail open on loss of YAU but the direction is to trip the reactor

D. Incorrect – plausible since a loss of YAU will cause this plant response (as defined in DB-OP-02541 Attachment 7) but the direction is to trip the reactor

Sys #	System	Category	KA Statement
057	Loss of Vital AC Instrument Bus	AK3 - Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus:	Actions contained in EOP for loss of vital ac electrical instrument bus

K/A# AK3.01 **K/A Importance** 4.1 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02541 step 4.1 and Att. 7 page 1

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.5 / 41.10 / 45.6 / 45.13

Objective: GOP-141

14. Initial Conditions:
    - 100% Power

    The following occurs:
    - Loss of D1P and DAP

    Current conditions:
    - DB-0P-02537, LOSS OF D1P **AND** DAP has been entered
    - Attachment 5: Transfer of Electrical Buses Control Power, Section 2, Transfer EDG1 Control Power to Alternate has been directed to be performed

    The reason for performing Attachment 5, Section 2 is without DC control power EDG 1 will _____

A. NOT start automatically and CANNOT be started manually from the Control Room

B. start automatically and run at idle speed (450 rpm) but will NOT accelerate to 900 rpm

C. NOT start automatically but can be started manually from the Control Room

D. start automatically and run at 900 rpm but CANNOT be placed on its associated 4160 VAC Essential Bus

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Answer: A

Explanation/Justification: Correct. Control power has been lost to EDG 1 and C1. IAW DB-OP-02537, pg 35 this is the result.

A. Correct – Control power has been lost to EDG 1 and C1

B. Incorrect – plausible because the EDG has an idle start feature and loss of D1P and DAP will affect control logic for EDG start.

C. Incorrect – plausible because the EDG will not start automatically

D. Incorrect – plausible because control power is lost and the EDG output breaker, AC101, can not be closed

Sys #	**System**	**Category**	**KA Statement**
058	Loss of DC Power	AK3.- Knowledge of the reasons for the following responses as they apply to the Loss of DC Power:	Use of DC control power by D/Gs

K/A#	AK3.01	**K/A Importance**	3.4	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02537 Attachment 8 Step C. 3
Question Source:	Bank DB 2011 NRC Exam Q15			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.5 / 41.10 / 45.6 / 45.1
Objective:	GOP-137				

15. Initial conditions:
    - 100% Power

    The following occurs:
    - Loss of all Service water
    - DB-OP-02511, Section 4.3, Loss of all Service Water has been implemented

    Current conditions:
    - Multiple CRD MOTOR STATOR TEMP computer points are in alarm indicating 180°F and rising

    With these current plant conditions, which of the following actions are required to be taken per DB-OP-02511, Section 4.3, Loss of all Service Water?

A. Commence a rapid shutdown immediately

B. Trip the Reactor and trip all RCPs

C. Trip the Reactor, initiate and isolate SFRCS

D. Place the Rod Control Panel in Manual

Answer: B

Explanation/Justification: KA match due to requiring the ability to operate the plant in compliance with the loss of service water procedure when notified of exceeding trip criteria as notified by alarm system

A. Incorrect – plausible since this is the direction for exceeding Generator cold gas temp of 113°F

B. Correct – DB-OP-02511, Section 4.3, Loss of all Service Water step 4.3.11 directs tripping the Reactor and tripping all reactor coolant pumps when any CRD stator temperature reaches 180°F

C. Incorrect – plausible since this is the trip criteria actions for exceeding MDFP Lube Oil temperature limit of 160°F when MDFP is only source of feedwater

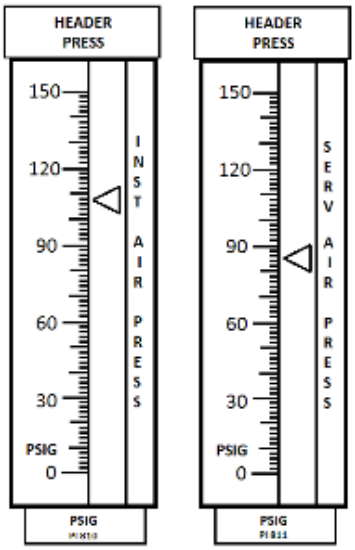
D. Incorrect – plausible since this would eliminate heat load due to rod movements

Sys #	System	Category	KA Statement
062	Loss of Nuclear Service Water	AA1 - Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water (SWS):	CRDM high-temperature alarm system

K/A#	AA1.04	**K/A Importance**	2.7*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02511, Step 4.3.11
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7 / 45.5 / 56.6
Objective:	GOP-111				

16. The plant is operating at 100% power.

Which of the following will result in the stable readings on the gauges below?



A. Instrument Air Dryer Switching Failure

B. Leak on the air header to the Atmospheric Vent Valves

C. Leak on the air header to the Turbine Plant Cooling Water Heat Exchanger temperature control valves

D. Leak on the air header to the Moisture Separator Reheater Demineralizer skid resin transfer system

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Answer: D

Explanation/Justification: KA Match – candidate must have the ability to determine the leak is located on the Station Air (SA) portion of the air header and that the SA header back pressure valve has modulated close to isolate the leak from the Instrument Air (IA) portion of the air header which has allowed IA pressure to return to normal.

A. Incorrect – Plausible since this failure will cause IA and SA pressure to be about equal and lower for this failure.

B. Incorrect – Plausible since IA pressure would still lower for this failure

C. Incorrect – Plausible since IA pressure would still lower for this failure

D. Correct – Leak is on station air header See DB-OP-02528 Instrument Air System Malfunctions step 4.1.6 and Attachment 24 Background Information page 126 2nd paragraph. MSRD skid resin transfer air is on SA header. See OS-0019B sheet 2.

Sys #	System	Category	KA Statement
065	Loss of Instrument Air	AA2 - Ability to determine and interpret the following as they apply to the Loss of Instrument Air:	Location and isolation of leaks

K/A# AA2.03 **K/A Importance** 2.6 **Exam Level** RO

References provided to Candidate Drawing in stem **Technical References:** DB-OP-02528 step 4.1.6 and Att. 24 2nd paragraph, OS-0019B Sheet 2

Question Source: Bank DB 2015 NRC Exam Q53 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 43.5 / 45.13

Objective: GOP-128

17. Current conditions:
    - 100% Power
    - EDG 1 has been OOS for 4 hours for maintenance

    The following occurs:
    - The Regional Transmission System Operator (PJM) notifies the Control Room that Emergency Operations (degraded grid) conditions exist
    - Actions for DB-OP-02546 Degraded Grid are in progress
    - Both Offsite AC circuits have been declared INOPERABLE

    With these current plant conditions which of the following actions is **required**?

A. Idle start Emergency Diesel Generator 2

B. Reduce power to 35% and trip the Main Turbine

C. Enter Technical Specification 3.0.3 to initiate actions within one hour to place the unit in Mode 3

D. Perform Technical Verification Requirement 8.8.2.1 for verifying SBODG Availability within one hour

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Answer: C

Explanation/Justification: KA match is based on knowledge of facility license operating limitations due to a disturbance on the grid causing a degraded grid conditions to exist with an EDG out of service

A. Incorrect – plausible since it would seem prudent to warm and prepare the EDG for potential loss of grid

B. Incorrect – plausible since Operation of the Main Generator outside of the 59.4 to 60.6 Hz operating band is restricted due to excessive vibration of the last stages of the Low Pressure Turbines

C. Correct – TS 3.8.1 I, Three or more AC sources Inoperable (EDG and the two required offsite sources) requires LCO 3.0.3 entry immediately

D. Incorrect – plausible since this TVR exists for the Station Blackout Diesel Generator and the SBODG would be placed in service in the event of a loss of offsite power

Sys #	System	Category	KA Statement
077	Generator Voltage and Electric Grid Disturbances	Generic	Knowledge of conditions and limitations in the facility license

K/A#	2.2.38	**K/A Importance**	3.6	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	TS 3.8.1 Condition I
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 41.10 / 43.1 / 45.13
Objective:	GOP-146				

18. In preparation for MU/HPI cooling, the operator is directed to trip all but one RCP.

    What is the basis for tripping RCPs during a lack of heat transfer?

A. To minimize RCS heat input from RCPs

B. To reduce core flow and increase core ΔT for improved natural circulation

C. To reduce electrical power requirements in the event of a loss of offsite power

D. To minimize the potential for damage to the RCPs

Answer: A

Explanation/Justification: KA Match- knowledge of the operational implication of number of RCPs in service during inadequate heat transfer and of emergency procedure direction

A. Correct – DB-OP-02000 Section 6 Lack of Heat transfer directs stopping all but one RCP and bases document describes the reason as to reduce heat input

B. Incorrect – plausible because natural circulation retarded by forced flow and natural circulation flow is proportional to ΔT.

C. Incorrect – plausible because RCPs are large electrical loads

D. Incorrect – plausible because a stopped RCP is less likely to suffer damage than an operating RCP

Sys #	System	Category	KA Statement
BW E04	Inadequate Heat Transfer	EK1 – Knowledge of the operational implications of the following concepts as they apply to (Inadequate Heat Transfer):	Normal, abnormal and emergency procedures associated with (Inadequate Heat Transfer)

K/A# EK1.2 **K/A Importance** 4.0 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02000 step 6.3.2 and DBOPBASES

Question Source: Bank 288353 **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.8 / 41.10 / 45.3

Objective: GOP-305

19. The following plant conditions exist:

- The Reactor Operator is performing the CRD Exercise test for Safety Rod Group 4.
- All the rods in the group indicate they have moved upon command **EXCEPT** rod 4-1.
- 100% light for rod 4-1 remains ON, the rest of the Group 4 - 100% lights are OFF.
- The I&C Technician reports that the CRDM phase lights in the rod control cabinet show that the CRDM phase rotation is operating properly
- Relative position indication shows rod 4-1 to be the same as the remainder of the group 4 rods.

Based on these indications, what is the status of the rod 4-1?

Rod 4-1 _____.

A. has dropped

B. is misaligned

C. has a malfunctioning RPI

D. is stuck

Answer: D

Explanation/Justification: KA match interrelation between control rod and positioner

A. Incorrect. Plausible if candidate since Relative CRD Position Indication stays aligned with the remainder of the rods in the group even when a control rod is dropped.

B. Incorrect. Plausible if candidate does not know CRD exercise test only inserts Control Rods approximately 3%. A misaligned control rod is one that is greater than 6.5% from group average.

C. Incorrect. Plausible if candidate does not know the 100% lights use magnetic reed switches to determine rod position compare to counting the counting of revolutions used by the Relative Position Indication System.

D. Correct. IAW DB-OP-02516 – Section 2, Symptoms

Sys #	System	Category	KA Statement
005	Inoperable/ Stuck Control Rod	AK2 Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following:	Controllers and Positioners

K/A#	AK2.01	**K/A Importance**	2.5	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02516 – Section 2, Symptoms
Question Source:	Bank DB 2011 NRC Exam Q20			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.7
Objective:	GOP-116				

20. The plant is operating at 100% power.

Assuming NO operator actions have been taken, which of the following describes the plant response to a leak on the reference leg of the selected Pressurizer Level Transmitter?

Makeup Tank level __(1)__.
Pressurizer Heaters __(2)__.

A. (1) lowers
(2) de-energize

B. (1) lowers
(2) remain energized

C. (1) rises
(2) de-energize

D. (1) rises
(2) remain energized

Answer: D

Explanation/Justification:

A. Incorrect – MUT rises and PZR heaters stay energized. Plausible because this is plant response to variable leg leak (level input failing low). See DB-OP-02513 Pressurizer System Abnormal Operation steps 2.6.4 and 2.6.5.

B. Incorrect – response describes letdown leak. Plausible because item 2 is correct. See DB-OP-02522 Small RCS Leaks Attachment 13 Background Information Letdown System Leaks (page 50).

C. Incorrect – response describes significant RCS leak after automatic transfer of MU Pump suction to the BWST at 17 inch MU Tank level. See OS-0002 sheet 2 DUN 13-0024-001-001 CL-8. Plausible for misconception of significant potential RCS mass loss from reference leg leak. See DB-OP-02522 Small RCS Leaks Attachment 12 Align MU Pump Recirc to the BWST (page 47).

D. Correct – PZR level indication uses a wet reference leg dP transmitter – see RCS System Description SD-039A section 2.5.1.10 (page 2-55) Reference leg leak causes level input to indicate higher than actual level. High level causes PZR Level Control Valve MU32 to throttle closed to lower MU flow. Lower MU flow with constant letdown flow causes MU Tank level to rise. See DB-OP-02513 Pressurizer System Abnormal Operation step 2.6.3. PZR heaters are affected by low level, not high level, so they remain energized. DB-OP-02513 step 2.6.5

Sys #	System	Category	KA Statement
028	Pressurizer (PZR) Level Control Malf	AK1 Knowledge of the operational implications of the following concepts as they apply to the Pressurizer Level Control Malfunctions:	PZR reference leak abnormalities

K/A#	AK1.01	**K/A Importance**	2.8	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	SD-039A section 2.5.1.10 (page 2-54 and 55); DB-OP-02513 steps 2.6.3 and 2.6.5.
Question Source:	Bank DB 2015 NRC Exam Q20			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.8 / 41.10 / 45.3
Objective:	GOP-113				

21. Current conditions:
    - Reactor Power is 1 x 10^{-8} amps
    - RPS Channel 1 is deenergized

    With these current plant conditions, after RPS Channel 1 is re-energized:

    - Which of the following Source Range Detector power supply modules will require power to be manually restored?

      AND

    - What will be the status of the source range instrument?

    The ON-OFF switch for the Source Range DETECTOR POWER SUPPLY MODULE will be required to be placed in ON for Source Range __(1)___ and the Source Range detector will be __(2)__

A. (1) NI1
   (2) Energized

B. (1) NI1
   (2) De-energized

C. (1) NI2
   (2) Energized

D. (1) NI2
   (2) De-energized

Answer: D

Explanation/Justification: KA Match ability to operate the power supply and monitor the correct response when manually restoring power to source range NI lost when its channel power was de-energized

A. Incorrect – plausible since NI and RPS both contain numeral 1 and SR will be energized at $5x10^{-10}$ amps and $1x10^{-8}$ could be determined as lower with 8 being a lower number than 10

B. Incorrect – plausible since NI and RPS both contain 1 and the second part is correct

C. Incorrect – plausible since NI2 is correct and SR will be energized at $5x10^{-10}$ amps and $1x10^{-8}$ could be determined as lower with 8 being a lower number than 10

D. Correct – RPS Channel 1 contains the power supply for NI2 and SR will be energized at $5x10^{-10}$ amps and above

Sys #	System	Category	KA Statement
032	Loss of Source Range Nuclear Inst	AA1 Ability to operate and / or monitor the following as they apply to the Loss of Source Range Nuclear Instrumentation:	Manual restoration of power

K/A#	AA1.01	**K/A Importance**	3.1	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-06403 step 3.1.17
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.5 / 45.6
Objective:	SYS-504				

22. DB-OP-02012, STM GEN/SFRCS ALARM PANEL 12 ANNUNCIATOR procedure directs Radiation Protection to be notified to take local surveys of the Main Steam Line area when annunciator 12-1-A, MN STM LINE 1 RAD HI comes into alarm.

    Which of the following is the reason for this direction?

A. To evaluate for initiating conditions into RA-EP-02861, Radiological Incidents

B. To obtain data to support leak rate calculation for DB-OP-02522, Small RCS Leaks

C. To project off site doses from the Station Vent in accordance with RA-EP-02240, Offsite Dose Assessment

D. To verify affected SG diagnosis in accordance with DB-OP-02531, Steam Generator Tube Leak

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Answer: D

Explanation/Justification: KA match - determining S/G tube failure based on local surveys

A. Incorrect – Plausible because high radiation levels would be an initiating condition for the radiological incidents off normal procedure but this alarm is to support indications of a steam generator tube leak

B. Incorrect – Plausible because there is a leak rate calculation that uses RE indications in the calculation but it uses steam jet air ejector discharge RE1003A & B.

C. Incorrect – Plausible Steam Generator Tube Leaks will cause a release of radioactive material, but checking radiation levels in the Main Steam Line area will not allow determination of dose from the station vent.

D. Correct – DB-OP-02012 directs checking symptoms in accordance with DB-OP-02531 along with alarm verification to access entry conditions into the steam generator tube leak abnormal procedure.

Sys #	**System**	**Category**	**KA Statement**
037	Steam Generator Tube Leak	AA2 - Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak:	S/G tube failure

K/A#	AA2.06	**K/A Importance**	4.3	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02012 Step 3.4
Question Source:	Bank DB 2013 NRC Exam Q23			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	43.5 / 45.13
Objective:	GOP-131				

23. Current conditions:
    - Unisolable steam leak in Containment is in progress
    - DB-OP-02000, RPS, SFAS, SFRCS TRIP, OR SG TUBE RUPTURE, Section 7 Overcooling Actions are in progress

    With these current plant conditions which of the following describes an action required of the Reactor Operator and the reason for the action?

A. Open the Atmospheric Vent Valve on the affected Steam Generator to blow it down to atmosphere to ensure compliance with TNC 8.7.1 Steam Generator Pressure/Temperature Limitation

B. Open the Atmospheric Vent Valve on the affected Steam Generator to blow it down to atmosphere to ensure compliance with LCO 3.6.1 Containment

C. After blowing down the affected Steam Generator, close its Atmospheric Vent Valve to ensure compliance with LCO 3.6.1 Containment

D. After blowing down the affected Steam Generator, close its Atmospheric Vent Valve to ensure compliance with TNC 8.7.1 Steam Generator Pressure/Temperature Limitation

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Answer: C

Explanation/Justification:

A. Incorrect – Plausible because AVV is opened for steam leak in Containment and opening AVV would reduce SG pressure if TNC 8.7.1 was applicable

B. Incorrect – Plausible because AVV is opened for steam leak in Containment and opening AVV limits containment pressure rise.

C. Correct – AVV must be closed following SG blowdown to isolate direct path from containment atmosphere through steam rupture to outside atmosphere via AVV. See DBOPBASES step 7.26

D. Incorrect – Plausible because closing AVV after SG blowdown is correct action.

Sys #	**System**	**Category**		**KA Statement**
069	Loss of Containment Integrity	Generic		Ability to interpret and execute procedure steps
K/A#	2.1.20	**K/A Importance**	4.6	**Exam Level** RO
References provided to Candidate	None			**Technical References:** Bases and Deviation Document for DB-OP-02000 Step 7.26
Question Source:	Bank DB 2016 NRC Exam Q25			**Level Of Difficulty: (1-5)**
Question Cognitive Level:	Low			**10 CFR Part 55 Content:** 41.10 / 43.5 / 45.12
Objective:	GOP-306			

24. A valid high radiation alarm from which of the following radiation monitors is a symptom of high activity in the reactor coolant system which REQUIRES entry into DB-OP-02535, "High Activity In The Reactor Coolant System"?

A. RE1998, FAILED FUEL DETECTOR

B. RE1003A, VAC SYS NON-COND VENT

C. RE609, MN STM LINE 1 N-16

D. RE4596, CONTAINMENT AREA HIGH RANGE

Answer: A

Explanation/Justification: KA match – requires knowledge of the interrelation between the Letdown RE (failed Fuel Detector) and the entry conditions for the abnormal operating procedure for high activity in the RCS

A. Correct – RE1998 generates annunciator alarm 2-1-A LETDOWN RAD HI which is a symptom entry condition requiring entry into DB-OP-02535, High Activity in the Reactor Coolant System

B. Incorrect – plausible since this is an indication of increased activity in the secondary system due to a steam generator tube leak

C. Incorrect – plausible since this is an indication of increased activity in the secondary system due to a steam generator tube leak

D. Incorrect – plausible since this is indication of increased activity in containment due to an RCS leak

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Sys #	System	Category	KA Statement
076	High Reactor Coolant Activity	AK2 Knowledge of the interrelations between the High Reactor Coolant Activity and the following: Process radiation monitors	Process radiation monitors

K/A# AK2.01 **K/A Importance** 2.6 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02002, Annunciator 2-1-A and DB-OP-02535 Section 2.0, Symptoms

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.7 / 45.7

Objective: GOP-135

25. The following plant conditions exist:

The plant is at 90% power

ICS is in a normal lineup

The following alarms occurs:

- 8-4-A, MFPT 1 TRIP alarms
- 10-1-A, MFP 1 DISCH HI PRESS TRIP alarms
- 13-4-C, DEAR STRG TK LVL
- 14-3-D, ICS MFP LOSS OR LO DEAR RUNBACK alarms

Main Generator load is lowering and stabilizes at approximately 700 MWe with #1 Deaerator level at 9 feet.

