QUESTION NUMBER: 1 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.5 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 000007.EK2.03

Knowledge of the interrelations between a reactor trip and the following: Reactor trip status panel

OBJECTIVE: SYS.ES2.OB08

List and explain the Solid State Protection System design features and interlocks which provide for the following:

5. First Out indication/annunciators

DEVELOPMENT REFERENCES: ALM-0064A
LN OP51.SYS.ES2

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.ES2.OB08-016

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since a General Warning is generated for a loss of either 48 VDC power supply. If this were the only General Warning the unit would remain at power, but performing testing on the other train generates a General Warning for both trains and the unit trips.

b. Plausible since a Reactor Trip is generated, but a First Out annunciator occurs due to the unit being above P-9 (50%) power for RX > 50% PWR TURB TRIP.

c. Plausible since a General Warning is generated while performing testing on SSPS. If this were the only General Warning the unit would remain at power, but a loss of either 48 VDC power supply on the other train generates a General Warning for both trains and the unit trips.

√ **d.** Testing on one train of SSPS generates a General Warning. A loss of any of the four DC power supplies in the other train of SSPS also generates a General Warning. General Warnings in both trains of SSPS causes the Reactor Trip Breakers to open, which then causes the turbine to trip. Since the power level is above 50%, the turbine trip then causes a reactor trip signal to be generated which causes the First Out annunciator. The First Out annunciator would NOT alarm if power were below 50%.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Must first determine that General Warnings occur on both trains of SSPS which causes the trip breakers to open. Must then analyze the reactor trip signals and the plant conditions to determine whether or not a first annunciator will occur.

QUESTION NUMBER: 2 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.4 **SRO**

10CFR55 CONTENT: **41(b)** 5 # **43(b)**

KA: 000008.AA2.12 # NO 55.41(b) tie identified in NUREG-1122

Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: PZR level indicators

OBJECTIVE: EO0.XG2.OB16

Given that a Reactor Trip and Safety Injection has occurred in MODE 1, predict and analyze plant parameters/equipment response associated with the Trip/SI in accordance with EOP-0.0A/B. Parameters addressed should include:

- Pressurizer level

DEVELOPMENT REFERENCES: EOS-1.2A/B
FSAR 15.6.1.1
LN LO21.MCO.TAA

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EO0.XG2.OB09-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since for all LOCAs except the pressurizer vapor space break pressurizer level indication decreases.

√ **b.** The break will cause pressure to lower in the steam space of the pressurizer. As the RCS pressure lowers, saturation conditions will be reached which will cause voids to form and a two-phase mixture to flow into the pressurizer, resulting in an increase in pressurizer level indication.

c. Plausible since pressure will decrease, but pressurizer level will increase.

d. Plausible since level will increase, but pressure will also decrease.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Must analyze the effect of the location of the break on the indications normally used to determine RCS inventory and pressure

QUESTION NUMBER: 3 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.1 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 000009.2.4.06

Knowledge of symptom based EOP mitigation strategies (Small Break LOCA).

OBJECTIVE: EO1.XG3.OB406

Given plant/system conditions indicating a Loss of Reactor Coolant (LOCA) event has occurred, recognize, determine, and evaluate parameters, and discuss operator actions to respond to the event

DEVELOPMENT REFERENCES: EOS-1.2

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EO1.XG3.OB403-003

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since it is desirable to stop a train specific SIP, but it is to ensure that ECCS injection flow is maintained, not recirculation flow.

b. Plausible since it is desirable to stop the SIP in the opposite train, but it is to ensure that ECCS injection flow is maintained, not recirculation flow.

c. Plausible since it is desirable to ensure that there will be some RCS injection flow maintained, but it is due to any cause, not just a loss of the single train supplying the previously stopped CCP.

√ **d.** Balancing the load between ECCS trains increases the probability that there will still be some RCS injection flow if loss of one train of ECCS occurs for any reason.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of required action and bases for action when responding to a small break LOCA

QUESTION NUMBER: 4 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 2.6* **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 000011.EK2.02

Knowledge of the interrelations between the Large Break LOCA and the following: Pumps

OBJECTIVE: FRZ.XH5.OB401

Given a major action step of FRZ-0.1A(B), state the basis for the step.

DEVELOPMENT REFERENCES: FRZ-0.1
LN OPD1.FRZ.XH5

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.CC1.OB02-023

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since this is the bases for tripping the RCPs under small break LOCA conditions, but with a large break LOCA, such as this, RCP operation has no effect on RCS inventory.

b. Plausible since this is the bases for tripping the RCPs in the event of a loss of secondary heat sink and CETs are increasing, but RCPs are tripped due to a loss of CCW to the motors and bearing coolers.