Based on these plant conditions, what procedures and associate actions are **required**?

A. Trip the reactor and enter DB-OP-02000 in accordance with DB-OP-02014, MSR/ICS Alarm Panel 14 Annunciators

B. Place SG/RX Demand Station in HAND and perform runback to 55% power in accordance with DB-OP-02010, Feedwater Alarm Panel 10 Annunciators

C. Stabilize the plant at the current power level in accordance with DB-OP-06401, ICS Procedure, section for plant stabilization following a runback

D. Place Feedwater Loop Demands and the Rod Control Panel in MANUAL and stabilize Reactor power and Tave in accordance with DB-OP-02526, Primary to Secondary Heat Transfer Upset

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Answer: B

Explanation/Justification: KA Match – Knowledge of annunciators and indications implying a runback is necessary and incomplete and the remedial actions required to complete the runback to the expected plant status

A. Incorrect – Plausible because DB-OP-02014 directs tripping reactor if deaerator level approaches low off scale

B. Correct – DB-OP-02010 for MFPT trip provides this direction for a MFPT Trip

C. Incorrect – Plausible because DB-OP-06401 provides direction for stabilization following a runback, however reactor power was not reduced below runback setpoint for loss of a MFP.

D. Incorrect – Plausible because DB-OP-02526, Primary to Secondary Heat Transfer Upset provides these directions for plant stabilization upon a plant upset

Sys #	System	Category	KA Statement
BW A01	Plant Runback	AK1 - Knowledge of the operational implications of the following concepts as they apply to the (Plant Runback):	Annunciators and conditions indicating signals, and remedial actions associated with the (Plant Runback)

K/A# AK1.3 - **K/A Importance** 3.7 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02010 Annunciator 10-1-A

Question Source: Bank DB 2013 NRC Exam Q25 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.8 / 41.10 / 45.3

Objective: SYS-514

26. Initial conditions:
    - The Reactor has tripped
    - DB-OP-02000, RPS, SFAS, SFRCS TRIP, OR SG TUBE RUPTURE, Section 4 Supplemental Actions are in progress

    The following occurs:
    - NNI X DC is lost

    With these current plant conditions which of the following actions will DB-OP-02000, RPS, SFAS, SFRCS TRIP, OR SG TUBE RUPTURE, Section 4 Supplemental Actions direct the Reactor operator to perform and why?

A. Close MU 85, Letdown Flow Control Inlet Isolation to MU 6 to isolate Letdown flow due to MU 6 failing 50% open

B. Lock both Makeup Pump Suctions on the BWST to prevent Makeup pump loss of suction due to loss of Makeup Tank Level indications

C. Turn off all PZR heaters if uncompensated PZR is less than 60 inches to prevent uncovering PZR heaters due to a loss of compensated pressurizer level

D. Control Atmospheric Vent Valves (AVVs), ICS11A and ICS11B in manual to control cooldown due to AVVs failing 50% open

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Answer: C

Explanation/Justification: KA Match – Knowledge of the Operator response to a loss of NNI-X DC following a transient due to effect of temperature on indication and reasons for this response

A. Incorrect – plausible since this is directed in the loss of NNI abnormal as an action for NNI Y

B. Incorrect – plausible since this is directed in DB-OP-02000 supplemental for a loss of NNI Y

C. Correct – DB-OP-02000 step 4.5 directs turning off PZR heaters if uncompensated level falls below 60 inches and per DB-OP-02000 bases document a loss of NNI X DC will result in a loss of compensated Pressurizer Level. In this condition, Uncompensated Level will be maintained greater than 60 inches to prevent operating PZR Heaters uncovered.

D. Incorrect – plausible since this is the direction for loss of ICS power

Sys #	System	Category	KA Statement
BW A02	Loss of NNI-X	AK3 – Knowledge of the reasons for the following responses as they apply to the (Loss of NNI-X):	Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics

K/A# AK3.1 **K/A Importance** 3.7 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02000 and DB-OP-02000 Bases document step 4.5

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.5 / 41.10 / 45.6 / 45.13

Objective: GOP-303

27. During an internal flooding event, which of the following areas has floor drain plugs and tools staged to enable timely compliance with RA-EP-02880, Internal Flooding if required?

A. Component Cooling Water Pump Room

B. Service Water Pump Room

C. Emergency Core Cooling System Pump Rooms

D. Emergency Feedwater Facility

Answer: B

Explanation/Justification: KA Match – requires the ability to perform the floor drain plugging within the postulated time required, by knowing floor plugs are on station, to enable the continued operation of safety related equipment

A. Incorrect – plausible since Component Cooling Water Pump Room is an area specifically addressed in RA-EP-02880

B. Correct – RA-EP-02880, Internal Flooding, Attachment 1 step 3.3 directs plugging the floor drains and Attachment 5 Pipe Tunnel Drains Arrangement displays the location of the plugs and tools in the Service Water Pump room

C. Incorrect – plausible since Emergency Core Cooling System Pump Rooms are specifically addressed in RA-EP-02880

D. Incorrect – plausible since the Emergency Feedwater Facility is an area specifically addressed in RA-EP-02880

Sys #	**System**	**Category**	**KA Statement**
BW A07	Flooding	AA1 – Ability to operate / monitor the following as they apply to (Flooding):	Desired operating results during abnormal and emergency situations

K/A#	AA1.3	**K/A Importance**	3.3	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	RA-EP-02880 pages 9 and 14
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7 / 45.5 / 45.6
Objective:	GOP-605				

28. Initial conditions:
    - 100% power

    The following occurs
    - High vibrations on Reactor Coolant Pump 1-1

    Current conditions:
    - Power has been reduced to 70%
    - Reactor Coolant Pump 1-1 is stopped

    Which of the following combinations represents the plant response to stopping the Reactor Coolant Pump?

A. Pressurizer spray flow capability will be greater than 75%
The Reactor Protection System high flux setpoint will automatically reduce

B. Pressurizer spray flow capability will be greater than 75%
The Reactor Protection System flux/∆flux/flow setpoint will automatically reduce

C. Pressurizer spray flow capability will be less than or equal to 75%
The Reactor Protection System high flux setpoint will automatically reduce

D. Pressurizer spray flow capability will be less than or equal to 75%
The Reactor Protection System flux/∆flux/flow setpoint will automatically reduce

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Answer: B

Explanation/Justification: KA match – predicts/monitors change in parameter (spray flow) and design limit (flux/∆flux/flow) associated with the change in flow due to operation of the RCP control to stop the pump.

A. Incorrect – plausible since the first part is correct and the second part is plausible since flux/∆flux/flow setpoint will automatically reduce but the high flux setpoint must be manually reduced

B. Correct – with one pump in loop 1 and 2 pumps in loop 2 spray flow capability remains at 92% per Table 5 of DB-OP-02000. The flux/∆flux/flow setpoint is generated by the changing parameter inputs to a function generator

C. Incorrect – The first part is plausible since 75% of the total RCPs remain in service. The second part is plausible since flux/∆flux/flow setpoint will automatically reduce but the high flux setpoint must be manually reduced

D. Incorrect - The first part is plausible since 75% of the total RCPs remain in service. The second part is correct.

Sys #	System	Category	KA Statement
003	Reactor Coolant Pump	A1 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the **RCPS** controls including:	RCS flow

K/A# A1.05 **K/A Importance** 3.4 **Exam Level** RO

References provided to Candidate None **Technical References:** DBOP02000 Table 5, SD-044 step 2.1.2.2.6

Question Source: Bank 291245 **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.5 / 45.5

Objective: SYS-105

29. Initial conditions:
    - 100% power

    The following occurs:
    - The RCS leakage surveillance indicates RCP seal leakoff has increased

    Current conditions:

    - RCP 1-2 second stage seal cavity pressure is 1400 psig
    - RCP 1-2 third stage seal cavity pressure is 1250 psig

    With these conditions which of the following describes the condition of RCP 1-2 seals and the action required by DB-OP-02515, Reactor Coolant Pump and Motor Abnormal Operation Procedure?

A. The second seal stage has failed
   Continue to monitor, RCP 1-2 can remain in operation

B. The second seal stage has failed
   Trip the reactor and stop RCP 1-2

C. The third seal has failed
   Continue to monitor, RCP 1-2 can remain in operation

D. The third seal has failed
   Trip the reactor and stop RCP 1-2

Answer: A

Explanation/Justification: KA match based on seal failure malfunction resulting in increased leakoff and knowledge of procedural direction of monitoring for a second seal failure before requiring stopping the pump

A. Correct – minimal pressure drop across second stage indicates seal failure, DB-OP-02515 directs tripping pump only if two stages have failed

B. Incorrect – plausible since the second stage has failed and DB-OP-02515 directs tripping pump if two stages have failed

C. Incorrect – plausible since there is high pressure in the third stage and DB-OP-02515 directs tripping pump only if two stages have failed

D. Incorrect – plausible since there is high pressure in the third stage and DB-OP-02515 directs tripping pump if two stages have failed

Sys #	System	Category	KA Statement
003	Reactor Coolant Pump	A2. Ability to (a) predict the impacts of the following malfunctions or operations on the **RCPS**; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Problems with RCP seals, especially rates of seal leak-off

K/A# A2.01 **K/A Importance** 3.5 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02515 Step 4.1.1

Question Source: Bank 286399 Modified **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.5 / 43.5 / 45.3 / 45.13

Objective: GOP-115

30. Initial conditions:
    - 100% Power
    - Feed and Bleed is in progress with addition to the Makeup tank from a Clean Waste Monitor Tank and Letdown diverted to a Clean Waste Receiver tank.

    With these current plant conditions which of the following would cause MU 40, BATCH ISO, to automatically close?

A. Makeup Tank pressure increases to 70 psig

B. Makeup Tank level increases to 86 inches

C. Control Rod Group 7 drops into the Core

D. Control Rod Group 1 drops into the Core

Answer: D

Explanation/Justification: KA match – ability to recognize automatic operation of CVCS system (addition via MU40) due to a change in reactor power

A. Incorrect – plausible since this is when 2-3-B MU TK PRESS HI alarms

B. Incorrect – plausible since this is when 2-2-B MU TK LVL HI alarms

C. Incorrect – plausible since MU 40 will close if group 5 is less than 25% withdrawn

D. Correct – Groups 1-4 must be 100% withdrawn and group 5 must be greater than 25% for MU40 to be open when MU11 is open to the Makeup tank (Feed and Bleed)

Sys #	System	Category	KA Statement
004	Chemical and Volume Control	A3 - Ability to monitor automatic operation of the **CVCS**, including:	reactor power

K/A#	A3.08	**K/A Importance**	3.9	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	OS-002 SH 2 CL-7
Question Source:	Bank 291464			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7 / 45.5
Objective:	SYS-106				

31. Initial conditions:
    - Mode 5

    The following occurs:
    - DH11, Reactor Coolant to Decay Heat System fails closed

    Current conditions
    - The Reactor has been shutdown for 140 hours
    - RCS temperature 140°F
    - Reactor Coolant System level 30" above Hot Leg centerline

    With these current plant conditions, if no actions are taken (1) how long before the Reactor Coolant System (RCS) boils down to the top of the core and (2) which section of DB-OP-02527, Loss of Decay Heat Removal will be used to mitigate the event?

    REFERENCE PROVIDED

A. (1) 148 minutes
   (2) Loss of Decay Heat Removal Pump(s)

B. (1) 148 minutes
   (2) Loss of RCS Inventory During DHR Operation

C. (1) 128 minutes
   (2) Loss of Decay Heat Removal Pump(s)

D. (1) 128 minutes
   (2) Loss of RCS Inventory During DHR Operation

Answer: A

Explanation/Justification: KA match based on ability to predict uncovering the core due to RHR valve malfunction and the procedure required to mitigate

A. Correct – using Curve 6.3c will be used to determine 20 minutes to start to boil (212°F) from initial temperature (140°F) and, Curve 6.3.d will be used to determine 128 minutes from start of boil (212°F) to top of core. Adding these times together will determine 148 minutes from initial temperature (140°F) to top of the core. DH12 failing closed will require stopping the running Decay Heat Pumps and implementing the Loss of Decay Heat Removal Pump(s) section of DB-OP-02527, Loss of Decay Heat Removal

B. Incorrect – plausible since the first part is correct and inventory will be lost as the RCS boils down

C. Incorrect – plausible since the first part is time to uncover the core from 212°F and the second part is correct

D. Incorrect – plausible since the first part is time to uncover the core from 212°F and inventory will be lost as the RCS boils down

Sys #	System	Category	KA Statement
005	Residual Heat Removal System	A2- Ability to (a) predict the impacts of the following malfunctions or operations on the **RHRS**; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	RHR valve malfunction
K/A#	A2.04	**K/A Importance** 2.9	**Exam Level** RO

References provided to Candidate DB-PF-06703 Curve 6.3c and 6.3d

Technical References: DB-PF-06703 Curve 6.3c and 6.3d
DB-OP-02527 step 4.2.1

Question Source: New

Level Of Difficulty: (1-5)

Question Cognitive Level: High

10 CFR Part 55 Content: 41.5 / 43.5 / 45.3 / 45.13

Objective: GOP-127

32. Current conditions:
    - Plant Cooldown in progress
    - Mode 5
    - DH Loop 2 is in service
    - DH Loop 1 is in Standby LPI Mode

    With these current plant conditions which of the following describes the actions required to open DH13B, DH COOLER 1 BYPASS FLOW CONTROL VALVE, from the Control Room?

A. (1) Press AUTO on Hand Indicating Switch HISDH13B
   (2) Press OPEN on Hand Indicating Switch HISDH13B

B. (1) Press AUTO on Hand Indicating Switch HISDH13B
   (2) Select an OPEN demand signal on Hand Indicating Controller HICDH13B

C. (1) Press BLOCK on SFAS Block Pushbutton DH13B1
   (2) Press OPEN on Hand Indicating Switch HISDH13B

D. (1) Press BLOCK on SFAS Block Pushbutton DH13B1
   (2) Select an OPEN demand signal on Hand Indicating Controller HICDH13B

Answer: B

Explanation/Justification: KA match based on having the ability to gain control of the Heat exchanger bypass flow control valve and open it

A. Incorrect – plausible since (1) is correct and (2) open/close are the usual options for valve handswitches

B. Correct – DH13B has been closed by pressing the close pushbutton (this opens the solenoid to vent air from the valve placing it in its SFAS position) when placed in LPI Standby. HISDH13B only has a CLOSE and AUTO pushbutton. The auto pushbutton must be depressed to close the venting solenoid and allow the valve to be operated by its hand indicating controller when there is no SFAS signal.

C. Incorrect – plausible since (1) in Mode 5 system pressure would be below the SFAS trip setpoint for DH13B (SFAS trips are blocked during shutdown) and this is the sequence that would normally be required to operate an SFAS actuated valve that has open/close and (2) open/close are the usual options for valve handswitches

D. Incorrect – plausible since (1) see answer explanation C and (2) is correct

Sys #	System	Category	KA Statement
005	Residual Heat Removal System	A4 - Ability to manually operate and/or monitor in the control room:	Heat exchanger bypass flow control

K/A#	A4.02	**K/A Importance**	3.4*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	OS-004 SH2 CL-8
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.5 / 45.8
Objective:	SYS-303				

33. Initial conditions:
    - RCS temperature 270°F
    - Decay Heat Pump 1 is in service
    - Decay Heat Pump 2 is in Standby LPI Mode

    The following occurs:
    - Maintenance in progress causes a loss of bus D1

    With these current plant conditions which of the following Technical Specifications would be required to be declared?

A. 3.4.6 RCS Loops – Mode 4

B. 3.4.7 RCS Loops – Mode 5, Loops Filled

C. 3.5.2 ECCS – Operating

D. 3.5.3 ECCS – Shutdown

Answer: D

Explanation/Justification:

A. Incorrect – plausible since plant will be in mode 4 and a DHR loop is required to be operable

B. Incorrect – plausible since the loops will be filled and it could be determined plant was in mode 5

C. Incorrect – plausible since two ECCS trains are required to be operable in mode 3

D. Correct – plant condition is mode 4 which requires one LPI subsystem to remain operable

Sys #	**System**	**Category**	**KA Statement**
006	Emergency Core Cooling	Generic	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations

K/A#	2.2.36	**K/A Importance**	3.1	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	Tech Spec 3.5.3
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.10 / 43.2 / 45.13
Objective:	GOP-435				

34. The following plant conditions exist:

- The unit is at 100% power
- Computer Point T773 RC PRZR PWR RLF OUT TEMP indicates 306°F
- PZR Quench Tank level and pressure are increasing very slowly.

In accordance with technical specifications, which one of the following is the correct classification for this leakage?

A. Pressure boundary

B. RCS pressure isolation valve

C. Identified

D. Controlled

Answer: C

Explanation/Justification: KA match cause-effect relationship (RCS Tech Spec leakage) between the RCS and the Quench Tank via the Pressurizer relief valve

A. Incorrect – plausible since there is a specification for pressure boundary leakage

B. Incorrect – plausible since there is a specification for RCS pressure isolation valve leakage

C. Correct – Determine PORV is leaking to quench tank. Tech specs defines identified leakage as captured and conducted. RCS Water Inventory Balance Surveillance classifies calculated change in PZR Quench Tank as identified leakage

D. Incorrect – plausible since there used to be a specification for controlled leakage (RCP seal return)

Sys #	System	Category	KA Statement
007	Pressurizer Relief/Quench Tank	K1 - Knowledge of the physical connections and/or cause-effect relationships between the **PRTS** and the following systems:	RCS

K/A# K1.03 **K/A Importance** 3.0 **Exam Level** RO

References provided to Candidate None **Technical References:** TS Definition Identified Leakage a.1., DB-SP-03357 Attachment 1, step 4.2.3.c

Question Source: Bank DB 2005 NRC Exam Q30 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.2 to 41.9 / 45.7 to 45.8

Objective: GOP-410

35. The plant is operating at 100% power.

The following conditions are noted in the control room:

- LI225 Quench Tank Level 9 feet and slowly lowering
- LI1721 Reactor Coolant Drain Tank Level 20 inches and slowly rising
- Quench Tank Circ Pump GREEN light is LIT

Which of the following is occurring?

A. Pressurizer Code Safety Valve leakage

B. Pressurizer Power Operated Relief Valve leakage

C. Pressurizer High Point Vent line valves leaking by

D. Quench Tank Demineralized Water makeup valves leaking by

Answer: D

Explanation/Justification: KA Match – monitoring of automatic operation of Quench Tank drain due to Demin water discharge to quench tank

A. Incorrect – Plausible since safety valve leakage would raise level but would also raise Quench Tank temperature which would start the Circ Pump which the green light shows to be not running

B. Incorrect – same as Safety Valve leakage.

C. Incorrect – same as Safety Valve leakage.

D. Correct – Demin Water in-leakage causes Quench Tank level rise. The discharge valve to the RCDT (RC225A) will auto open when Quench Tank level is >9'6" and auto close at 8'6"

Sys #	System	Category	KA Statement
007	Pressurizer Relief/Quench Tank	A3 - Ability to monitor automatic operation of the **PRTS**, including:	Components which discharge to the PRT

K/A#	A3.01	**K/A Importance**	2.7*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-06004 Attachment 3
Question Source:	Bank DB 2015 NRC Exam Q34			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.5
Objective:	SYS-104				

36. The plant is operating at 100% power with all systems aligned for normal operation.
    - CCW Pump 1 is running
    - CCW pump 3 is being aligned to CCW Loop 1
    - CCW 3 valves have been opened to CCW Loop 1
    - ACD2, CCW 3 tie to C1 bus, is racked in with closed power fuses installed

    The following events occurs:
    - Loss of all offsite power (LOOP).
    - All systems function as designed.

    What will be the status of CCW Pumps 1 and 3?

A. Both CCW Pump 1 and CCW Pump 3 will start

B. Only CCW Pump 1 will start

C. Only CCW Pump 3 will start

D. Neither CCW pump will start

Answer: B

Explanation/Justification: KA Match – requires knowledge

A. Incorrect. - plausible since both are lined up electrically for a short time during pump transfer

B. Correct. CCW pumps 1 and 3 both receive backup power from the EDGs, however there is an interlock that prevents CCW pump 3 from receiving the LOOP start signal when CCW pump 1 is racked onto the bus.