√ **c.** With containment pressure above the Hi-3 setpoint, Phase B actuation would have occurred resulting in a loss of CCW flow to the RCP motor and bearing coolers. The RCPs are required to be tripped under these conditions.

d. Plausible since ABN-101 requires tripping the RCPs within one minute in the event of a loss of both seal injection and CCW cooling to the thermal barriers, but seal injection is maintained during a safety injection.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Must analyze the plant conditions to determine the cause of the event and then determine the proper reason for tripping the RCPs based on those conditions.

QUESTION NUMBER: 5 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.4 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 000022.AA1.08

Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Pump Makeup: VCT level

OBJECTIVE: SYS.CS1.OB02

State the performance and design attributes of the following CVCS components, flowpaths, and features:

2. Volume Control Tank

- LCV-112A
- LT-112
- LT-185
- Charging pump suctions

DEVELOPMENT REFERENCES: ALM-0061A
LN OP51.SYS.CS1.

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.CS1.OB02-058

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since LT-112 failing high with LCV-112A in AUTO results in all letdown flow being diverted to RHUT. VCT level drops and at 46% level an auto makeup should occur, but with LT-112 failed high no auto makeup occurs.

b. Plausible since this would occur if the normal letdown configuration were aligned and if the failure were LT-185 instead of LT-112, but level will continue to decrease until the pump loses suction.

c. Plausible since this is what occurs when LT-112 fails high, with the exception of not shifting to the RWST suction since it requires both channels to shift.

√ **d.** With LT-112 failing high, letdown diverts to the RHUT, no auto makeup occurs, and level continues to decrease until suction to the PDP is lost since it requires both channels below 2% to shift the suction.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Must analyze the response of the VCT level control system to a failed channel and compare the resulting actions to the given letdown flow conditions

QUESTION NUMBER: 6 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.9 **SRO**

10CFR55 CONTENT: **41(b)** 8 **43(b)**

KA: 000025.AK1.01

Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation

OBJECTIVE: IPO.XO0.OB06

Summarize the major action steps for each of the major sections of IPO-010 considering the following:
3. Establishing adequate vent path lineups

DEVELOPMENT REFERENCES: IPO-010
LN OPD1.IPO.XO0

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.RH1.OB18-024

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** When a cold leg opening exists without an adequate hot leg vent path, subsequent pressurization of the reactor vessel following a loss of RHR could force water from the core and out the cold leg opening. Once water level is below the fuel, the risk of sustaining core damage is substantially increased.

b. Plausible since the vessel would pressurize without a hot leg vent path, but stresses on the vessel flange due to the pressure are minimal compared to full pressure conditions.

c. Plausible since a loss of RHR will cause a heatup, but steam and not water will be expelled out the hot leg vent path, thereby cooling the core.

d. Plausible since a major concern when in reduced inventory operations is time to reach saturation conditions, but providing a hot leg vent path will maintain a lower pressure in the RCS and therefore result in a lower saturation temperature and shorter time to core boiling.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the reason for establishing a hot leg vent path whenever a cold leg opening exists in the RCS

QUESTION NUMBER: 7 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.4 **SRO**

10CFR55 CONTENT: **41(b)** 10# **43(b)**

KA: 000026.2.2.22 # NO 55.41(b) tie identified in NUREG-1122

Knowledge of limiting conditions for operations and safety limits (Loss of Component Cooling Water).

NOTE: THIS IS REQUIRED KNOWLEDGE OF CPSES REACTOR OPERATORS.

OBJECTIVE: SYS.CC1.OB16

Given the approved documents, describe the Technical Specifications associated with the Component Cooling Water System.

DEVELOPMENT REFERENCES: Tech Spec 3.7.7
Tech Spec Table 1.1-1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.CC1.OB27- 003

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since refueling outages are typically considered to be conducted after the RCS temperature is reduced below 140°F, but both CCW trains are only required to be operable in Modes 1-4.

√ **b.** Both trains of CCW are required to be operable prior to entry into Mode 4. The RCS temperature defining Mode 4 operations is 200°F, so this is the highest temperature that can be achieved.

c. Plausible since a temperature of 320°F appears throughout Tech Specs, primarily associated with LTOP, but both trains of CCW are required to be operable in Modes 1-4.

d. Plausible since a temperature of 345°F would prevent entering Mode 3 from Mode 4 (occurs at 350°F), but both trains of CCW are required to be operable in Modes 1-4.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the Tech Spec Mode requirements for CCW and the RCS temperatures associated with each Mode

QUESTION NUMBER: 8 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.7 **SRO**

10CFR55 CONTENT: **41(b)** 7# **43(b)**

KA: 000027.AA2.15 # NO 55.41(b) tie identified in NUREG-1122

Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Actions to be taken if PZR pressure instrument fails high

OBJECTIVE: SYS.PP1.OB14

Analyze the indications and describe the mitigation strategy for the following procedures as they effect the Pressurizer Pressure and Level Control systems:

1. ABN-705, Pressurizer Pressure Malfunction

DEVELOPMENT REFERENCES: ABN-105
LN OP51.SYS.PP1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the normal channel providing control for PORV 455A is PT-455 and PORV 455A would not have opened normally, but with PS-455F in the 457/456 position the PORV will open and must be closed.