C. Incorrect. - plausible since both are lined up electrically and at least one pump would be expected to start

D. Incorrect. – plausible since both are lined up electrically and both pumps starting would be undesirable

Sys #	System	Category	KA Statement
008	Component Cooling Water	K2 - Knowledge of bus power supplies to the following:	CCW pump, including emergency backup

K/A#	K2.02	**K/A Importance**	3.0*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	SD 3A, 4160v, pg2-6 (30)
Question Source:	Bank DB 2011 NRC Exam Q35			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.2 to 41.9 / 45.7 to 45.9

Objective: SYS-304

37. Initial conditions:
    - 35% Power
    - RCS Pressure 2155 psig

    The following occurs:
    - Selected RCS Pressure NNI input fails high

    With these current Plant conditions and no Operator actions which of the following Reactor Protection System trips will trip the Reactor?

A. RC High Pressure

B. RC Low Pressure

C. High RC Pressure – Temperature

D. Low RC Pressure – Temperature

Answer: B

Explanation/Justification: KA match – pressurizer pressure control malfunction causing a RPS trip

A. Incorrect – plausible since indicated pressure is failing high

B. Correct – the spray valve will open and eventually the PORV to reduce RCS pressure until trip setpoint is reached

C. Incorrect – plausible since there is a pressure-temperature RPS trip and there is a pressure component and at 100% power RC Pressure-Temperature trip is correct

D. Incorrect – plausible since there is a pressure-temperature RPS trip and there is a pressure component and at 100% power RC Pressure-Temperature trip is correct

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Sys #	**System**	**Category**	**KA Statement**
010	Pressurizer Pressure Control	K3 - Knowledge of the effect that a loss or malfunction of the **PZR** **PCS** will have on the following:	RPS

K/A#	K3.02	**K/A Importance**	4.0	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02513 Attachment 2
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.6
Objective:	SYS-504				

38. The DNBR Safety Limit is applicable in MODE(s) __(1)__

The __(2)__ RPS trip is designated to prevent exceeding the DNBR AND fuel center line melt Safety Limit

Which of the following completes the statement above?

A. (1) one ONLY
(2) High Flux

B. (1) one ONLY
(2) High RCS Temperature

C. (1) one AND two
(2) High Flux

D. (1) one AND two
(2) High RCS Temperature

Answer: C

Explanation/Justification: KA match – requires knowledge of the operational modes requiring RPS protection for DNB Safety Limit and what protection is provided for that limit

A. Incorrect – First part is incorrect but plausible since the Safety Limits do apply in MODE 1. Also it would be plausible to question the logic of a DNBR limit being in place in MODE 2 since power is limited to 5% in that MODE. Second part is correct

B. Incorrect – First part is incorrect but plausible since the Safety Limits do apply in MODE 1. Also it would be plausible to question the logic of a DNBR limit being in place in MODE 2 since power is limited to 5% in that MODE. Second part is plausible since RPS provides a high temperature trip

C. Correct – The DNBR and fuel centerline temperature Safety Limits are applicable in both Mode 1 and 2. The High flux RPS trip is designed to protect against exceeding both the DNBR and Fuel Centerline temperature Safety Limits.

D. Incorrect – First part is correct. Second part is plausible since RPS provides a high temperature trip

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Sys #	**System**	**Category**	**KA Statement**
012	Reactor Protection	K5.01 - Knowledge of the operational implications of the following concepts as they apply to the **RPS**:	DNB

K/A#	K5.01	**K/A Importance**	3.3*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	Tech Spec Bases page 3.3.1-11
Question Source:	Oconee 2015 RO-SRO Q36			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.5 / 45.7
Objective:	SYS-504				

39. The plant is operating at 100% power.

A Design Bases Loss of Coolant Accident (DBLOCA) occurs.

Which of the following describes –
(1) the definition of a Safety Features Actuation System (SFAS) safety train?
(2) the operational implication of the failure of one SFAS safety train on the DBLOCA Analyses assumptions?

(1) SFAS Channels __(1)__ Output Modules comprise Safety Actuation Train 1.
(2) DBLOCA Analyses assumptions __(2)__ met.

A. (1) 1 and 4
(2) are

B. (1) 1 and 3
(2) are

C. (1) 1 and 4
(2) are NOT

D. (1) 1 and 3
(2) are NOT

Answer: B

Explanation/Justification: KA match – requires knowledge of definition an ESF actuation channel and implications of ESF train failure

A. Incorrect – plausible since there are 4 SFAS Channels and the second part is correct

B. Correct – SFAS Channels 1 and 3 Output Modules comprise Actuation Channel 1. See Bases 3.3.7 2nd paragraph. DBLOCA Analyses assumptions are met. See UFSAR 6.3.2.11.

C. Incorrect – plausible since there are 4 SFAS Channels and one safety train is failed (as example Core Flood requires both trains)

D. Incorrect – plausible since part one is correct, and one safety train is failed (as example Core Flood requires both trains)

Sys #	System	Category	KA Statement
013	Eng. Safety Features Actuation	K5 - Knowledge of the operational implications of the following concepts as they apply to the **ESFAS**:	Definitions of safety train and ESF channel

K/A#	K5.01	**K/A Importance**	2.8	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	Bases 3.3.7 2nd paragraph; UFSAR 6.3.2.11 page 6.3-8
Question Source:	Bank DB 2015 NRC Exam Q40			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.5 / 45.7
Objective:	SYS-506				

40. Initial Conditions:
    - 100% Power
    - Containment Air Coolers 1 and 2 are running in FAST speed

    The following occurs:
    - Loss of Offsite Power

    Assuming NO operator actions, what will be the status of the Containment Air Coolers after the Emergency Diesel Generators re-energize C1 and D1 buses?

    Containment Air Coolers 1 and 2 Fans will indicate _____ LIGHT ON.

A. GREEN

B. RED

C. BLUE

D. WHITE

Answer: A

Explanation/Justification: KA match based on ability to monitor CAC Fans in the CTRM

A. Correct – Containment Air Coolers will not be running (GREEN) since they do not latch in when running in fast and the only start signal is SFAS level 2 in slow and manual start

B. Incorrect – plausible since the would have been running in fast when LOOP occurred

C. Incorrect – plausible since fans would be running if in slow speed initially or SFAS level 2 exists

D. Incorrect – plausible since this is one of the four fan indications (overload) and could occur during a LOCA

Sys #	**System**	**Category**	**KA Statement**
022	Containment Cooling	A4 - Ability to manually operate and/or monitor in the control room:	CCS Fans

K/A#	A4.01	**K/A Importance**	3.6	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	Lesson Plan OPSSYSI306
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7 / 45.5 / 45.8
Objective:	SYS306				

41. Initial conditions:
    - 100% Power

    The following occurs:
    - Large break Loss of Coolant Accident

    Current conditions:
    - CTMT Pressure 40 psia
    - Safety Features Actuation System levels 1,2 and 3 have actuated ONLY

    With these current plant conditions which of the following actions will the Reactor Operator be required to take to lower Containment temperature?

    Start _____

A. Containment Air Coolers in fast speed

B. Containment Spray Pumps

C. Containment Purge on Containment

D. Containment Recirculation Fans

Answer: B

Explanation/Justification: KA match – predict containment temperature will be lowered by starting CTMT Spray

A. Incorrect – plausible since increasing speed will increase air flow but slow speed is the SFAS position

B. Correct – It will be determined CTMT Spray pumps will be required to be started due to SFAS Level 4 should have actuated

C. Incorrect – plausible since CTMT purge would move fresh air into CTMT

D. Incorrect – plausible since Containment Recirc fans would move air in CTMT

Sys #	System	Category	KA Statement
026	Containment Spray System	A1 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the **CSS** controls including:	Containment temperature

K/A#	A1.02	**K/A Importance**	3.6*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02005 5-2-B, SD-022 page 2-2
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.5 / 45.5
Objective:	SYS-306				

42. Recirculation from the Emergency Sump has been accomplished following a large break Loss of Coolant Accident.

Which of the following is a procedural action to protect the Containment Spray Pumps from losing sufficient net positive suction head?

A. Verify Containment Spray Pump discharge valves throttle position amber lights are lit

B. Verify the "Emergency Sump Level Greater Than 2 Feet" red lights are lit

C. Verify emergency sump water temperature is less than the saturation temperature for the containment pressure

D. Verify the Containment Spray Pump vent valves are open for continuous venting

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Answer: A

Explanation/Justification: KA match – ability to monitor CSS controls for proper operation following a transfer of ECCS suction from the Borated Water Storage tank to the Emergency Sump

A. Correct - OP2000 step after completion of transfer to the emergency sump verifies Containment Spray discharge valves have moved to the throttle position which is indicated by amber lights lit

B. Incorrect - plausible since a higher sump level increases the NPSH, and the indication is an actual indication provided in the control room (LL1526A/B)

C. Incorrect - plausible since NPSH increases as temperature below saturation temperature increases

D. Incorrect - plausible since some pumps have an automatic vent path to remove air or other gasses from the pump casing (Condensate and Chill Water pumps for example)

Sys #	System	Category	KA Statement
026	Containment Spray System	A4 - Ability to manually operate and/or monitor in the control room:	CSS controls

K/A#	A4.01	**K/A Importance**	4.5	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02000 Attachment 7 Section 2
Question Source:	Bank 287976			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7 / 45.5 / 45.8
Objective:	SYS-306				

43. The plant was operating at 100% power. The reactor is manually tripped due to high vibration on the Main Generator.

The following events occur:

- All Turbine Bypass Valves open to control Steam Generator Pressure.
- SP13B1, Steam Line 1 Turbine Bypass Valve sticks full open.

All other equipment functions as designed.

(1) How will the plant respond to this failure, assuming no operator actions?
(2) What, if any, operator actions will be **required** to stabilize the plant without relying on the Main Steam Safety Valve operation?

A. (1) The unaffected Turbine Bypass Valves will modulate closed to control both SG pressures at the normal post trip setpoint of approximately 995 psig. This condition will not result in an SFRCS actuation
(2) No Operator Action will be required to stabilize the plant

B. (1) SFRCS will actuate on low SG1 Level, closing the Main Steam Isolation Valves, and starting Auxiliary Feedwater to restoring SG1 Level to 49 inches
(2) No Operator Action will be required to stabilize the plant

C. (1) SFRCS will actuate on low SG1 Pressure, closing the Main Steam Isolation Valves
(2) The Operators will use the Atmospheric Vent Valves in manual to control RCS Tave constant or slightly lowering

D. (1) SFRCS will actuate on Steam to Feed Differential Pressure on SG1, isolating all Main and Auxiliary Feedwater to SG1
(2) The Operators will open the Atmospheric Vent Valves on #1 SG to blowdown the affected SG

Answer: C

Explanation/Justification: KA match – predict the Main Steam System will isolate and action required to mitigate

A. Incorrect – Plausible if the candidate concludes the steam flow rate due to one open TBV is less than the core decay heat rate post trip. This event will exceed the core decay heat rate even if all other TBVs are closed. If the steam flow was less than core decay heat, then this response would be accurate.

B. Incorrect – Plausible because the Steam Generator Level would be lowering with an open TBV, however the Main Feedwater System and AFW, if actuated, can maintain SG level at setpoint even with an open TBV. The MSIVs would not close on low SG Level.

C. Correct – Without Operator Action, SG pressure in #1 SG would lower and cause an SFRCS Low SG Pressure on #1 SG at 630 psig. Once the MSIVs close, SG Pressure will rise causing the low pressure trip to reset allowing AFW flow to #1 SG. Operator action to control SG Pressure would be necessary to prevent Main Steam Safety Valves from opening.

D. Incorrect – Plausible because SFRCS will eventually actuate on Steam to Feed Differential Pressure once the MSIVs are closed in response to the low SG Pressure. The actions to blowdown the affected SG are actions taken in response to a Steam Line Break in accordance with DB-OP-02525, Steam Leaks, not an action taken in response to a TBV malfunction.

Sys #	System	Category	KA Statement
039	Main and Reheat Steam System	A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the **MRSS**; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Malfunctioning steam dump

K/A# A2.04 **K/A Importance** 3.4 **Exam Level** RO

References provided to Candidate None **Technical References:** USAR 10.4.4.1 page 10.4-6, DB-OP-02000 Table 1

Question Source: Bank DB 2013 NRC Exam Q59 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.5 / 43.5 / 45.3 / 45.13

Objective: SYS-202

44. Initial condition
    - 100% Power

    The following occurs:
    - Main Feedwater Pump #1 trip
    - Reactor trip due to turbine trip

    Current conditions:
    - All systems operated as designed
    - Plant is stable

    With these current conditions Steam Generator levels will be automatically controlled at which of the following levels?

A. 40 inches

B. 49 inches

C. 55 inches

D. 124 inches

Answer: A

Explanation/Justification: KA match ability to monitor SGs being controlled at the correct levels following a reactor trip with MFW supply

A. Correct – rapid feedwater reduction will allow SG levels to lower until low level limit setpoint of 40 inches

B. Incorrect – plausible since this is an AFW setpoint for normal SFRCS actuation and MFW Pump has tripped

C. Incorrect – plausible since this is an AFW setpoint for an AFP supplying the opposite SG MFW Pump has tripped

D. Incorrect – plausible since this is an AFW setpoint for an AFP supplying the opposite SG with SFAS actuation MFW Pump has tripped

Sys #	**System**	**Category**	**KA Statement**
059	Main Feedwater	A3 - Ability to monitor automatic operation of the **MFW**, including:	Programmed levels of the S/G

K/A#	A3.02	**K/A Importance**	2.9	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	SD-045 page 36 and 125
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7 / 45.5
Objective:	SYS-516				

45. Initial conditions:
    - The plant is shutdown due to an extended loss of offsite power event
    - Both Emergency Diesel Generators are running and are supplying the C1 and D1 busses.
    - The Station Blackout Diesel Generator is powering the D2 bus.
    - Both Auxiliary Feedwater Pumps are running, being supplied by Main Steam.
    - Condensate Storage Tank levels are 2.8 feet in both tanks and slowly lowering.

    The following occurs:
    - Annunciator Alarm 10-5-G, AFP 1 SUCTION PRESS LO
    - Auxiliary Feedwater Pump 1 suction pressure lowers to 5.0 psig for approximately 45 seconds

    With these current conditions which of the following is the correct action required to be taken in accordance with DB-OP-02010, FEEDWATER ALARM PANEL 10 ANNUNCIATORS?

A. Stop both Auxiliary Feedwater Pumps and transfer to the Makeup/High Pressure Injection mode of cooling

B. Verify Main Steam is isolated to the Auxiliary Feedwater Pump 1

C. Stop Auxiliary Feedwater Pump 1 and start the Motor Driven Feedwater Pump

D. Verify the Auxiliary Feedwater Pump 1 Emergency Suction Valve from the Service Water System opens

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Answer: D

Explanation/Justification: KA match based on effect of pump loss of suction on emergency suction supply valve

A. Incorrect – plausible since this would be the mode of cooling if all feedwater was lost; however, feedwater will not be lost in this situation since Service Water will supply water to the Auxiliary Feedwater Pumps

B. Incorrect – plausible since this is an automatic action that will occur if suction pressure reduces below 3.8 psig for >60 seconds

C. Incorrect – plausible since the Motor Driven Feed Pump does have a power source and can receive water from the Service Water System; however, it would require a manual valve lineup

D. Correct - Emergency Suction Valve from the Service Water System opens when Auxiliary Feedwater Pump suction pressure falls below 5.3 psig for >10 seconds

Sys #	**System**	**Category**	**KA Statement**
061	Auxiliary/Emergency Feedwater	K6 - Knowledge of the effect of a loss or malfunction of the following will have on the **AFW** components:	Pumps

K/A#	K6.02	**K/A Importance**	2.6	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02010 10-5-G, SD-015 step 2.5.2.1
Question Source:	Bank 293212			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.7
Objective:	SYS-213				

46. The plant is at 100% power.

- Emergency Diesel Generator 1 monthly surveillance test is in progress
- Emergency Diesel Generator 1 has been idle started and is running at 450 RPM
- A loss of offsite power occurs.

Which one of the following describes how Emergency Diesel Generator 1 will power C1 Bus?

A. The Emergency Diesel Generator speed will automatically increase to 900 RPM
AC 101 will automatically close

B. The Emergency Diesel Generator speed will automatically increase to 900 RPM
AC 101 will have to be manually closed

C. IDLE RELEASE must be depressed to increase the Emergency Diesel Generator speed to 900 RPM
AC 101 will automatically close

D. IDLE RELEASE must be depressed to increase the Emergency Diesel Generator speed to 900 RPM
AC 101 will have to be manually closed

Answer: A

Explanation/Justification: KA match – knowledge of the cause effect relationship between the AC Electrical distribution and the EDG while the EDG is at idle speed during a loss of offsite power

A. Correct – The idle start is overridden during a safety start. This will cause the Emergency Diesel Generator to automatically rise in speed to 900 RPM at which point AC101 will automatically close and power C1 bus.

B. Incorrect – plausible since AC101 would be opened on an Safety Features Actuation Signal with no loss of offsite power if paralleled

C. Incorrect – plausible since depressing the idle release button is the normal way to allow the Emergency Diesel Generator to rise to normal speed of 900 RPM

D. Incorrect – plausible since depressing the idle release button is the normal way to allow the Emergency Diesel Generator to rise to normal speed of 900 RPM and AC101 would open on an Safety Features Actuation Signal with no loss of offsite power if paralleled

Sys #	System	Category	KA Statement
062	AC Electrical Distribution	K1 - Knowledge of the physical connections and/or cause-effect relationships between the **AC distribution** system and the following systems:	EDG

K/A# K1.02 **K/A Importance** 4.1 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-SC-03070 step 4.12 and OS-041A CL-1 and CL-2

Question Source: Bank 294734 **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.2 to 41.9

Objective: SYS-406

47. Initial conditions:
    - Reactor Coolant System temperature 175°F
    - DB-OP-06900 Plant Heatup in progress
    - HX01A Red light ON
    - HX01B Red light ON
    - HX02A Green light is ON
    - HX02B Green light is ON
    - Direction has been given to start RCP 1-1

    Per DB-OP-06005, RC Pump Operation, before starting RCP 1-1 it is required to depress and hold ___(1)___ switch(es)

    AND

    Undervoltage automatic protection is verified bypassed by the UV TRIP BYPASS blue indicating light(s) turning __(2)__

A. (1) HS9829, BUS C1 UV TRIP BYPASS
   (2) ON

B. (1) HS9829, BUS C1 UV TRIP BYPASS
   (2) OFF

C. (1) HS9829, BUS C1 UV TRIP BYPASS **AND** HS9828, BUS D1 UV TRIP BYPASS
   (2) ON

D. (1) HS9829, BUS C1 UV TRIP BYPASS **AND** HS9828, BUS D1 UV TRIP BYPASS
   (2) OFF

Answer: C

Explanation/Justification: KA match – using control room indication to determine both buses are on the same startup transformer and that automatic undervoltage protection is verified by the correct control room indication

A. Incorrect – plausible since only one EDG is required operable in Mode 5, and RCP 1-1, C1 and Startup transformer X01 are train 1 components and ON is correct

B. Incorrect – plausible since only one EDG is required operable in Mode 5, and RCP 1-1, C1 and Startup transformer X01 are train 1 components and it is typical to have an indicator de-energize when something (automatic protection) is removed from service

C. Correct – DB-OP-06005 step 3.1.29 requires both switches depressed when A and B buses are on the same transformer and verifying the bypass light confirms the bypass in effect

D. Incorrect – (1) is correct and it is typical to have an indicator de-energize when something (automatic protection) is removed from service

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Sys #	System	Category	KA Statement
062	AC Electrical Distribution	Generic	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

K/A# 2.2.44 **K/A Importance** 4.2 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-06005 step 3.1.29

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.5 / 43.5 / 45.12

Objective: SYS-405

48. Current conditions:

- A loss of offsite power has occurred.
- A lockout on 4160V Bus C1 has occurred.
- All other plant responses are normal.

With these current plant conditions which of the following describes the status of the 120 VAC Instrument bus Y1?

Y1 _____.

A. is energized from YRF1

B. is energized from D1P

C. automatically transfers to XY1

D. must be manually transferred to YAR

Answer: B

Explanation/Justification: KA match – knowledge of the relationship between the AC and DC electrical systems and the effect of a loss of AC power on the AC electrical system which has a DC backup

A. Incorrect – plausible since YRF1 is a supply source to Y1 but is powered from C1 via E1 and E12A

B. Correct – Y1 is supplied from inverter YV1 which is normally supplied by YRF1 except when output voltage becomes less than DCMCC1 voltage via D1P

C. Incorrect – plausible since XY1 is the alternate source via static transfer switch but is powered from C1 via E1 and E16A

D. Incorrect – plausible since Y1 can be manually transferred to YAR but YAR deenergized due to LOOP

Sys #	**System**	**Category**	**KA Statement**
063	DC Electrical Distribution	K1 - Knowledge of the physical connections and/or cause-effect relationships between the **DC distribution** system and the following systems:	AC electrical system

K/A#	K1.02 -	**K/A Importance**	2.7	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-06319 Att 12
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.2 to 41.9 / 45.7 to 45.8
Objective:	SYS-408				

49. Current conditions:
    - 100% Power
    - Annunciator 1-2-A EDG 1 AIR RCVR PRESS LO is in alarm
    - Local Annunciator 43-3-B LOW AIR START PRESSURE is in alarm
    - Starting air pressure reads 180 psig and stable locally
    - EDG Air Compressor is running
    - EDG Air Receiver pressure will go no higher than 180 psig

    In the event of an undervoltage start signal, EDG 1 will _____.

A. not turn over and not start

B. start and load within 10 seconds

C. start but will NOT load within 10 seconds

D. turn over for approximately 7 seconds, but will not start

Answer: B

Explanation/Justification: KA match – knowledge of the effect on the EDG due to malfunctioning air receivers

A. Incorrect – plausible since at a low enough pressure there will not be enough motive force to turn over the EDG

B. Correct –EDG remains operable with one air receiver greater than or equal to 150 psig which requires a load and start within 10 seconds

C. Incorrect – plausible since air pressure is below normal operating pressure

D. Incorrect – plausible since the EDG has a fail to start circuit that will shutdown the EDG if it has not exceeded 200 RPM in 7 seconds

Sys #	System	Category	KA Statement
064	Emergency Diesel Generator	K6 - Knowledge of the effect of a loss or malfunction of the following will have on the **EDG** system:	Air receivers

K/A#	K6.07	**K/A Importance**	2.7	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-06316 Attachment 13
Question Source:	Bank TMI 2011 NRC Exam Q20			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.7
Objective:	SYS-406				

50. Initial Conditions:
    - Clean Waste Monitor Tank Release in progress
    - Maximum release rate is 90 gpm
    - RE1770A, Clean Liquid Radwaste Discharge Radiation Detector in service
    - RE1770B, Clean Liquid Radwaste Discharge Radiation Detector in service

    The following occurs:
    - RE1770A fails high

    WC1701A, Clean Liquid Rad Waste Low Flow Collection Box Disch Header Flow Control Valve
    WC1701B, Clean Liquid Rad Waste Hi Flow Collection Box Disch Header Flow Control Valve

    With these current plant conditions which of the following is correct?

    The Liquid Release will _____.

A. continue uninterrupted because the release is via WC1701B

B. continue uninterrupted since only one Radiation Element has failed

C. terminate because the release is via the WC1701A

D. terminate because both flow paths will receive an isolation signal

Answer: D

Explanation/Justification: KA match – knowledge of the effect on the release upon a PRM malfunction

A. Incorrect – plausible because the Valve and the RE both have the A designation which would imply only WC1701A would receive a close signal and releases above 25 gpm are through WC1701B

B. Incorrect – plausible since it is typical (like SFAS, ARTS, RPS) to require multiple or redundant signals to prevent single failure from initiating protective actions

C. Incorrect – plausible because the Valve and the RE both have the A designation and would be correct for releases below 25 gpm which are through WC1701A

D. Correct – High radiation trip on either RE closes WC1701A and WC1701B

Sys #	**System**	**Category**	**KA Statement**
073	Process Radiation Monitoring	K3 - Knowledge of the effect that a loss or malfunction of the **PRM** system will have on the following:	Radioactive effluent releases

K/A#	K3.01	**K/A Importance**	3.6	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	OS-028A SH4 and SH1 CL-12 and CL-13
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7 / 45.6
Objective:	SYS-110				

51. Initial conditions
    - 100% Power

    The following occurs:
    - Loss of offsite power

    Current conditions:
    - EDG 1 is running supplying bus C1
    - SW 1 is running
    - EDG 2 running supplying bus D1
    - SW 2 is running
    - CCW Pump 2 failed to start and could not be started manually

    With these Plant conditions, which of the following will DB-OP-02000, Specific Rule 6 direct to be performed?

A. Place CCW 3 in service as 2 to provide cooling to EDG 2

B. Trip EDG 2 when CCW HX 2 outlet temperature reaches 130°F

C. Trip EDG 2 immediately using the Control Room EDG STOP Pushbutton

D. Trip EDG 2 immediately using the local Emergency Shutdown Pushbutton

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Answer: D

Explanation/Justification: KA match on expectation of RO knowing specific rules and specific rule requirement to shutdown the EDG immediately if CCW cooling is lost

A. Incorrect – plausible since 3 can and eventually will be lined up as 2 but not until after EDG has been shut down. Per DBOP2000 bases If the EDG continued to run, the cylinder head would likely crack in approximately 6 minutes, and the EDG would likely seize in 11 to 14 minutes which is not enough time to replace CCW pump 2 with 3.

B. Incorrect – plausible since this is the specific rule guidance if service water is lost

C. Incorrect – plausible since the requirement is to shut down the EDG which will not shut down from the CTRM with a safety start signal

D. Correct – Specific Rule 6 step 3 RNO is "IF a CCW Pump is NOT available to supply cooling to a running EDG THEN stop that EDG(s) using the local Emergency Shutdown Pushbutton

Sys #	System	Category	KA Statement
064	Emergency Diesel Generators	Generic	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls

K/A# 2.4.49 **K/A Importance** 4.6 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02000 Specific Rule 6 Step 6.1.3 RNO

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.10 / 43.2 / 45.6

Objective: GOP301

52. Initial conditions:
    - 100% Power
    - Component Cooling Water Pump 1 is in service
    - Makeup Pump 2 is in service
    - Service Water Pumps 1 and 2 are in service

    The following occurs:
    - Loss of Offsite Power (LOOP)
    - Large break LOCA following LOOP
    - Emergency Diesel Generator 1 has TRIPPED on overspeed
    - The source breaker for MCC F12C TRIPPED OPEN when Emergency Diesel Generator 2 loaded onto the D1 bus

With these current plant conditions which of the following describes the status of the Service Water System?

A. Service Water Pump 2 does NOT have Minimum flow due to the strainer blowdown valve NOT OPENING

B. Cooling will NOT be available to secondary loads due to CT 2955, Turbine Plant Cooling Water Heat Exchanger Supply From Circulating Water, NOT OPENING

C. Full Service Water flow will NOT be available to Emergency Core Cooling System equipment due to secondary loads failing to isolate

D. Full Service Water flow will NOT be available to Containment Air Cooler 2 until manually restored due to the loss of offsite power

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Answer: C

Explanation/Justification: KA Match requires knowledge of power supply to ESF actuated MOV

A. Incorrect – plausible since the blowdown valve protects minimum flow and will not open but minimum flow will not be an issue due to the SFAS signal based on service water loads in service on an SFAS

B. Incorrect – Plausible since CT2955 would supply cooling to secondary loads if SW1395 were to close. since SW1395 remains open cooling will remain available to secondary loads

C. Correct – SW1395, supplying secondary loads, is powered from F12C and thus will remain open. A large break LOCA would cause SFAS to send a close signal to SW1395 to isolate. Remaining open will cause SW flow to be diverted from essential loads

D. Incorrect – true on LOOP only but refill logic will time delay open the Containment Air Cooler inlet valve due to the SFAS signal

Sys #	**System**	**Category**	**KA Statement**
076	Service Water System	K2 - Knowledge of bus power supplies to the following:	ESF-actuated MOVs

K/A#	K2.08	**K/A Importance**	3.1*	**Exam Level**	RO

References provided to Candidate None **Technical References:** E1040A Section 6.4 SH11
Question Source: Bank 294094 **Level Of Difficulty: (1-5)**
Question Cognitive Level: High **10 CFR Part 55 Content:** 41.7
Objective: SYS-305

53. Which of the following describes the interlock providing for train separation when aligning Service Water Pump 3 electrically to Service Water Trains 1 or 2?

- ACD4, TIE TO FDR BKR AC109
- AC109, XFER CD9 SW PUMP 1-3
- ACD5, TIE TO FDR BKR AD109
- AD109, XFER CD9 SW PUMP 1-3

A. Mechanical Interlock between AC109 and AD109

B. Mechanical Interlock between ACD4 and ACD5

C. Electrical Interlock between AC109 and AD109

D. Electrical Interlock between ACD4 and ACD5

Answer: B

Explanation/Justification: KA match based on knowledge of the interlock preventing breakers from being closed at the same time which would tie trains together electrically

A. Incorrect – plausible since this a method that could have been used to prevent both breakers being closed at the same time

B. Correct – Kirk Key devices (mechanical interlock) are required to be installed on ACD4/5 when placing SWP 3 in service

C. Incorrect – plausible since this a method that could have been used to prevent both breakers being closed at the same time

D. Incorrect – plausible since this a method that could have been used to prevent both breakers being closed at the same time

Sys #	System	Category	KA Statement
076	Service Water System	K4 - Knowledge of **SWS** design feature(s) and/or interlock(s) which provide for the following:	Service Water train separation

K/A#	K4.06	**K/A Importance**	2.8	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-06261, step 2.2.16 and Attachment 18, step 8.b
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7
Objective:	SYS-305				

54. Initial conditions:
    - 100% Power
    - Station Air Compressor 2 is in LEAD
    - Station Air Compressor 1 is in LAG

    The following occurs:
    - 9-3-E STA AIR HDR PRESS LO comes into alarm

    With these plant conditions, if plant air system pressure continues to lower, at what pressure is the Emergency Instrument Air Compressor expected to automatically start to control Instrument Air System pressure?

A. 100 psig

B. 97 psig

C. 95 psig

D. 90 psig

Answer: C

Explanation/Justification: KA match based on IAS design/interlock for automatic transfer of control of instrument air pressure from the station air compressors to the emergency instrument air compressor.

A. Incorrect – plausible since this is when the standby compressor (lag) starts

B. Incorrect – plausible since this is when the station air header pressure low annunciator alarm comes in

C. Correct – the EIAC automatically starts at 95 psig

D. Incorrect – plausible since this is the entry condition symptom for severe loss of instrument air procedure

Sys #	**System**	**Category**	**KA Statement**
078	Instrument Air	K4.01 - Knowledge of **IAS** design feature(s) and/or interlock(s) which provide for the following:	Manual/automatic transfers of control

K/A#	K4.01	**K/A Importance**	2.7	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02009 9-3-E
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7
Objective:	SYS-602				

55. Initial conditions:
    - 100% Power
    - BWST Temperature 55°F
    - CTMT Temperature 115°F
    - CTMT to Annulus d/p - 5 inches H2O
    - Containment Vacuum breaker isolation valves CV5090, CV5091 are closed for maintenance.

    Per DB-OP-03007 Miscellaneous Daily Checks which of the following actions, if any, would be required if maintenance needed another vacuum breaker isolation valve closed?

A. No action is required

B. Increase BWST temperature to 60°F

C. Disable ONE Containment Spray Train

D. Increase CTMT pressure to a positive value

Answer: B

Explanation/Justification: KA match based on ability to predict pressure to decrease beyond design could occur due to operating CTMT control (vacuum breakers) below minimum required for conditions given

A. Incorrect – plausible since this would be correct if BWST temperature was 60°F or above when only 6 vacuum breakers are required

B. Correct – per DB-OP-03007 Miscellaneous Daily Checks a minimum of 8 of the 10 vacuum breakers are required to be functional when BWST temperature is below 60°F with only 6 of the 10 required when BWST temper is 60°F. This prevents exceeding CTMT negative design pressure due to an inadvertent CTMT Spray actuation of one CS train.

C. Incorrect – plausible since both CTMT spray pumps are usually actuated at the same time and disabling both pumps would remove any vacuum breaker functionality requirement

D. Incorrect – plausible since indicated pressure is negative and increasing would add margin

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Sys #	System	Category	KA Statement
103	Containment	A1 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment system controls including:	Containment pressure, temperature, and humidity

K/A# A1.01 **K/A Importance** 3.7 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-03007 Step 4.7, TS Bases pg 3.6.6-3

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.5 / 45.5

Objective: SYS-108

56. The plant is operating at 100% power.

All attempts to trip the Reactor from the Control Room have failed.

An operator is dispatched to the Low Voltage Switchgear Rooms to open Reactor Trip Breakers.

Which pair of Reactor Trip Breakers located in the Low Voltage Switchgear Rooms will trip the Reactor when opened?

A. A and B

B. C and D

C. A and C

D. B and D

Answer: A

Explanation/Justification: KA match based on knowledge of the cause effect relationship between the power supply from the CRDS and the CRDMs

A. Correct – DB-OP-02000 directs opening of Trip Breakers A, B, and C in the Low Voltage Switchgear Room. A and B open will cause a reactor trip

B. Incorrect – Trip Breaker D is in the CRD Cabinet Room. Plausible because C and D open would trip the reactor.

C. Incorrect – CRDMs still energized via B and D. Plausible because both breakers are in the Low Voltage Switchgear Rooms.

D. Incorrect - CRDMs still energized via A and C. Plausible because both breakers are in the CRD power supply.

Sys #	System	Category	KA Statement
001	Control Rod Drive	K1 - Knowledge of the physical connections and/or cause-effect relationships between the **CRDS** and the following systems:	CRDM

K/A#	K1.03	**K/A Importance**	3.4	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02000 step 3.3.4, DB-OP-06402 Attachment 4 page 2 of 2
Question Source:	Bank DB 2015 NRC Exam Q7			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.2 to 41.9 / 45.7 to 45.8

Objective: GOP-302

57. Initial conditions:
    - 100% Power

    The following occurs:
    - Loss of power to 120 VAC Instrument Bus Y3

    With these current plant conditions which of the following combinations of Nuclear Instruments will be deenergized

A. NI3 Intermediate Range
   NI7 Power Range

B. NI3 Intermediate Range
   NI8 Power Range

C. NI4 Intermediate Range
   NI7 Power Range

D. NI4 Intermediate Range
   NI8 Power Range

Answer: D

Explanation/Justification: KA match requires knowledge of bus power supply to RPS channel 3 and which instrumentation is affected by the loss of RPS channel 3

A. Incorrect – plausible since NI3 number matches the bus Y3 number and NI7 is the third of four power range instruments

B. Incorrect – plausible since NI3 number matches the bus Y3 number and NI8 is correct

C. Incorrect – plausible since NI4 is correct and NI7 is the third of four power range instruments

D. Correct – Y1 powers RPS Channel 3 which supplies NI4 and NI8

Sys #	**System**	**Category**	**KA Statement**
015	Nuclear Instrumentation System	K2 - Knowledge of bus power supplies to the following:	NIS channels, components, and interconnections

K/A#	K2.01	**K/A Importance**	3.3	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	E1040 A Sect 7 SH11, SD044 step 2.1.2.1.1
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7
Objective:	SYS-502				

58. Engineering has determined the non-qualified Incores are not available for indication in the Control Room.

With this plant condition natural circulation can still be verified by verifying the qualified Incore indications at the __(1)__ are tracking with __(2)__.

A. (1) Post-Accident Monitoring Panel
(2) Tcold

B. (1) Post-Accident Monitoring Panel
(2) Thot

C. (1) Auxiliary Shutdown Panel
(2) Tcold

D. (1) Auxiliary Shutdown Panel
(2) Thot

Answer: B

Explanation/Justification: KA match based on the effect of malfunction of ITS on verifying indications of natural circulation

A. Incorrect – plausible since (1) is correct and (2) does represent RCS temperature and is used in determining natural circulation in conjunction with SG Tsat

B. Correct – There are 2 channels of 8 qualified Incores each that can be monitored from the Post Accident Monitoring panel. One of the verifications of natural circulation indications is Incores tracking with RCS Thot

C. Incorrect – (1) is plausible since the auxiliary shutdown panel is used to monitor the plant when indications are unavailable in the control room (2) see answer A

D. Incorrect – (1) see answer C and (2) is correct

Sys #	System	Category	KA Statement
017	In-Core Temperature Monitor	K3 - Knowledge of the effect that a loss or malfunction of the **ITM** system will have on the following:	Natural circulation indications

K/A#	K3.01	**K/A Importance**	3.5*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	SD-043 step 2.9, DB-OP-06903 step 6.3
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7 / 45.6
Objective:	SYS-503				

59. Which of the following describes the design feature to prevent Containment Purge from pulling a vacuum in Containment?

A. A pressure switch will trip the Exhaust Fan if Containment negative pressure rises above a predetermined value

B. A pressure switch will trip the Exhaust Fan if Containment positive pressure falls below a predetermined value

C. The Exhaust Fan will trip if the Supply Fan is not running within a predetermined time

D. The Exhaust Fan will not start unless the Supply Fan is running

---

Answer: C

Explanation/Justification: KA match – knowledge of the design to prevent negative pressure in Containment due to CTMT Purge

A. Incorrect – plausible since this would be a method to prevent negative pressure

B. Incorrect – plausible since this would be a method to prevent negative pressure

C. Correct – to prevent pressurizing or pulling a vacuum in the Containment, a time delay interlock between the Exhaust Fan and the Supply Fan will prevent the Exhaust Fan from operating if the Supply Fan fails to start within 175 seconds

D. Incorrect – plausible since this is would prevent a negative pressure and is typical

Sys #	System	Category	KA Statement
029	Containment Purge	K4 - Knowledge of the design feature(s) and/or interlock(s) which provide for the following:	Negative pressure in containment

K/A# K4.02 **K/A Importance** 2.9 **Exam Level** RO

References provided to Candidate None **Technical References:** SD-022 step 2.2.2

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.7

Objective: SYS-109

60. Plant conditions:
    - Reactor is in Mode 1
    - SFP LVL, 3-1-B alarms
    - Spent Fuel Pool level = 23.2 ft slowly lowering
    - DB-OP-02547, Spent Fuel Pool Cooling Malfunctions, Section 4.2, Loss of Spent Fuel Pool Inventory is entered
    - Location of the leak is **UNKNOWN**

    Based on the above plant conditions, complete the following statement.

    In accordance with DB-OP-02547, you are **FIRST** directed to stop the pump in service on the Spent Fuel Pool _____.

A. Immediately

B. when spent fuel pool level lowers to 23 ft

C. when spent fuel pool level lowers to 22.4 ft

D. when spent fuel pool level lowers to 19 ft

Answer: D

Explanation/Justification: KA Match: This question matches the KA by requiring the ability to monitor SFP level and determine when actions on the SFP Cooling system are taken and the design to prevent uncovering fuel assemblies

A. Incorrect – because you will not secure pumps until SFP level lowers to 19 ft. It is plausible because if the leak were determined to be coming from the SFP cooling system, it would be correct.

B. Incorrect –because you will not secure pumps until SFP level lowers to 19 ft. It is plausible because if you assume that this is the level above the fuel, that you would secure the SFP pumps prior to going below that level required by TS.

C. Incorrect – because you will not secure pumps until SFP level lowers to 19 ft. It is plausible because this is the level at which you are actually 23 ft above the fuel (see B).

D. Correct – IAW DB-OP-02547, IAAT SFP level reaches 19 ft, you are directed to stop the pumps in service on the SFP.

Sys #	**System**	**Category**	**KA Statement**
033	Spent Fuel Pool Cooling	A1 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with **Spent Fuel Pool Cooling** system operating the controls including:	Spent fuel pool water level

K/A#	A1.01	**K/A Importance**	2.7	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-02547 pages 20 and 33
Question Source:	Bank DB 2018 NRC Exam Q60			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.5 / 45.5
Objective:	SYS-113				

61. Initial conditions:
    - The plant is at 100% power.
    - Normal equipment lineups exist.

    The following occurs:
    - Main Steam Isolation Valve MS100 begins traveling closed inadvertently due to a malfunction in its air operator.
    - MS 100 stops traveling at 62% open.
    - SG 2 outlet pressure spikes up to 1027 psig during the transient.
    - Turbine Header pressure is 910 psig.