√ **b.** With PS-455F in the 457/456 position, PT-457 supplies the 'controlling' input to PK-455A. With PT-457 failed high, PORV 455A will be open and won't automatically close until PT-458 decreases below 2185 psig. The operator is required to close the PORV and the block valve. Heaters and sprays are already being controlled by the controller in manual.

c. Plausible since PT-457 provides the low pressure interlock signal to PORV 456 and with PT-457 failed high there is no interlock available to cause the PORV to close, but 456 will not get an open signal under these conditions.

d. Plausible since PORV 455A will have to be closed and isolated and PT-457 provides the low pressure interlock signal to PORV 456 and with PT-457 failed high there is no interlock available to cause the PORV to close, but 456 will not get an open signal under these conditions.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analyze the combined effect of an abnormal control switch alignment along with a failed channel to determine the proper operator response

QUESTION NUMBER: 9 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.9 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 000038.EK1.03

Knowledge of the operational implications of the following concepts as they apply to the SGTR: Natural circulation

OBJECTIVE: EO3.XG5.OB15

Given that a ruptured Steam Generator has been isolated in accordance with the appropriate procedure, discuss the various options available for cooling, depressurizing and providing inventory control of the ruptured Steam Generator once it has been isolated.

DEVELOPMENT REFERENCES: EOP-3.0

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the just completed cooldown prior to the depressurization would enhance natural circulation, but core ΔT should not be effected and any voiding that does occur would tend to hinder natural circulation.

√ **b.** The upper head region may void during RCS depressurization if the RCPs are not running. This will result in a rapidly increasing pressurizer level.

c. Plausible since a rapid drop in any stagnant loop cold leg may occur, but this is as a result of safety injection flow into the loop and not due to any depressurization.

d. Plausible since the PRT may rupture, although not likely. Even if the PRT were to rupture containment conditions would only change slightly and a rapid rise in pressure would not occur.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of EOP caution associated with depressurizing the RCS during a SGTR under natural circulation conditions

QUESTION NUMBER: 10 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 2.6* **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 000040.AK2.01

Knowledge of the interrelations between the Steam Line Rupture and the following: Valves

OBJECTIVE: EO2.XG4.OB401

Given specific plant and monitoring equipment conditions, determine a faulted Steam Generator conditions and describe the actions associated with isolating the faulted Steam Generator in accordance with EOP-2.0A/B.

DEVELOPMENT REFERENCES: EOP-2.0
OWI-206

REFERENCES SUPPLIED TO APPLICANT:

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since only 1 SG is faulted and if it were a ruptured SG instead of a faulted SG only the 1 MSIV would be closed, but all 4 MSIVs are required to be closed and the MSIVs are locally closed by rotating the operating nut in the clockwise direction.

b. Plausible since all MSIVs are required to be closed, but the MSIVs are locally closed by rotating the operating nut in the clockwise direction.

c. Plausible since the MSIVs are locally closed by rotating the operating nut in the clockwise direction, but all 4 MSIVs are required to be closed.

√ **d.** Any SG low pressure results in a closure signal to all 4 MSIVs and the local action taken is to remove a pipe cap and rotate the operating nut in a clockwise direction.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the means required to locally close the MSIVs

QUESTION NUMBER: 11 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.3 **SRO**

10CFR55 CONTENT: **41(b)** 5 / 10 **43(b)**

KA: WE12.EK3.02

Knowledge of the reasons for the following responses as they apply to the (Uncontrolled Depressurization of all Steam Generators) Normal, abnormal and emergency operating procedures associated with (Uncontrolled Depressurization of all Steam Generators).

OBJECTIVE: SK1.XG1.OB104

Given a Note or Caution from ECA-2.1, state the reason for the Note or Caution.

DEVELOPMENT REFERENCES: ECA-2.1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SK1.XG1.OB103-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** Maintaining a minimum verifiable AFW flow to the SG allows the components to remain in a 'wet' condition, thereby minimizing any thermal shock effects if feed flow is increased.

b. Plausible since RCS subcooling margin increases as RCS temperature decreases and maintaining AFW flow to a dry SG will cause RCS temperature to continue to decrease, but maintaining a minimum verifiable AFW flow to the SG prevents dryout.

c. Plausible since AFW flow does affect RCS cooldown, but the rate of cooldown is more controlled by the size of the steam break and maintaining a minimum verifiable AFW flow to the SG prevents dryout.

d. Plausible since maintaining AFW flow will cause the SG pressure to stabilize above atmospheric conditions, but maintaining a minimum verifiable AFW flow to the SG prevents dryout.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the reason for maintaining a minimum AFW flow requirement per the EOPS

QUESTION NUMBER: 12 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 4.4 **SRO**

10CFR55 CONTENT: **41(b)** 5 / 10 **43(b)**

KA: 000054.AK3.04

Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): Actions contained in EOPs for loss of MFW

OBJECTIVE: SM2.XH6.OB104

Given a procedural step, sequence of steps, note, or caution, discuss the reasons or bases for the step, sequence, note, or caution.