    With these Plant conditions, _____.

A. the Turbine Bypass Valve will open because SG 2 pressure is >930 psig

B. neither the Turbine Bypass Valves and Atmospheric Vent Valve will open because Turbine Header Pressure is 910 psig

C. both the Turbine Bypass Valves and Atmospheric Vent Valve will open because SG 2 pressure is >995 psig

D. the Atmospheric Vent Valve will open because SG 2 pressure is >1025 psig

---

Answer: D

Explanation/Justification: KA match based on knowledge of SG status following a MSIV malfunction

A. Plausible since 930 psig is the TBV setpoint with the reactor and turbine reset and the ULD>17%; however the TBVs will be closed due to the MSIV being <90% open.

B. Incorrect – Plausible since during normal operation both sets of valves would be closed at 910 psig; however the AVVs will be operating off of SG pressure due to the MSIV being <90%open.

C. Incorrect – plausible since 995 psig Header Pressure is the reactor trip setpoint for the TBVs; however, they will be closed due to the MSIV being <90% open and the AVVs will be operating off of SG pressure.

D. Correct –When MS101 closes, the TBV control station demands are transferred to the AVVs and the AVV will lift at 1025 psig

Sys #	**System**	**Category**	**KA Statement**
035	Steam Generator System	K6 - Knowledge of the effect of a loss or malfunction of the following will have on the **S/G** system:	MSIVs

K/A#	K6.01	**K/A Importance**	3.2	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	M-533-00175-4 Logic String 6 & M-533-00174-4 T-6 boxes
Question Source:	Bank DB 2008 NRC Exam Q34			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.7
Objective:	GOP-307				

62. Plant conditions:
    - The plant is starting up after a forced outage towards the end of core life
    - The reactor is critical below the point of adding heat (POAH)
    - One Turbine Bypass Valve fails open

    Based on the above plant conditions, which ONE of the following is correct regarding how the plant will initially respond?

A. RCS temperature will not change since you are below the POAH and RCS temperature is being maintained by pump heat. Since temperature is not changing, power will remain constant.

B. RCS temperature will lower due to lowering SG pressure however, since you are below the POAH, this has no effect on core reactivity so power will remain constant.

C. RCS temperature will lower due to lowering SG pressure and the effect of the moderator temperature coefficient will cause reactor power to rise to the POAH.

D. RCS temperature will lower due to lowering SG pressure and the effect of the moderator temperature coefficient will cause reactor power to lower towards the source range.

Answer: C

Explanation/Justification: KA match reactivity effects of SDS malfunction

A. Incorrect – because reducing SG pressure/temperature will reduce RCS temperature. It is plausible because RCP heat is what has heated to RCS to hot standby (normal operating temperature).

B. Incorrect – because any change in RCS temperature will cause power to change (unless the moderator temperature coefficient is 0). It is plausible because in discussing the concept of the POAH, it is common to think that RCS temperature will not effect power.

C. Correct – Reducing SG pressure/temperature lowers RCS temperature and since you towards the EOL, positive reactivity will be added causing power to increase towards the POAH.

D. Incorrect – because the lowering RCS temperature will add positive reactivity due to the plant being at EOL. It is plausible because if it were after a refueling outage (BOL), it could and probably would be correct.

Sys #	**System**	**Category**	**KA Statement**
041	Steam Dump/Turbine Bypass Control	K5 - Knowledge of operational implications of the following concepts as they apply to the **SDS**:	Reactivity feedback effects

K/A#	K5.07	**K/A Importance**	3.1*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	Reactor Theory Fundamentals
Question Source:	Bank DB 2018 NRC Exam Q61			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.5 / 45.7
Objective:	SYS-202				

63. Initial conditions:
    - 28% power

    The following occurs:
    - 15-2-B EHC FLUID PRESS LO
    - 15-1-B EHC 2ND PMP STARTED
    - 15-3-B EHC FLUID LEVEL

    PI 2326, EHC SYSTEM PRESSURE indicates 1000 psig
    EHC Fluid level indicates 10 inches below normal

    With these plant conditions:

    (1) Which of the following reflects the impact?

    AND

    (2) Which procedure will be used to respond to this impact?

A. (1) Verify the Turbine has tripped
   (2) GO TO DB-OP-02500, Turbine Trip

B. (1) Verify the Reactor and the Turbine have tripped
   (2) GO TO DB-OP-02000, RPS, SFAS, SFRCS Trip, or SG Tube Rupture

C. (1) EHC fluid addition required to prevent low tank level trip
   (2) Refer to DB-OP-06204, EHC System Operating Procedure

D. (1) Manual shutdown of the Turbine is required
   (2) Refer to DB-OP-06903, Plant Shutdown and Cooldown

Answer: A

Explanation/Justification: KA match based on (1) impact on turbine and (2) procedure to control

A. Correct – turbine automatically trips at 1100 psig EHC system pressure and reactor does not trip on turbine trip below 40% power

B. Incorrect – plausible since turbine automatically trips at 1100 psig EHC system pressure and reactor does trip on turbine trip above 40% power

C. Incorrect - plausible since this will be required to restore level

D. Incorrect – plausible since this is direction for high level due to water intrusion

Sys #	System	Category	KA Statement
045	Main Turbine Generator	A2 - Ability to (a) predict the impacts of the following malfunctions or operation on the **MTG** system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Malfunction of electrohydraulic control

K/A#	A2.17	**K/A Importance**	2.7*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	OS-23 SH2 CL-4, DB-OP-02500 Att7 pg 1
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.5 / 43.5 / 45.3 / 45.5
Objective:	SYS-214				

64. Initial conditions:
    - 100% Power
    - Station Air Compressor (SAC) 2 is in lead and running
    - The Emergency Instrument Air Compressor (EIAC) is in lag and standing by
    - Station Air Compressor (SAC) 1 is out of service

    The following occurs:
    - An Equipment Operator reports a major leak in the Station Air header

    Current conditions:
    - SAC 2 is running
    - EIAC is running
    - Instrument Air header pressure is 97 psig and rising
    - Station Air header pressure is 87 psig and lowering

    With these indications which of the following describes the status of the air system?

A. SA6445, IA/SA CROSS TIE SOLENOID VALVE has closed to allow the EIAC to be dedicated to the Instrument Air System.

B. SA6445, IA/SA CROSS TIE SOLENOID VALVE has opened to allow the EIAC to support SAC 2 to attempt to maintain Station Air System pressure

C. SA2008 STATION AIR HEADER BACK PRESSURE REGULATOR is failing closed causing a loss of Station Air System

D. SA2008 STATION AIR HEADER BACK PRESSURE REGULATOR is throttling open in attempt to maintain Station Air Pressure

---

Answer: A

Explanation/Justification: KA match based on the ability to monitor the status of the IA/SA cross connect from the CTRM using available indications

A. Correct – SA6445 trips closed at 95 psig to separate Instrument Air from Station Air

B. Incorrect – plausible since the EIAC auto starts at 95 psig

C. Incorrect – plausible since SA2008 begins to throttle at 90 psig on the Instrument Air header

D. Incorrect – plausible Station Air header is dropping and SA2008 does throttle to maintain Instrument air header pressure

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Sys #	**System**	**Category**	**KA Statement**
079	Station Air	A4 - Ability to manually operate and/or monitor in the control room:	Cross-tie with Instrument Air system

K/A#	A4.01	**K/A Importance**	2.7	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	SD-001 pages 2-1 and 2-2
Question Source:	Bank DB 2011 NRC Exam Q54			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.5 to 45.8
Objective:	SYS-602				

65. The following plant conditions exist:

- The plant is at 35% power
- Annunciator 9-1-G FIRE OR RADIATION TRBL alarms
- FSA-MAIN-TRANS C-3310 YD-PROT is indicated on the FDS/RMS Console

With these current plant conditions:

DB-OP-02529, Fire Procedure directs the Control Room Operator to ____(1)____ after which the Main Transformer deluge system will _(2)____
.

A. (1) trip the Reactor
(2) automatically actuate

B. (1) trip the Reactor
(2) require manual actuation locally

C. (1) trip the Main Turbine
(2) automatically actuate

D. (1) trip the Main Turbine
(2) require manual actuation locally

Answer: C

Explanation/Justification: KA match based on monitoring automatic actuation of the FPS reveals it doesn't occur until required CTRM actions are performed

A. Incorrect – plausible since this is the direction if power is above 40% and part 2 is correct

B. Incorrect – plausible since this is the direction if power is above 40% and the Main Turbine bearings do require manual actuation locally

C. Correct – below 40% the Main Turbine can be tripped without tripping the Reactor. The Main Transformer has a permissive interlock that will block the deluge solenoid until the transformer is deenergized

D. Incorrect –

Sys #	**System**	**Category**	**KA Statement**
086	Fire Protection	A3 - Ability to monitor automatic operation of the **Fire Protection** system, including:	Actuation of the FPS

K/A#	A3.02	**K/A Importance**	2.9	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	SD-036A page 2-22, DB-OP-02529 4.1.1
Question Source:	Bank 296863			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.5
Objective:	SYS-601				

66. Given the following plant conditions:

- The Field Supervisor provides you a working copy of DB-SP-03357, “RCS Water Inventory Balance”.
- You note that this procedure has not been annotated as the latest approved procedure.
- All Plant systems are operable.

Which of the following will be the **REQUIRED** method, if any, to validate DB-SP-03357 is the latest revision in accordance with NOP-LP-2601, “Procedure Use and Adherence”?

A. **NOT** required to be validated prior to use

B. **MUST** be validated by comparing to FileNet prior to use

C. **NOT** required to be validated prior to use, since this procedure is designated as General Skill Reference

D. **ONLY** required to be validated by comparing to FileNet once per week

---

Answer: B

Explanation/Justification: Meets the K/A by requiring the knowledge of how to validate that a procedure copy is the same as the controlled copy.

A. Incorrect. Plausible incorrect answer. During emergency operations and drills, the documents in the emergency facilities may be used without validating to FileNet.

B. Correct. The candidate must have knowledge of how a controlled copy of an operating procedure is verified. In accordance with NOP-LP-2601, this is the requirement for all other procedures other than emergencies or safeguard information which is not viewable in FileNet.

C. Incorrect. Plausible incorrect answer. Since the procedure is complex, it is designated as Step-By-Step, not General Skill Reference, it must be validated prior to use.

D. Incorrect. Plausible because NOP-LP-2601 does require procedures other than emergencies or drills to be validated every three days thereafter. The procedure is also required to be validated prior to use.

Sys #	**System**	**Category**			**KA Statement**
N/A	N/A	Generic			Ability to verify the controlled procedure copy
K/A#	2.1.21	**K/A Importance**	3.5*	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	NOP-LP-2601, Rev 6, pg 6 & 12
Question Source:	Bank BV2LOT8 Q#66			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.10 / 45.10 / 45.13
Objective:	GOP-519				

67. Initial conditions:
    - Plant shutdown per DB-OP-06902, Power Operations is in progress
    - The Site Vice President DB Nuclear is observing in the Control Room
    - The Site Vice President DB Nuclear is not a licensed RO or SRO

    Current conditions:
    - Attachment 11, Reactor Trip from Low Power is complete up to the step directing Trip the Reactor, using either Reactor Trip Pushbutton

    The following occurs:
    - The Site Vice President DB Nuclear requests permission to be the one to push the Reactor Trip Pushbutton

    Per NOP-OP-1004, Reactivity Management, which of the following is correct concerning permission for the Site Vice President DB Nuclear to trip the Reactor?

    Permission _____

A. can be granted with approval and consent required of the Command SRO ONLY

B. can be granted with approval and consent required of the Reactor Operator at the Controls ONLY

C. must be denied due to his not being a member of the on shift operating crew

D. must be denied unless he is enrolled in a NRC-approved training program to qualify for an operator license

---

Answer: D

Explanation/Justification: KA match based on knowledge of procedural limitation of the Reactivity Management procedure

A. Incorrect – plausible since the Site VP has overall responsibility for the site and this would be correct for manipulating apparatus and mechanisms which may indirectly affect the reactivity or power level of a reactor

B. Incorrect – plausible since the Site VP has overall responsibility for the site and this would be correct for manipulating apparatus and mechanisms which may indirectly affect the reactivity or power level of a reactor

C. Incorrect – plausible since it is true permission must be denied and the VP is not a member of the on shift operating crew

D. Correct – Per NOP-OP-1004, Reactivity Management only a licensed RO or SRO may operate the Reactor Trip switches unless they are training to qualify for a license

Sys #	**System**	**Category**	**KA Statement**
N/A	N/A	Generic	Knowledge of procedures, guidelines, or limitations associated with reactivity management

K/A#	2.1.37	**K/A Importance**	4.3	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	NOP-OP-1004, Step 4.2.1.3
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.1 / 43.6 / 45.6
Objective:	GOP-529				

68. Initial conditions:
    - The plant is in Mode 6
    - Refueling operations are in progress
    - The Equipment Hatch is off

    The following occurs:
    - The refueling personnel in CTMT report that an irradiated fuel assembly has been damaged and gases are escaping.

    With these current plant conditions which of the following actions will be taken?

A. Manually start the Control Room Emergency Ventilation System

B. Align the Station Emergency Ventilation System to the Shield Building negative pressure area

C. Align the Containment Purge System to the Shield Building negative pressure area

D. Manually actuate all SFAS Level 1 equipment

Answer: A

Explanation/Justification: KA match based on knowledge of RO required duty to place CTRM EVS in service on the CTRM during Fuel Handling accidents

A. Correct - The actions for all fuel handling accident scenarios follow a general theme. Evacuate the area, isolate the normal ventilation system, start the Emergency Ventilation System to control the radiation release, start Control Room Emergency Ventilation to protect the Control Room crew, and develop a recovery plan

B. Incorrect - plausible because the station emergency ventilation system will be aligned to the fuel handling area

C. Incorrect - plausible because the CTMT Purge ventilation may be in service on CTMT. Direction will be to shutdown and isolate

D. Incorrect - plausible since SFAS Level 1 actuates CTMT isolation components

---

Sys #	**System**	**Category**	**KA Statement**
N/A	N/A	Generic	Knowledge of RO duties in the control room during fuel handling, such as responding to alarms from the fuel handling area, communication with the fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation

K/A# 2.1.44 **K/A Importance** 3.9 **Exam Level** RO

References provided to Candidate None **Technical References:** DB-OP-02530, Attachment 5

Question Source: Bank 287235 **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.10 / 43.7 / 45.12

Objective: GOP-130

69. Initial condition:
    - Plant startup in progress
    - The Reactor Engineer determines criticality will be achieved at ≥ 1.0%Δk/k of the Estimated Critical Position (ECP)

    With these current plant conditions which of the following identifies the correct action required per DB-OP-06912, Approach to Criticality?

A. Manually trip the reactor

B. Insert Control Rod Groups 2-7

C. Maintain current rod position and have a Condition Report written and evaluated prior to continuing

D. Maintain current rod position and perform the appropriate Boron concentration adjustment

---

Answer: B

Explanation/Justification: KA match based on the ability to perform the correct procedure direction and identify the correct control to operate to manage reactivity

A. Incorrect – plausible since this action is directed for numerous abnormal plant conditions

B. Correct – directed per DB-OP-06912, approach to criticality limit and precaution 2.1.13

C. Incorrect – plausible since the reactor is not critical and procedure does direct a condition report to be written and evaluated prior to continuing

D. Incorrect – plausible since if > 0.5%Δk/k, but < 1.0%Δk/k, of the ECP the requirement is to insert groups 2-7, perform the appropriate boron concentration adjustment and re-initiate the approach to criticality

Sys #	**System**	**Category**	**KA Statement**
N/A	N/A	Generic	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity

K/A#	2.2.1	**K/A Importance**	4.5	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-OP-06912 L&P 2.1.13
Question Source:	Bank 287931			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.5 / 41.10 / 43.5 / 43.6 / 45.1
Objective:	GOP-210				

70. When performing a Surveillance procedure, which one of the following conditions PROHIBITS the use of "N/A" in the sign-off spaces provided?

A. Performance of partial tests

B. Inability to perform the Surveillance as written

C. Performing a Surveillance that pre-establishes conditions for non-performance of steps

D. Performance of steps that cannot be performed due to plant conditions but do not change the intent of the procedure

---

Answer: B

Explanation/Justification: KA match based on standard use of NA in surveillance procedures

A. Incorrect. Partial tests allow N/A.

B. Correct. Situation requires issuing a revision after placing equipment in a safe condition.

C. Incorrect. N/A is specifically used for this condition.

D. Incorrect. May use N/A as long as procedure intent is not altered.

Sys #	System	Category			KA Statement
N/A	N/A	Generic			Knowledge of surveillance procedures
K/A#	2.2.12	**K/A Importance**	3.7	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	NOP-LP-2601 Rev 6 pg 7-9
Question Source:	Bank BV2LOT17 Q70			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.10 / 45.13
Objective:	GOP-519				

71. A large break LOCA is in progress. Core damage has occurred with high radiation levels in accessible plant areas.

To prevent the loss of an ECCS pump, an individual is dispatched to locally operate a failed MOV in an area surveyed at 100 R/hr area. He becomes injured and immobilized, and two individuals are sent to rescue him.

What are the Davis Besse voluntary exposure limits for the **original operation**, and the **subsequent rescue**?

A. valve operation: 5 REM as a Planned Special Exposure
two rescuers: 10 REM each lifesaving activities

B. valve operation: 5 REM as a Planned Special Exposure
two rescuers: 10 MAN-REM combined total for all lifesaving activities

C. valve operation: 10 REM as an emergency exposure
two rescuers: 25 MAN-REM combined total for all lifesaving activities

D. valve operation: 10 REM as an emergency exposure
two rescuers: 25 REM each for all lifesaving activities

Answer: D

Explanation/Justification: KA match based on knowledge of radiation exposure limits under emergency conditions

A. Incorrect. Incorrect dose values but the 5 rem is plausible because it is equivalent to the annual occupational dose limit, and the second part is the dose limit allowed for protecting valuable property.

B. Incorrect. Incorrect dose values but the 5 rem is plausible because it is equivalent to the annual occupational dose limit, and the second part is is double this value.

C. Incorrect. First part is correct. Second part is plausible if they think that the lifesaving activity total dose is only allowed to be 25 rem.

D. Correct. 10 rem to protect valuable equipment and 25 rem each to save a life.

Sys #	**System**	**Category**			**KA Statement**
N/A	N/A	Generic			Knowledge of radiation exposure limits under normal or emergency conditions
K/A# 2.3.4	**K/A Importance**	3.2	**Exam Level**		RO
References provided to Candidate	None		**Technical References:**		RA-EP-02620 page 6 and 7
Question Source:	Bank BV2LOT17 Q71		**Level Of Difficulty: (1-5)**		
Question Cognitive Level:	High		**10 CFR Part 55 Content:**		41.12 / 43.4 / 45.10
Objective:	GOP-600				

72. The following conditions exist:

- Plant is operating at 100% power
- Radiation level is 1,324 mrem/hr at 30 centimeters from the Letdown piping
- You have been assigned to enter the Purification Demineralizer Valve Room and hang a clearance

Which of the following identifies the radiation area posting at the Purification Demineralizer Valve Room entrance, and the minimum approval authority for entry in accordance with NOP-OP-4101, 'Access Controls for Radiologically Controlled Areas'?

	Demin Valve Room Posting	Minimum Approval
A.	High Radiation Area (HRA)	Operations Shift Manager
B.	High Radiation Area (HRA)	Radiation Protection Supervisor
C.	Locked High Radiation Area (LHRA)	Operations Shift Manager
D.	Locked High Radiation Area (LHRA)	Radiation Protection Supervisor

Answer: D

Explanation/Justification: K/A is met by identifying the area as a LHRA and determine who must give permission to enter the LHRA in order to hang a clearance

A. Incorrect. HRA is An accessible area in which radiation levels could result in an individual receiving a deep-dose equivalent in excess of ≥100 mrem/hr at a distance of 30 centimeters or more from a radiation source or from any surface that the radiation penetrates. The RPM approval is required if the gen area dose was >2.5 rem/hr, or it was a Very High Rad Area and it is typical to have permissions required from the Shift Manager

B. Incorrect. For posting, see explanation above. Radiation Protection Supervisor is the correct authorization.

C. Incorrect. LHRA is the correct posting. The RPM approval is required if the gen area dose was >2.5 rem/hr, or it was a Very High Rad Area and it is typical to have permissions required from the Shift Manager

D. Correct. LHRA is A locked area with an accessible area to individuals, in which radiation levels could result in dose rates ≥1,000 mrem/hr at a distance of 30 centimeters from a radiation source or from any surface that the radiation penetrates. The RP Supervisor must give approval for entry into the LHRA as long as the general area dose rate is <2.5Rem/hr.

Sys #	System	Category	KA Statement
N/A	N/A	Generic	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

K/A# 2.3.13 **K/A Importance** 3.4 **Exam Level** RO

References provided to Candidate None **Technical References:** NOP-OP-4101 page 5 and 16

Question Source: Bank BV2LOT15 Q72 **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.12 / 43.4 / 45.9 / 45.10

Objective: GOP-511

73. The purpose of the PROCESS radiation monitors is to _____

A. warn personnel of rising background radiation levels in various areas of the plant

B. monitor equipment used on radioactive systems for radioactive contamination

C. initiate automatic actions to prevent the spread and / or release of radioactive materials

D. initiate containment isolation by SFAS due to high radiation levels in containment

---

Answer: C

Explanation/Justification: KA Match based on the knowledge of the generic purpose of a specific type of radiation monitoring system

A. Incorrect – plausible since this is the purpose of AREA radiation monitors

B. Incorrect – plausible since this equipment is monitored and there are monitors for this purpose

C. Correct – process monitors initiate appropriate protective functions to maintain process and effluent radioactive levels within acceptable limits

D. Incorrect – plausible since there are SFAS high radiation monitors used to cause CTMT isolation, but they are not process and are currently disabled

Sys #	System	Category	KA Statement
N/A	N/A	Generic	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc

K/A# 2.3.15 **K/A Importance** 2.9 **Exam Level** RO

References provided to Candidate None **Technical References:** Lesson Plan SYS508, SD-017A 2.1.1.1

Question Source: Bank 295915 **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.12 / 43.4 / 45.9

Objective: SYS-508

74. Due to a non-functional fire detection zone a Continuous Fire Watch is required per the Fire Hazard and Analysis Report.

- No maintenance activities are in progress in the affected area
- The detection zone is expected to be out of service for 8 hours
- An OPERATING SPECIFICATION FIRE WATCH is assigned to perform the Continuous Fire Watch

Per DB-FP-00009, Fire Protection Impairment and Fire Watch procedure which of the following is a **REQUIREMENT** of the Continuous Fire Watch?

A. Ensure the assigned patrol is made every 15 minutes

B. Ensure the assigned patrol is made every 20 minutes

C. Remain in the area for a minimum of 30 minutes after the zone is returned to service

D. Remain in the area for a minimum of 60 minutes after the zone is returned to service

---

Answer: A

Explanation/Justification: KA match based on knowledge of continuous fire watch responsibility as specified in a fire protection procedure

A. Correct – Per DB-FP-00009 a continuous fire watch must make the assigned patrol every 15 minutes

B. Incorrect – plausible since there is a five minute margin allowed by the FHAR but it cannot be used to continuously reset the 15 minutes requirement

C. Incorrect – plausible since this is a requirement of an open flame fire watch

D. Incorrect – plausible since this is a natural numerical progression of the 30 minute requirement of an open flame fire watch in addition to the existence of hourly fire watch requirements

Sys #	**System**	**Category**			**KA Statement**
N/A	N/A	Generic			Knowledge of fire protection procedures
K/A#	2.4.25	**K/A Importance**	3.3	**Exam Level**	RO
References provided to Candidate	None			**Technical References:**	DB-FP-00009 Step 4.7
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.10 / 43.5 / 45.13
Objective:	GOP-508				

75. A General Emergency has been declared and all Emergency Response facilities have been manned and activated. All appropriate turnovers are complete.

Who, by title, has the authority to make Offsite Protective Action Recommendations (PARs), for these conditions?

A. Emergency Plant Manager

B. Emergency Offsite Manager

C. Dose Assessment Coordinator

D. Emergency Director

Answer: D

Explanation/Justification: KA match based on knowledge of authority required offsite PARS

A. Incorrect – plausible since some items may be delegated to the EPM, but not PARs.

B. Incorrect – plausible since this individual is responsible for offsite plume tracking and dose assessment.

C. Incorrect – plausible since this individual is responsible for the dose calculations, but not the associated PARs.

D. Correct – IAW RA-EP-02010 page 6 the ED is responsible for offsite PARs and this is a Non-Delegable Responsibility.

Sys #	System	Category		KA Statement
N/A	N/A	Generic		Knowledge of lines of authority during implementation of the emergency plan
K/A# 2.4.37	**K/A Importance** 3.0		**Exam Level**	RO
References provided to Candidate None			**Technical References:**	RA-EP-02010 R20 Page 6
Question Source: Bank DB 2011 NRC Exam Q74			**Level Of Difficulty: (1-5)**	
Question Cognitive Level: Low			**10 CFR Part 55 Content:**	41.10 / 45.13
Objective: GOP-601				

76. Initial conditions:
    - 100% Power

    The following occurs:
    - (4-1-D) PZR RLF VLV OPEN annunciator alarm
    - T773, RC PRZR PWR RLF OUT TEMP, RC12-1 computer alarm
    - RCS pressure is lowering
    - Flow is indicated on:
        1. ZI 4263A, PRESSURIZER VALVES PAM Channel 1
        2. ZI 4264A, PRESSURIZER VALVES PAM Channel 2

    Current plant conditions:
    - DB-OP-02513, Pressurizer System Abnormal actions have been taken
    - Plant is stable
    - Tech Spec 3.4.11, Pressurizer Pilot Operated Relief Valve (PORV) has been entered and the 1 hour REQUIRED ACTIONS have been completed

    With these current plant conditions:

    (1) Which function of TNC 8.3.7 Post Accident Monitoring (PAM) Instrumentation is Nonfunctional requiring entry into a NONCONFORMANCE condition?
    AND
    (2) What is the required routing of DB-OP-02513, Pressurizer System Abnormal Operation?

A. (1) PORV Position Indicator
   (2) Consult with Plant Management as necessary to confirm that normal operation may continue

B. (1) PORV Position Indicator
   (2) Be in MODE 3 in 6 hours AND MODE 4 in 12 Hours

C. (1) PORV Block Valve Position Indicator
   (2) Consult with Plant Management as necessary to confirm that normal operation may continue

D. (1) PORV Block Valve Position Indicator
   (2) Be in MODE 3 in 6 hours AND MODE 4 in 12 Hours

Answer: C

Explanation/Justification: Meets KA by determine acoustic monitors indicate PORV leak by requiring closure of PORV block valve and SRO by knowledge of what is in a Table required by TNC 8.3.7 and that complying with TS 3.4.11 will render a PAM instrumentation in that Table Nonfunctional and a routing decision for continued operation

A. Incorrect – plausible since the PORV will be closed and the PORV position indicator is a required function in Table 8.3.7-1 and part 2 correct

B. Incorrect – plausible since the PORV will be closed and the PORV position indicator is a required function in Table 8.3.7-1 and part 2 is the required actions for TS 3.4.11 required action and completion time not met

C. Correct – Indication are of PORV leakage. DB-OP-02513 will have the PORV block valve closed and TS 3.4.11 requirements complied with. TS 3.4.11 will require the PORV Block valve power removed which will render its position indicator Inoperable. Routing direction DB-OP-02513 step 4.4.7 is to consult plant management for continued operation

D. Incorrect – plausible since part 1 is correct and part 2 is the required actions for TS 3.4.11 required action and completion time not met

Sys #	System	Category	KA Statement
008	Pressurizer Vapor Space Accident	AA2 - Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident:	PORV position indicators and acoustic monitors

K/A# AA2.03 **K/A Importance** 3.9 **Exam Level** SRO

References provided to Candidate None **Technical References:** DB-OP-02513 section 4.4, TS 3.4.11, TNC 8.3.7

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 43.5 / 45.13

Objective: GOP-113

77. Initial Conditions:
    - 100% Power

    The following occurs:
    - RCS Leak
    - Reactor trip
    - Loss of Subcooling Margin

    Current conditions:
    - Plant is stable
    - RCS Temperature 475°F
    - RCS Pressure 1200 psig
    - The Command SRO has successfully progressed to the final step in DB-OP-02000, Section 5 Loss of Subcooling Margin

    With these current plant conditions where will Section 5 route to next to complete the loss of coolant mitigation strategy?

A. Section 9, Inadequate Core Cooling

B. Section 10, Large LOCA Cooldown

C. Section 11, RCS Saturated with SG Removing Heat Cooldown

D. Section 13, RCS Subcooled with SG Removing Heat Cooldown

Answer: D

Explanation/Justification: KA match based on DB-OP-02000 mitigation strategies. SRO only ES401 Att. 2 item E Page 7 second bullet – diagnostic step and decision point

A. Incorrect – plausible since this is a routing step in Section 5

B. Incorrect – plausible since this is a routing step in Section 5

C. Incorrect – plausible since this is a routing step in Section 5

D. Correct – Section 5 routes to Section 13 upon completion if SCM has been regained and heat transfer is occurring

Sys #	System	Category	KA Statement
009	Small Break LOCA	Generic	Knowledge of the EOP mitigation strategies

K/A#	2.4.06	**K/A Importance**	4.7	**Exam Level**	SRO
References provided to Candidate	Steam Tables			**Technical References:**	DB-OP-02000 Step 5.25
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.10 / 43.5 / 45.13
Objective:	GOP-304				

78. Initial Conditions:
    - 100% Power

    The following Occurs:
    - Turbine trips
    - Reactor does not trip
    - DB-OP-02000, Immediate Actions are performed
    - RNO Actions attempted in the Control Room were not successful in shutting down the Reactor
    - An Equipment Operator was dispatched to locally open the Reactor Trip Breakers in the Low Voltage Switchgear Rooms

    Current conditions:
    - All Power Range NIs indicate 0%
    - IR SUR is -0.3 dpm

Based on this sequence of events, what is the **HIGHEST** Emergency Classification?

REFERENCE PROVIDED

A. SU6.1

B. SU6.2

C. SA6.1

D. SS6.1

Answer: C

Explanation/Justification: SRO only ES401 Att. 2 item F 1st bullet. Determine emergency classification based on failure of automatic reactor trip and control room manual trip actions due to occurrence of turbine trip and ATWS

A. Incorrect – plausible since this is an EAL related to an ATWS

B. Incorrect – plausible since this is an EAL related to an ATWS

C. Correct – SA6.1 An automatic or manual trip fails to shut down the reactor as indicated by reactor power > 5% AND Manual trip actions taken at the Controls Area (manual RPS trip pushbuttons and de-energizing E2 and F2) are not successful in shutting down the reactor as indicated by reactor power > 5%

D. Incorrect – plausible since this is an EAL related to an ATWS

Sys #	System	Category	KA Statement
029	Anticipated Transient Without Scram	EA2 - Ability to determine and interpret the following as they apply to a ATWS:	Occurrence of a main turbine/reactor trip

K/A# EA2.09 **K/A Importance** 4.5 **Exam Level** SRO

References provided to Candidate RA-EP-01500, Emergency Classification **Technical References:** RA-EP-01500, Emergency Classification R16 page 32

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 43.5 / 45.13

Objective: GOP-602

79. The plant is operating at 100% power.

The following events occur:

- Reactor Trip
- Main Steam Safety Valves on **BOTH** Steam Generators stick open and can not be reseated.
- All Feedwater Flow is isolated to #1 Steam Generator.
- Trickle Feed is established to #2 Steam Generator
- RCS Pressure is stabilized at 1700 psig.

In accordance with DB-OP-02000, RPS, SFAS, SFRCS Trip or SG Tube Rupture, what Steam Generator Level if any, is **required** to be maintained for these plant conditions?

A. No specific Level requirement exists for these plant conditions

B. Maintain 40 inches using Main Feedwater flow

C. Maintain 49 inches using Auxiliary Feedwater flow

D. Maintain 124 inches using Auxiliary Feedwater flow

Answer: A

Explanation/Justification: SRO only ES401 Att. 2 item E 1st paragraph page 6. This is NOT system knowledge since automatic controls must be overridden to implement the trickle feed strategy. The question is at the SRO level since it requires detailed knowledge of how this is accomplished. This is a significant step in implementing this method because if normal levels are maintained, a significant overcooling event will occur. This goes beyond basic purpose, overall sequence, and mitigating strategy of the procedure which indicates SRO only.

A. Correct per **note** for step 7.28 RNO. SRO ONLY since it requires the candidate to assess the given plant conditions and then select the appropriate procedure actions contained in that section, in this case a note preceding a supplemental action step.

B. Incorrect – Plausible because this the normal method of control and system used to maintain SG Level following a Reactor Trip

C. Incorrect – Plausible because this the normal method of control and system used to maintain SG Level following AFW Actuation that would occur when Feedwater isolated to #1 SG.

D. Incorrect – Plausible because this the normal method of control and system used to maintain SG Level following AFW Actuation that would occur when Feedwater isolated to #1 SG. and RCS Pressure reduction caused by overcooling resulted in an SFAS actuation.

Sys #	System	Category	KA Statement
054	Loss of Main Feedwater	Generic	Ability to perform specific system and integrated plant procedures in all modes of plant operation

K/A# 2.1.23 **K/A Importance** 4.4 **Exam Level** SRO

References provided to Candidate None **Technical References:** DB-OP-02000 Step 7.28 RNO

Question Source: Bank DB 2013 NRC Exam Q81 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.10 / 43.5 / 45.2 / 45.6

Objective: GOP-306

80. Initial conditions:
    - 100% Power
    - SFAS Channel 1 Load Sequencer is INOPERABLE

    The following occurs:
    - SFAS Channel 2 Load Sequencer becomes INOPERABLE

    With these plant conditions:

    (1) Can a Completion Time extension, per Technical Specifications Section 1.3 Completion Times, be granted for the second Sequencer REQUIRED ACTION?

    AND

    (2) When all REQUIRED ACTIONs are complete, will the SFAS loads controlled by the Sequencer load on the EDGs sequentially with a large break LOCA and a Loss of Offsite power?

    REFERENCE PROVIDED

A. (1) Yes
   (2) No

B. (1) Yes
   (2) Yes

C. (1) No
   (2) No

D. (1) No
   (2) Yes

Answer: D

Explanation/Justification: SRO only based on requiring knowledge on how to apply separate entry conditions and completion time extensions. ES-401 Section II B first bullet. Knowledge of Tech Spec Section 1. KA match on ESF load sequencer supporting LOOP with SA signal

A. Incorrect – plausible since (1) completion time extensions are addressed and allowed in certain cases in TS Section 1.3 (2) there are two sequencers inoperable and two of the same train would prevent sequencing. Train 1 is Channels 1 &3, Train 2 is Channels 2&4.

B. Incorrect – plausible since (1) see answer A and (2) is correct

C. Incorrect – plausible since (1) is correct and (2) see answer A

D. Correct – (1) Completion Time extensions do not apply to those Specifications that have exceptions that allow completely separate reentry into the Condition. (2) There is only one sequencer module removed in each train. Train 1 is Channels 1 &3, Train 2 is Channels 2&4. Each train only requires one of the two sequencers to allow sequencing (which is why the EDG remains operable with only one sequencer in the train)

Sys #	System	Category	KA Statement
056	Loss of Offsite Power	AA2 - Ability to determine and interpret the following as they apply to the Loss of Offsite Power:	ESF channels, A and B breaker-trip alarms, indicators, and bus voltage indicators

K/A#	AA2.33	**K/A Importance**	3.7	**Exam Level**	SRO
References provided to Candidate		TS section 1.3	**Technical References:**		TS 1.3-2, TS 3.8.1 H, TS Bases 3.8.1 H.1
Question Source:		New	**Level Of Difficulty: (1-5)**		
Question Cognitive Level:		Low	**10 CFR Part 55 Content:**		43.5 / 45.13
Objective:		SYS-506			

81. Initial conditions
    - Plant shutdown progress
    - Reactor Power is 12%
    - Motor Driven Feedwater Pump is lined up in the Main Feedwater mode

    The following occurs:
    - Loss of Offsite Power
    - Loss of all Feedwater

    Current conditions:
    - AFW Pump 2 is restored feeding SG2
    - AFW Pump 1 is unavailable
    - Station Blackout Diesel Generator has been started
    - AF3871, Auxiliary Feed Pump 2 to Steam Generator 1 is failed closed
    - Steam Generator 1 has boiled dry
    - Steam Generator Tube to Shell differential temperatures are within limits

    The Command SRO directs the Reactor Operator restore feedwater to #1 Steam Generator, using Attachment 5, Guidelines for Restoring Feedwater, and shift the running AFW Pump recirculation flow path to the CST.

    (1) Which Section of Attachment 5 will the Command SRO direct the Reactor Operator to perform?

    AND

    (2) Which of the following will be maintained as a result of shifting the AFW Pump recirculation flowpaths?

A. (1) Section A: Motor Driven Feedwater Pump in the Main Feedwater Mode
(2) Condensate Storage Tank chemistry parameters within specification

B. (1) Section A: Motor Driven Feedwater Pump in the Main Feedwater Mode
(2) The margin assumed in the Condensate Storage Tank Capacity analysis

C. (1) Section B: Emergency Feedwater Pump via the Auxiliary Feedwater header
(2) The margin assumed in the Condensate Storage Tank Capacity analysis

D. (1) Section B: Emergency Feedwater Pump via the Auxiliary Feedwater header
(2) Condensate Storage Tank chemistry parameters within specification

Answer: B

Explanation/Justification: ES-401 Att 2 Section II E SRO only based on assessment of facility conditions and selection of appropriate procedure. KA match based on result of local operator action in relation to systems available for mitigation of inadequate heat transfer

A. Incorrect – (1) is correct and (2) is plausible since AF59 normal alignment is open to direct AFP recirc water to the storm drain to prevent degradation of chemistry of the CSTs if AFW pumps start with suction from SW.

B. Correct – (1) The use of the Emergency Feedwater Pump is limited to beyond design bases events (e.g., loss of both Auxiliary Feedwater trains). Shift Manager's permission under the provisions of 10CFR50.54(x) and (y) is required for any use of the Emergency Feedwater Pump that is not for beyond design bases response. (2) After AFW pumps start, local operator opens AF50 & AF51, then closes AF59 to shift recirc to CSTs to preserve CST inventory

C. Incorrect – (1) is plausible since per attachment 5 the AFW header is preferred when feeding a dry steam generator (2) is correct

D. Incorrect – (1) see answer B (2) see answer A

Sys #	System	Category	KA Statement
BW E04	Inadequate Heat Transfer	Generic	Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects

K/A# 2.4.35 **K/A Importance** 4.0 **Exam Level** SRO

References provided to Candidate None **Technical References:** DB-OP-02000, Attachment 5 page 1 and 2, DBOP2000 bases and deviation step 4.18

Question Source: Bank DB 2015 NRC Exam Q46 modified to SRO **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.10 / 43.5 / 45.13

Objective: GOP-305

82. Initial conditions
- RCP 1-1 was stopped due to high bearing temperature
- Reactor power is 71%

The following occurs:
- A control rod drops and cannot be retrieved for TWO hours

With these plant conditions which of the following is the highest power level that will not exceed the ALLOWABLE THERMAL POWER limit after two hours?

REFERENCE PROVIDED

A. 33%

B. 45%

C. 50%

D. 60%

Answer: B

Explanation/Justification: SRO only ES401 Att. 2 item B Page 3 first bullet. KA Match based on applying Tech Spec for a dropped rod

A. Incorrect – Plausible since DB-OP-02516 directs reducing power to 33% for a dropped rod with 3 RCPs running

B. Correct – Maximum allowable power with 3 RCPs running is 75%. 60% of 75% = 45% which is required within 2 hours per TS 3.1.4

C. Incorrect – Plausible since DB-OP-02516 directs reducing power to 50% for a dropped rod with 4 RCPs running

D. Incorrect – Plausible since this would be the requirement if 4 RCPs were in operation

Sys #	System	Category	KA Statement
003	Dropped Control Rod	Generic	Ability to apply Technical Specifications for a system

K/A# 2.2.40 **K/A Importance** 4.7 **Exam Level** SRO

References provided to Candidate Tech Spec 3.1.4 **Technical References:** Tech Spec 3.1.4

Question Source: Bank 159508 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.10 / 43.2 / 43.5 / 45.3

Objective: GOP-116

83. Waste Gas Decay Tank 1 is being discharged to the station vent IAW DB-OP-03012, Radioactive Gaseous Batch Release. WG1821, Waste Gas To Station Vent Flow Control is being utilized for this batch release.

The following valid alarms and indications are received:

- RE1822A Waste Gas System Radiation Monitor alarms WARN & HIGH
- RE1822A Waste Gas System Radiation Monitor indicates offscale high

No automatic actions have occurred. An Operator is sent to investigate and becomes contaminated and injured requiring transport to the Hospital Emergency Room where he was treated and released.

Based on these conditions:

(1) which of the following valves FAILED to automatically CLOSE?

1. WG1819, Waste Gas To Station Vent Isolation
2. WG1820, Waste Gas To Station Vent Isolation
3. WG1821, Waste Gas To Station Vent Flow Control
4. WG1836, Waste Gas Decay Tank 1 To Station Vent Control

AND

(2) Which of the following shall be notified within 8 hours, per NOP-OP-1015, Event Notifications?

REFERENCE PROVIDED

A. (1) 1 & 2 only
(2) NRC ONLY

B. (1) 1 & 2 only
(2) NRC and OSHA

C. (1) 3 & 4 only
(2) NRC ONLY

D. (1) 3 & 4 only
(2) NRC and OSHA

Answer: A

Explanation/Justification: SRO Only – Notification requirements are an SRO job function. KA match on improper valve alignment for current condition resulting in an accidental release

A. Correct – (1) RE1822A trip should have caused both the Waste Gas to Station Vent Isolations to Close (2) OSHA is not required since the injured worker was not admitted.

B. Incorrect – Plausible since (1) is correct and (2) since OSHA would be required if injured worker was admitted as an in-patient.

C. Incorrect – (1) Plausible because if the RE1822A trip would use a controller to provide isolation, it is logical that WG1821 and WG1836 would close to provide isolation. (2) is correct

D. Incorrect – (1) Plausible because if the RE1822A trip would use a controller to provide isolation, it is logical that WG1821 and WG1836 would close to provide isolation and (2) since OSHA would be required if injured worker was admitted as an in-patient

Sys #	System	Category	KA Statement
060	Accidental Gaseous Radwaste Release	AA2 - Ability to determine and interpret the following as they apply to Accidental Gaseous Radwaste Release:	Valve lineup for release of radioactive gases

K/A# AA2.06 **K/A Importance** 3.8 **Exam Level** SRO

References provided to Candidate NOP-OP-1015 **Technical References:** OS-030 Sheet 1 (B-16) and Sheet 2 CL-1 and NOP-OP-1015

Question Source: Bank DB 2013 NRC Exam Q22 modified to SRO **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 43.5 / 45.13

Objective: SYS-110 GOP-510

84. The Control Room is evacuated due to a serious control room fire.

(1) Per DB-OP-2519, Serious Control Room Fire who will direct the actions to stabilize the Plant from the Auxiliary Shutdown Panel and
AND
(2) Which of the following will be directed to be monitored remotely from the Mechanical Penetration Room?

A. (1) Shift Manager
(2) Reactor Coolant Pressure

B. (1) Shift Manager
(2) Reactor Coolant Tcold

C. (1) Command SRO
(2) Reactor Coolant Pressure

D. (1) Command SRO
(2) Reactor Coolant Tcold

Answer: B

Explanation/Justification: SRO only – SRO function which requires knowledge of Attachments in DB-OP-02519 for Shift Manager and Unit Supervisor actions outside the control room on a CTRM evacuation. KA match by requiring knowledge of indication available

A. Incorrect –plausible since (1) is correct (2) Plausible since RCS pressure is monitored from the Aux Shutdown Panel

B. Correct – (1) The Shift Manager assumes establishes plant control per Attachment 1: Shift Manager action outside the control room (2) Tcold is measured by portable temperature monitors that will be connected by attachment 5: equipment operator actions in MPR 3

C. Incorrect – (1) plausible since the Command SRO is normally the position to direct operator actions with the Shift Manager providing oversight and (2) see answer A

D. Incorrect – (1) see answer C and (2) is correct

Sys #	**System**	**Category**			**KA Statement**
068	Control Room Evacuation	Generic			Ability to identify post-accident instrumentation
K/A#	2.4.3	**K/A Importance**	3.9	**Exam Level**	SRO
References provided to Candidate	None			**Technical References:**	SB-OP-02519 Att. 1 page 1 and Att. 5 Step 1.0.j
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.6 / 45.4
Objective:	GOP-119				

85. Initial conditions:
    - 100% power

    The following occurs:
    - Steam Leak in the Auxiliary Building
    - Reactor is tripped
    - DB-OP-02000 Section 7, Overcooling is implemented

    Current conditions
    - Steam Generator (SG) 1 has been identified as the leaking SG
    - SG 1 is isolated and is being blown down
    - Indications are SG 2 is leaking steam into Containment

    The Reactor Operator reports Reactor Coolant System Cooldown rate cannot be maintained less than the Technical Specification maximum.

    With these Plant conditions which of the following will the Command SRO perform?

A. Inform the Reactor Operator the new cooldown rate limit is 235 °F/hr

B. Direct Isolation of SG2 and establishment of Trickle Feed Cooling on SG 1

C. Direct establishment of Trickle Feed Cooling on SG 2

D. Go to Attachment 4, Initiate MU/HPI Cooling

Answer: D

Explanation/Justification: SRO only based on ES-401 E. diagnostic step and decision point. KA match on adhering to procedure within the limits of cooldown rate Technical Specification requirements

A. Incorrect – plausible since this limit is directed in the SGTR enclosure when level is approaching 200 inches on the ruptured SG

B. Incorrect – plausible since steaming into containment (SG2) would be particularly adverse since inventory without boron would be accumulating in the emergency sump. OP2000 step 7.28 states IF the steam release location is NOT detrimental to personnel OR key equipment (e.g. dilution of Containment Sump), THEN establish Trickle Feed. DBOP2000 Bases and Deviation Document specifies into CTMT and the Auxiliary Building as being adverse to steaming.

C. Incorrect – Plausible since SG1 was already isolated and being blown down except steaming into CTMT is prohibited

D. Correct – per DB-OP-02000 Step 7.28 RNO when cooldown rate is greater than 100 °F/hr (Tech Spec limit) and Trickle Feed cannot be established isolated feed to both SGs and go to MU/HPI Cooling attachment

Sys #	**System**	**Category**	**KA Statement**
BW E13	EOP Rules and Enclosures	EA2.2 - Ability to determine and interpret the following as they apply to the (EOP Rules):	Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments

K/A#	EA2.2	**K/A Importance**	4.0	**Exam Level**	SRO
References provided to Candidate	None			**Technical References:**	DBOP2000 Step 7.28 and DBOP2000 Bases and Deviation document step 7.28
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 45.5 / 45.6
Objective:	GOP-306				

86. Initial conditions:
- 100% Power
- Makeup Pump (MUP) 1 is in service
- Makeup Pump (MUP) 2 is tagged out for maintenance

The following occurs:
- Makeup tank level indicates 0 inches
- MUP 1 amp, flow and discharge pressure is erratic
- DB-OP-02512, Makeup and Purification System Malfunctions is implemented
- (2-2-C) MU TK LVL LO
- (2-3-C) MU TK PRESS LO
- (6-5-C) SEAL INJ FLOW LO
- (6-6-C) SEAL INJ TOTAL FLOW

With these current plant conditions which of the following attachments from DB-OP-02512 will the Command SRO direct to be performed **FIRST**?

A. Attachment 2: Makeup Pump Venting

B. Attachment 3: Lineup Piggyback Operations

C. Attachment 4: Restoration of RCS Makeup Flow

D. Attachment 5: Restoration of RCP Seal Injection Flow

Answer: B

Explanation/Justification: SRO only ES401 Att. 2 item E Page 7 first bullet. KA Match based on interpreting and prioritizing response to annunciator alarms

A. Incorrect – plausible since indications of cavitation occurred.

B. Correct – DB-OP-02512 step 4.1.11 directs attachment 3 to be performed if no makeup pumps can be started

C. Incorrect – plausible since this attachment will restore MU flow but assumes MUPs available

D. Incorrect – plausible since alarms indicate loss of seal injection flow

Sys #	System	Category	KA Statement
004	Chemical and Volume Control	Generic	Ability to prioritize and interpret the significance of each annunciator or alarm

K/A# 2.4.45 **K/A Importance** 4.3 **Exam Level** SRO

References provided to Candidate None **Technical References:** DB-OP-02527 Step 4.1.11 RNO

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.10 / 43.5 / 45.3 / 45.12

Objective: GOP-112

87. The plant is operating at 100% power with all systems in normal alignment with the exception that HPI Train 2 is out of service for planned maintenance.

At 0800, a reactor trip occurs. SFAS Actuates on Low RCS Pressure, Low-Low RCS Pressure and High Containment Pressure.

At 0830, BWST level is 39 feet and lowering and level will reach 9 feet at 1630.

At 0900, LPI Train 1 **AND** 2 indicate 0 gallons per minute.

At 0930, Incore temperatures have stabilized at approximately 480 ºF with RCS pressure at 500 psig.

Which ONE (1) of the following DB-OP-02000 Attachments provides the required actions that mitigate these plant events?

A. Attachment 11, HPI Flow Balancing

B. Attachment 12, Establishing Long Term Boron Dilution

C. Attachment 14, Establishing HPI Alternate Minimum Recirc Flowpath

D. Attachment 22, Cross Connect LPI Pump Discharge

Answer: A

Explanation/Justification: SRO only ES401 Att. 2 item E Page 7 first bullet. Similar to question example from page 12.

A. Correct – Flow Balancing HPI is required during single train operation to protect against an HPI Line Break to ensure at least one HPI injection line flow is reaching the core. SRO ONLY since it requires the candidate to select the appropriate procedure attachment to mitigate the event.

B. Incorrect – Long term Boron dilutions is required when RCS temperatures are less than 333 ºF. At higher temperatures, the boron in the RCS will not precipitate out of solution. As a result, Long Term Boron Dilution is not required for these plant conditions.

C. Incorrect – HPI Alternate Minimum Recirc is required when BWST level is being reduce at less than 2 foot per hour. At higher flow rates, the RCS will not repressurize above the shutoff head of the HPI Pump. As a result, HPI Alternate Minimum Recirc Flow is not required for these plant conditions.

D. Incorrect – LPI Pump Discharge is required when a single LPI train is not available. Although no LPI flow exists in this scenario, LPI flows are consistent with the current Plant conditions. As a result, cross connecting LPI discharge is not required.

Sys #	System	Category	KA Statement
006	Emergency Core Cooling	A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the **ECCS**; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	System leakage

K/A#	A2.03	**K/A Importance**	3.7	**Exam Level**	SRO

References provided to Candidate Steam Tables **Technical References:** DB-OP-02000 attachment 11 page 1

Question Source: Bank DB 2013 NRC Exam Q86 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.5 / 45.5

Objective: GOP-304

88. Initial Conditions:
    - 100% Power
    - Component Cooling Water (CCW) Train 1 is in service
    - Component Cooling Water (CCW) Train 2 is in standby
    - Loss of Offsite Power occurs
    - Reactor trips

    Based on the above plant conditions, complete the following statement.

    1. When EDG 2 breaker (AD101) closes into Bus D1, CCW Pump 2 is designed to start ____(1)____.

    Current Conditions:
    - CCW Pump 2 subsequently tripped on an overcurrent condition
    - CCW Pump 3 valves have been aligned to supply CCW Train 2
    - CCW Pump 3 is powered from EDG 1

    2. Based on the above Current conditions, the Unit Supervisor will declare CCW Train 2 ____(2)____.

A. (1) immediately
   (2) OPERABLE

B. (1) immediately
   (2) INOPERABLE

C. (1) after a 10 second time delay
   (2) OPERABLE

D. (1) after a 10 second time delay
   (2) INOPERABLE

Answer: D

Explanation/Justification: NUREG-1021, Section ES-401 Attachment 2, step II.B SRO and KA Match based on requires knowledge of TS Bases to determine requirements for Operability

A. Incorrect: 1st part is incorrect because the CCW pump in STBY is designed to start 10 seconds after its associated EDG output breaker closes. It is plausible because if it were CCW Pump 1, it would be correct. 2nd part is incorrect because the Bases for the CCW system (TSB 3.7.7) requires the CCW pump to be operable in order for the CCW Train to be operable. The LCO bases states that the spare CCW pump and heat exchanger can be substituted as long as it is aligned to the same Essential bus as the pump it is replacing. It is plausible because the TSB requires the CCW pump/train to fulfill its safety function which it is..

B. Incorrect: 1st part is incorrect but plausible (see A). 2nd part is correct. If the pump is not powered from the same Essential bus as the pump it is replacing it cannot be considered Operable.

C. Incorrect: 1st part is correct. The CCW pump in STBY is designed to start 10 seconds after the EDG output breaker closes. 2nd part is incorrect but plausible (see A).

D. CORRECT: 1st part is correct (see C). 2nd part is correct (see B).

Sys #	System	Category	KA Statement
008	Component Cooling Water	Generic	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits

K/A#	2.2.25	**K/A Importance**	4.2	**Exam Level**	SRO
References provided to Candidate	None			**Technical References:**	TSB 3.7.7, OS-21 SH3 CL-13
Question Source:	Bank 2018 NRC Exam Q79			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.5 / 41.7 / 43.2
Objective:	SYS304				

89. Initial conditions:
    - 100% power
    - SFAS Channel 1 RCS PRESSURE LO TRIP Bistable BA104 is Inoperable and tripped to comply with Technical Specification 3.3.5, SFAS Instrumentation Condition A

    The following occurs:
    - Power is lost to SFAS Channel 2
    - An inadvertent SFAS Actuation occurs

    With these plant conditions:

    (1) Which of the following is the required action per Technical Specification 3.3.5, SFAS Instrumentation Condition B?

    AND

    (2) Which of the following procedures will be implemented **FIRST** to control this event?

A. (1) Be in Mode 5 within 36 hours
   (2) DB-OP-06910, TRIP RECOVERY

B. (1) Be in Mode 5 within 36 hours
   (2) DB OP-02000, RPS, SFAS, SFRCS TRIP, OR SG TUBE RUPTURE

C. (1) Reduce RCS pressure to < 1800 psig within 36 hours
   (2) DB-OP-06910, TRIP RECOVERY

D. (1) Reduce RCS pressure to < 1800 psig within 36 hours
   (2) DB-OP-02000, RPS, SFAS, SFRCS TRIP, OR SG TUBE RUPTURE

Answer: C

Explanation/Justification: SRO based on knowledge of Technical Specification required actions greater than 1 hour. KA match based on impact on SFAS System Tech Spec and procedure required to control event

A. Incorrect – plausible since (1) All the bistables will be tripped in the de-energized channel and this is the requirement if all the bistables were tripped in both channels (2) is correct

B. Incorrect – (1) see answer A (2) would be correct if an inadvertent SFAS level actuation other than level 1 or 2 occurred

C. Correct – (1) Tech Spec 3.3.5 requires RCS pressure to be reduced below 1800 psig if a RCS Pressure LO trip only occurred (2) Inadvertent SFAS recovery is directed by the trip recovery procedure. Inadvertent SFAS level 1 and/or 2 only does not require implementation of DB-OP-02000

D. Incorrect – (1) is correct (2) see answer B

Sys #	System	Category	KA Statement
013	Engineered Safety Features Actuation System	A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the **ESFAS**; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Inadvertent ESFAS actuation

K/A#	A2.06	**K/A Importance**	4.0*	**Exam Level**	SRO

References provided to Candidate None

Technical References: TS 3.3.5 Condition B, DB-OP-06910 step 1.3

Question Source: New

Level Of Difficulty: (1-5)

Question Cognitive Level: High

10 CFR Part 55 Content: 41.5 / 43.5 / 45.3 / 45.13

Objective:

90. Initial conditions:
    - Mode 1
    - Steam Generators on Low Level Limits

    The following occurs:
    - Auxiliary Feedwater Train 2 has been determined to be steam bound
    - AF599, AUXILIARY FEEDWATER TO STEAM GENERATOR 2 LINE STOP is closed during the process of recovery from steam binding

    While AF599 is closed which of the following describes the OPERABILITY status of Auxiliary Feedwater Train 1 AND the Motor Driven Feedwater Pump?

    Auxiliary Feedwater Train 1 is __(1)__
    Motor Driven Feedwater Pump is __(2)__

A. (1) OPERABLE
   (2) OPERABLE

B. (1) OPERABLE
   (2) INOPERABLE

C. (1) INOPERABLE
   (2) OPERABLE

D. (1) INOPERABLE
   (2) INOPERABLE

Answer: C

Explanation/Justification: NUREG-1021, Section ES-401 Attachment 2, step II.B SRO based on requires knowledge of TS Bases to determine requirements for Operability. K/A match based on ability to determine Operability of Emergency Feedwater Trains

A. Incorrect –plausible since (1) AF599 is a Train 2 component and (2) is correct

B. Incorrect –plausible since (1) AF599 is a Train 2 component and (2) the MDFP is a single pump designated to both SGs and would be Inoperable above 40% Power

C. Correct – Per TS Bases 3.7.5, each AFW pump and the MDFP is required be capable of supplying both Steam Generators. SR 3.7.5.1 provides a note allowing MDFP valves out of position without affecting OPERABILITY providing power is ≤ 40% and valves are capable of being aligned as required locally. Stem states SGs on low level limits which occurs below 40% power

D. Incorrect – plausible since (1) is correct and (2) the MDFP is a single pump designated to both SGs and would be Inoperable above 40% Power

Sys #	**System**	**Category**			**KA Statement**
061	Auxiliary/Emergency Feedwater	Generic			Ability to determine operability and/or availability of safety related equipment
K/A#	2.2.37	**K/A Importance**	4.6	**Exam Level**	SRO
References provided to Candidate	None			**Technical References:**	Tech Spec Bases page B3.7.5-3 and 3.7.5-7
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.7 / 43.5 / 45.12
Objective:	GOP-437				

91. Initial conditions:
    - 100% power

    The following occurs:
    - RC2, Pressurizer Spray valve Green indicating light goes out
    - All Pressurizer heaters energize
    - DB-OP-02513 Pressurizer System Abnormal Operation has been implemented
    - RC10, Pressurizer Spray Block Valve will not close
    - RCS pressure is slowly lowering

    With these plant conditions which of the following describes the INITIAL response of MU32 Pressurizer Level Control valve position AND the actions required by DB-OP-02513 Pressurizer System Abnormal Operation?

    MU32 valve position will initially _(1)_ AND DB-OP-02513 will direct actions to._(2)_.

A. (1) fully open
   (2) trip the Reactor, GO TO DB-OP-02000 and stop RCPs to reduce spray flow per Table 5 Pressurizer Spray Flow vs Reactor Coolant Pump Combination

B. (1) fully open
   (2) reduce Reactor power to less than or equal to 72%. REFER TO DBOP-02504, Rapid Shutdown and stop Reactor Coolant Pump 2-2

C. (1) remain approximately the same
   (2) trip the Reactor, GO TO DB-OP-02000 and stop RCPs to reduce spray flow per Table 5 Pressurizer Spray Flow vs Reactor Coolant Pump Combination

D. (1) remain approximately the same
   (2) reduce Reactor power to less than or equal to 72%. REFER TO DBOP-02504, Rapid Shutdown and stop Reactor Coolant Pump 2-2

Answer: D

Explanation/Justification: SRO based on assessing plant conditions and selecting a procedure path to mitigate the event. KA match based on impact of Pressurizer spray inadvertent actuation on Pressurizer level control and procedure/action to control

A. Incorrect – plausible since (1) MU32, PZR Lvl Control would fully open on a reactor trip due to Pressurizer out surge and (2) tripping the reactor would be anticipating an automatic action of low pressure trip (in addition to the fact that the immediate actions failed) and table 5 of OP2000 depicts percent spray flow based on RCP combination

B. Incorrect – plausible since (1) see answer A and (2) is correct - see answer D

C. Incorrect – plausible since (1) is correct - see answer D and (2) see answer A

D. Correct – (1) RC2 failed open will have no impact on the operation of PZR LCS since it has no impact on MU32 setpoint, RCS temperature or the volume of water in the RCS. (2) DB-OP-02513 Step 4.2.1 RNO directs reducing power and stopping RCP 2-2

Sys #	System	Category	KA Statement
011	Pressurizer Level Control	A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the **PZR LCS**; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Inadvertent actuation of PZR spray

K/A# A2.06 **K/A Importance** 3.9 **Exam Level** SRO

References provided to Candidate None **Technical References:** DB-OP-02513 Step 4.2.1 RNO

Question Source: Bank Oconee 2010 Q91 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.5 / 43.5 / 45.3 / 45.13

Objective: GOP-113

92. The plant is operating at 100% power when the following annunciators are received:

- (5-1-E) CRD SYSTEM FAULT
- (5-2-E) CRD ASYMMETRIC ROD

The following plant conditions are noted:

- Reactor Power is stable at 100% power.
- All Control Rod Group 6 100% lights are lit.
- Absolute Position indication for Rods 6-1 & 6-5 read 0%.
- Relative Position indication for all Group 6 Rods read 100%.

Based on these conditions, what actions are required?

A. Contact I & C to investigate the rod position malfunction for Rods 6-1 and 6-5. Reactor Power may remain at 100% power.

B. Contact I & C to investigate the misaligned Rods 6-1 and 6-5. Reduce Reactor Power to 60%.

C. Contact I & C to investigate the dropped Rods 6-1 and 6-5. Reduce Reactor Power to 50%.

D. Manually trip the reactor due to multiple dropped rods.

Answer: A

Explanation/Justification: SRO only ES401 Att. 2 item E Page 7 second bullet – diagnostic step and decision point . KA match - Diagnose indication malfunction and make operational judgement based on plant performance

A. Correct – Indications are plant stable RODs 6-1 and 6-5 remain out. API indication problem does not require downpower.

B. Incorrect – Plausible for a misaligned control rods with 4 RCPs in service per TS 3.1.4.

C. Incorrect – Plausible because DB-OP-02516, CRD Malfunctions, power is reduced to 50% for a dropped Rod.

D. Incorrect – Plausible for multiple dropped rods.

Sys #	System	Category	KA Statement
014	Rod Position Indication	Generic	Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation

K/A# 2.1.07 **K/A Importance** 4.7 **Exam Level** SRO

References provided to Candidate None **Technical References:** DB-OP-02516 Section 2.4 and Section 4.3 steps 4.3.1, 4.3.3 and 4.3.5

Question Source: Bank DB 2011 NRC Exam Q92 **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.5 / 43.5 / 45.12 / 45.13

Objective: GOP-116

93. Initial conditions:
    - 50% Power

    The following occurs:

    - (14-2-D) ICS/NNI 118VAC PWR TRBL
    - (14-4-E) ICS INPUT MISMATCH
    - (14-4-F) ICS INPUT TRANSFER
    - NNI-X AC and NNI-X DC blue lights on the back panel are out
    - DB-OP-02532 Loss of NNI/ICS power is implemented

    Current conditions:
    - A minor plant transient is in progress
    - Turbine Throttle pressure indicates 900 psig

    Per DB-OP-02532 Loss of NNI/ICS, with these plant conditions:

    (1) Which of the following identifies the procedure section(s) the Command SRO will select to perform?

    AND

    (2) Which action(s) will the Reactor Operator be directed to take to stabilize the Plant?

A. (1) Section 4.2 Loss of NNI-X DC Power ONLY
   (2) Transfer the Rod Control Diamond station to MANUAL

B. (1) Section 4.2 Loss of NNI-X DC Power ONLY
   (2) Transfer the Main Turbine to MANUAL

C. (1) Sections 4.1 Loss of NNI-X AC Power and 4.2 Loss of NNI-X DC power concurrently
   (2) Transfer the Rod Control Diamond station to MANUAL

D. (1) Sections 4.1 Loss of NNI-X AC Power and 4.2 Loss of NNI-X DC power concurrently
   (2) Transfer the Main Turbine to MANUAL

Answer: B

Explanation/Justification: SRO only ES-401 Section E, knowledge of emergency procedure routing decision point. KA match based on loss of power to NNI causing header pressure midscale failure requiring turbine manual control

A. Incorrect – plausible since (1) is correct and (2)) is the first action required for DB-OP-02526 Primary to Secondary Heat Transfer Upset

B. Correct – (1) DB-OP-02532 Loss of NNI/ICS section 4.1 (loss NNI-X AC) will direct GO TO section 4.2 (loss NNI-X DC) if AC and DC are both lost (2) Section 4.2 step 4.2.1.a directs placing the Main Turbine in Manual if transient in progress due to midscale failure of Turbine Throttle Pressure to 900 psig

C. Incorrect – plausible since (1) both sections initially apply (2) see answer A

D. Incorrect – plausible since (1) both sections initially apply and (2) is correct

Sys #	System	Category	KA Statement
016	Nonnuclear Instrumentation	A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the **NNIS**; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Loss of power supply

K/A# A2.02 **K/A Importance** 3.2* **Exam Level** SRO

References provided to Candidate None **Technical References:** DB-OP-02532 step 4.1.1 and 4.2.1

Question Source: New **Level Of Difficulty: (1-5)**

Question Cognitive Level: Low **10 CFR Part 55 Content:** 41.5 / 43.5 / 45.3 / 45.5

Objective: GOP-132

94. The plant is at 100% power at minimum staffing levels.

At 0200, the following events occur.

- The At the Controls Reactor Operator (ATC RO) falls in the Control Room and is unconscious.
- The First Aid Team requests an ambulance to transport the ATC RO to the hospital.

In accordance with NOP-OP-1002, Conduct of Operations, which of the following actions is required in response to this event?

A. Unit Supervisor must accompany ATC RO to the hospital in the ambulance.

B. Maintain the plant in a stable condition until the next shift of operators arrives for day shift.

C. Immediately callout a Reactor Operator to return to a minimum functional shift complement.

D. Have the Safe Shutdown Equipment Operator assume the RO position to comply with the Technical Requirements Manual.

Answer: C

Explanation/Justification: SRO only ES401 Att. 2, Section 2 item A third bullet. The SRO is required to know the content of the administrative procedures related to shift staffing and the Technical Specification requirements. The actions to restore shift staffing are a SRO responsibility.

A. Incorrect – Loss of an SRO would make shift manning level worse. Plausible because supervisor is notified; however, RA-EP-02000 R5 Medical Emergencies step 6.2.9 states that when on-duty manning is minimal, a Management Representative shall be called to meet the patient at the treatment facility.

B. Incorrect – Plausible because NOP-OP-1002 step 4.1.13.3 does direct maintaining stable conditions, but allowing 3-4 hours to elapse is not consistent with taking action immediately.

C. Correct – per NOP-OP-1002, Conduction of Operations Step 4.1.13.3.

D. Incorrect – Even if the SSEO was licensed, minimum manning is not met per NOP-OP-1002 R9 Conduct of Operations Attachment 4. Plausible because the TRM does not require any non-licensed operators (see TRM 10.2.1) and per NOP-OP-1002, Conduct of Operations step 4.1.13.3 if the Shift Manager becomes incapacitated, the senior on shift licensed operator assumes the Shift Manager position; however, no such provision exists for other positions.

Sys #	System	Category	KA Statement
N/A	N/A	Generic	Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.

K/A#	2.1.5	**K/A Importance**	3.9	**Exam Level**	SRO
References provided to Candidate	None			**Technical References:**	NOP-OP-1002 Step 4.1.13.3
Question Source:	Bank DB 2015 NRC Exam Q94			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.10 / 43.5 / 45.12
Objective:	GOP-501				

95. Current conditions:
    - Mode 6
    - Fuel Handling in progress
    - A spent fuel assembly is raised in the mast of the Main Fuel Handling Bridge in transport to the Refueling Canal Rack for inspection prior to transfer to the SFP Pool

    The following occurs:
    - It is determined there is an error in the Fuel Movement sheets that will take several hours to resolve
    - Fuel Movement in Containment is Suspended
    - The Fuel Handling Team requests permission to exit CTMT while the issue is being resolved

    With these plant conditions, per DB-OP-00030, Fuel Handling Operations, which of the following meets the minimum requirement for placing the fuel in the mast in a Safe Condition before leaving Containment?

A. Complete the movement to place the fuel into the Refueling Canal Rack

B. Lower the Fuel into a transfer mechanism basket AND lower the basket

C. Lower the Fuel into a transfer mechanism basket AND disengage the grapple

D. Lower the Fuel into the deep end of the Refueling Canal 4 feet below the normal transfer mechanism ZZ tape reading

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Answer: B

Explanation/Justification: SRO ES-401Att 2 item F Page 9 third bullet –The Fuel Handling team is contracted requiring the SRO to be responsible for adherence to the requirements of the fuel movement procedure

A. Incorrect – Plausible since this is the intended destination

B. Correct – placing the fuel in the transfer mechanism basket and lowering the basket is a Safe Condition as directed in attachment 1 step 3.1.3 and not prohibited by

C. Incorrect – plausible since this does meet the requirement to not leaving the fuel unattended in the mast

D. Incorrect – plausible since this is directed for lowering refueling canal level but the direction for suspending is to not leave fuel in the mast unattended

Sys #	System	Category			KA Statement
N/A	N/A	Generic			Knowledge of new and spent fuel movement procedures
K/A#	2.1.42	**K/A Importance**	3.4	**Exam Level**	SRO
References provided to Candidate	None			**Technical References:**	DB-OP-00030 R14, Fuel Handling Operations Step 6.3.3
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.10 / 43.7 / 45.13
Objective:	OPS-FHT				

96. An overhead Annunciator Alarm in the Control Room is not operating properly.

To avoid nuisance alarms, the Operations Manager has determined that the Annunciator will be disabled by removing the affected Annunciator Point Card.

Which of the following documents must be completed to remove this point card to disable the affected annunciator alarm?

1. Annunciator System Operating Procedure
2. Work Order for point card removal
3. 50.59 Regulatory Applicability Determination (RAD) and/or Screen
4. Engineering Change Package
5. Temporary Modification Tags
6. Clearance and Red Danger Tags

A. 1 and 3

B. 2, 4, and 5

C. 1 and 6

D. 2, 3 and 6

Answer: A

Explanation/Justification: Meets the requirements of the SRO only ES401 Att. 2, Section II .C page 6 third bullet. The SRO is required to know the administrative requirements for disabling annunciators. Additionally the SRO must be knowledgeable of the requirements for implementing other types of work as well to correctly identify the required documents to disable the alarm.

A. Correct – Disabling an Annunciator Window is directed using DB-OP-06411, Station Annunciator Procedure Section 4.5 which also requires a 50.59 RAD and/or Screen.

B. Incorrect – Disabling an Annunciator Window is directed using DB-OP-06411, Station Annunciator Procedure Section 4.5 which requires a 50.59 RAD and/or Screen. Plausible for another craft such as I&C or IS to perform card removal under a Work Order, pulled circuit cards may be considered Temporary Modifications per NOP-CC-2003 R19 Engineering Changes step 2.1.3, TM Tags described in NOP-CC-2003 Attachment 7.

C. Incorrect – Disabling an Annunciator Window is directed using DB-OP-06411, Station Annunciator Procedure Section 4.5 which requires a 50.59 RAD and/or Screen. A Clearance is not necessary or directed to perform this activity. Plausible to use OPS Only Clearance for equipment control per NOP-OP-1001 R21 Clearance and Tagging Program Section 4.10.

D. Incorrect – Disabling an Annunciator Window is directed using DB-OP-06411, Station Annunciator Procedure Section 4.5 which requires a 50.59 RAD and/or Screen. A Clearance is not necessary or directed to perform this activity. Plausible for another craft such as I&C or IS to perform card removal under a Work Order and Clearance Danger tags

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Sys #	**System**	**Category**	**KA Statement**
N/A	N/A	Generic	Knowledge of the process for controlling temporary design changes

K/A#	2.2.11	**K/A Importance**	3.3	**Exam Level**	SRO
References provided to Candidate	None			**Technical References:**	DB-OP-06411 Section 4.5
Question Source:	Bank DB 2015 NRC Exam Q96			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.10 / 43.3 / 45.13
Objective:	GOP-504				

97. The Plant is in Mode 5.

Based on planned maintenance, the Key Shutdown Defense in Depth for Electrical Power Availability meets the minimum number of points to be rated Yellow.

The following event occurs:

- A Severe Thunderstorm Watch for is issued for Ottawa and Lucas Counties by the National Weather Service.

Which of the following describes the impact on the Shutdown Defense In Depth indicator for the change in weather status and the maintenance controls that must be invoked?

Key Shutdown Defense in Depth for Electrical Power Availability _____.

REFERENCE PROVIDED

A. remains Yellow. This indicator is not affected by this weather forecast. Continue to comply with Yellow Risk Requirements of NOP-OP-1007, Risk Management.

B. remains Yellow but would require transition to Orange if a Severe Thunderstorm Warning is issued for Lucas County. Continue to comply with Yellow Risk Requirements of NOP-OP-1007, Risk Management.

C. would transition to Orange Risk. Comply with the Orange Risk Requirements of NOP-OP-1007, Risk Management.

D. would transition to Orange Risk, but require transition to Red if a Severe Thunderstorm Warning is issued for Lucas County. Comply with the Orange Risk Requirements of NOP-OP-1007, Risk Management.

Answer: A

Explanation/Justification: Meets the requirements of the SRO ES-401 Section II .E. SRO is required to have knowledge of the content of the administrative procedures and actions taken based upon conditions of the plant. Requires detailed knowledge of the procedure and evaluation of the impact on the risk level based upon changes in the weather conditions.

A. Correct – per NOP-OP-1005 Checklist, issuing a Severe Warning requires a reduction of one point which would cause the indicator to go to Orange. A Watch is a prelude to a Warning but does not remove credit for no severe weather

B. Incorrect – plausible since this would be correct if the watch/warning was for Ottawa county and Lucas County is the neighboring county containing a large metropolitan area (Toledo)

C. Incorrect – plausible since Watches are issued and could be construed as a warning then this would be correct

D. Incorrect – plausible if it is determined going from Watch being Orange to Warning being Red this would be the natural progression

Sys #	System	Category	KA Statement
N/A	N/A	Generic	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.

K/A# 2.2.18 **K/A Importance** 3.9 **Exam Level** SRO

References provided to Candidate NG-DB-00117 and Form NOP-OP-1005-02 **Technical References:** NOP-OP-1005 Checklist and NOP-OP-1005 step 4.3, NG-DB-00117 Att 2 pg 35

Question Source: Bank DB 2015 NRC Exam Q97 modified **Level Of Difficulty: (1-5)**

Question Cognitive Level: High **10 CFR Part 55 Content:** 41.10 / 43.5 / 45.13

Objective: GOP-531

98. The Miscellaneous Waste Monitor Tank (MWMT) has been prepared for batch discharge.

The following radiation monitors and flow elements are out of service and INOPERABLE.

- Miscellaneous RE 1878A
- Miscellaneous RE 1878B
- Clean RE 1770B
- FE 4687 Storm Sewer Flow

All other instrumentation is OPERABLE.

Based on these conditions, what Offsite Dose Calculation Manual (ODCM) actions will be **required** in order to discharge this tank?

REFERENCE PROVIDED

A. The system/process flow rate is estimated at least once per 4 hours during the actual release.

B. At least two independent samples of the tank's content are analyzed and at least two independent verifications of the release rate calculations and discharge valve lineups are performed AND the system/process flow rate is estimated at least once per 4 hours during the actual release.

C. Grab samples are collected, at least once per 12 hours, and analyzed, at least once per 12 hours, for gross radioactivity (beta or gamma) at a lower limit of detection no greater than 1.0^{-07} μCi/ml or a gamma isotopic analysis meeting the LLD Requirement of Table 2-3.

D. At least two independent samples of the tank's content are analyzed and at least two independent verifications of the release rate calculations and discharge valve lineups are performed.

Answer: D

Explanation/Justification: SRO only ES-401 ATT 2 item A Page 3 – ODCM is listed in TS Section 5.5 and Page 3 item B 4th bullet. SRO ONLY since it requires the SRO to have knowledge of the SRO responsibilities for approving liquid waste releases. K/A match based on determining when a radiation release can be authorized

A. Incorrect. Plausible if the candidate believes the tank being discharged will pass thru the storm sewer FE and that having Clean RE 1770A operable meets the one RM channel operable requirement.

B. Incorrect. Storm sewer FE is not required for this discharge flowpath. Independent actions are correct.

C. Incorrect. These are the correct compensatory actions for the liquid waste flow indicator being out of service

D. Correct. IAW ODCM Table 2-1 pages 19 and 20.

Sys #	System	Category		KA Statement
N/A	N/A	Generic		Ability to control radiation releases
K/A#	2.3.11	**K/A Importance**	4.3	**Exam Level** SRO
References provided to Candidate		ODCM Table 2-1 and 2-2 pages 19 thru 22		**Technical References:** ODCM Table 2-1 pages 19 and 20
Question Source:		Bank DB 2016 NRC Exam Q99		**Level Of Difficulty: (1-5)**
Question Cognitive Level:		High		**10 CFR Part 55 Content:** 41.11 / 43.4 / 45.10
Objective:	GOP-521			

99. Initial conditions:
    - DH Pump 1 is in service
    - Mode 6 has been declared
    - Head detensioning is in progress

    The following occurs:
    - DHR Pump 1 trips
    - DB-OP-02527, Loss of Decay Heat Removal is implemented
    - DHR pumps 1 and 2 will not start

    With these current plant conditions which DB-OP-02527 mitigation strategy will be selected?

A. Attachment 3: Establish Steam Generator Heat Transfer

B. Attachment 4: Using the SFP Cooling System to Cool the Core

C. Attachment 5: Establish Feed and Bleed Cooling

D. Attachment 11: Alternate Methods of Injection

Answer: C

Explanation/Justification: ES-401 Att 2 Section II E SRO only based on assessment of facility conditions and selection of appropriate procedure. KA match knowledge of implication of plant condition on selection of loss of DH mitigation strategy

A. Incorrect – plausible since SGs are a method of removing heat but the head is de-tensioned and the RCS is open to atmosphere. CTMT is evacuated and CTMT closure is established when DHR pumps cannot be started per step 4.1.7 RNO

B. Incorrect – plausible since this is a method to cool the core if the refueling canal is filled with SF1 or 2 open. The canal is not filled until the head is removed.

C. Correct – DB-OP-02527 step 4.1.7 RNO for DHR pumps unavailable will direct performing attachment 5 with these conditions

D. Incorrect – plausible since this attachment will list various methods of injection but is an RNO for the Attachment 5 selected sources

Sys #	System	Category	KA Statement
N/A	N/A	Generic	Knowledge of low power/shutdown implications in accident (e.g. loss of coolant accident or loss of residual heat removal) mitigation strategies

K/A#	2.4.9	**K/A Importance**	4.2	**Exam Level**	SRO
References provided to Candidate	None			**Technical References:**	DB-2527 step 4.1.7
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	High			**10 CFR Part 55 Content:**	41.10 / 43.5 / 45.13
Objective:	GOP-127				

100. Current conditions:
- DB-OP-02000, RPS, SFAS, SFRCS TRIP, OR SG TUBE RUPTURE has been implemented
- The Shift Manager has declared an Alert
- The Emergency Assistant Shift Manager has arrived in the Control Room and assumed the Emergency Director responsibilities from the Shift Manager

With these current conditions per NOP-OP-1002, Conduct of Operations, when plant conditions permit, whose responsibility is it to announce the resumption of normal alarm response mode?

A. Emergency Director

B. Shift Manager

C. Shift Technical Advisor

D. Command SRO

Answer: D

Explanation/Justification: SRO and KA match based on knowledge of SRO responsibilities during EOP usage

A. Incorrect – plausible since the Emergency Director has overall site responsibility and also some are non delegable

B. Incorrect – plausible since the shift manager has overall license responsibility for the plant

C. Incorrect – plausible since the STA is SRO licensed at DB and is responsible for assessment of plant conditions and providing recommendations

D. Correct – per DB-OP-1002 step 4.10.4.3 "When plant conditions permit, the Command SRO shall announce the resumption of normal alarm response mode."

Sys #	**System**	**Category**			**KA Statement**
N/A	N/A	Generic			Knowledge of Crew roles and responsibilities during EOP usage
K/A#	2.4.13	**K/A Importance**	4.6	**Exam Level**	SRO
References provided to Candidate	None			**Technical References:**	NOP-OP-1002 step 4.10.4.3
Question Source:	New			**Level Of Difficulty: (1-5)**	
Question Cognitive Level:	Low			**10 CFR Part 55 Content:**	41.7 / 43.5 / 45.12
Objective:	GOP-510				