DEVELOPMENT REFERENCES: FRH-0.1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: MCO.MI4.OB105-005

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** RCP operation results in heat addition to the RCS. By tripping RCPs, the effectiveness of the remaining water inventory in the SGs is extended, which extends the time at which the operator action to initiate bleed and feed is required.

b. Plausible since tripping the RCPs minimizes the heat input to the RCS, but this action is performed to conserve SG inventory, not prevent damage to the RCP seal package which is done in the event of a loss of all cooling to the RCP seals.

c. Plausible since tripping the RCPs for some events (small break LOCA) is desirable to minimize RCS inventory loss and the reason pumps are tripped is to conserve SG inventory, but this action is performed to minimize heat input into the RCS, not minimize RCS inventory loss.

d. Plausible since tripping the RCPs for some events (small break LOCA) is desirable to minimize RCS inventory loss but this action is performed to minimize heat input into the RCS, not minimize RCS inventory loss.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the reason for tripping RCPs during a loss of heat sink per the EOPS

QUESTION NUMBER: 13 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.5 **SRO**

10CFR55 CONTENT: **41(b)** 5 / 10 **43(b)**

KA: 000056.AK3.01

Knowledge of the reasons for the following responses as they apply to the Loss of Offsite Power: Order and time to initiation of power for the load sequencer

OBJECTIVE: SYS.AC2.OB13

Explain the operation of the undervoltage protection scheme for the Safeguards 6.9 KV and 480V buses.

DEVELOPMENT REFERENCES: ABN-601
ALM-0102A
LN OP51.SYS.AC2
LN OP51.SYS.ES3

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the alternate power supply will close within 1.0 seconds, but the alternate supply is XST1 and the EDG will not start.

b. Plausible since the EDG will not start under these conditions, but the normal and alternate power supplies are XST2 and XST1, respectively.

c. Plausible since the normal and alternate power supplies are XST2 and XST1, respectively. However, the EDG does not start as long as voltage is sensed within 1.0 seconds as supplied by the alternate power supply.

√ **d.** The normal power supply to the 6.9 KV safeguards buses on Unit 1 is XST2. The alternate power supply is XST1. The alternate breakers close within 1.0 seconds in the event of a loss of the normal power supply and prevent the EDGs from starting for this period of time to minimize unnecessary EDG starts.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the response of the safeguards buses to a loss of normal power supply and the reason for the response of the EDGs

QUESTION NUMBER: 14 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.6* **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 000057.AA1.03

Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Feedwater pump speed to control pressure and level in S/G

OBJECTIVE: SYS.SN1.OB12

Analyze the indications and describe the mitigation strategy and major steps taken relative to the Steam Generator Water Level Control System, both initial and subsequent, for:

1. ABN-603, "Loss of Protection or Instrument Bus"

DEVELOPMENT REFERENCES: ABN-603
ABN-709

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** A loss of 1PC1 results in a loss of steam flow / steam pressure on SGs 1 and 4. This causes the feed pump speed control, using the total steam flow input as a power input, to think that power has been reduced. Feed pump speed must be manually increased to the 60% value which is 125 psid, using a range of 80 to 170 psid from 20 to 100% power (steam flow).

b. Plausible since feed pump speed must be increased, but the value of 134 psid is determined using a programmed range of 80 to 170 psid from 0 to 100% power instead of 20 to 100% power.

c. Plausible since feed pump speed must be adjusted for a value of 125 psid, but speed will have decreased as a result of the failure and it must be increased in response.

d. Plausible since feed pump speed must be adjusted and the value of 134 psid could easily be incorrectly calculated, but the correct value is 125 psid and the speed must be increased.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Understanding of how steam pressure / steam flow fail, how they affect feed pump speed control, and calculation of the required ΔP

QUESTION NUMBER: 15 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.5 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 000058.AA2.03

Ability to determine and interpret the following as they apply to the Loss of DC Power: DC loads lost; impact on ability to operate and monitor plant systems

OBJECTIVE: SYS.DC1.OB14

Evaluate the effect a loss of the DC Electrical system has on the following:

1. Reactor Coolant Pumps

DEVELOPMENT REFERENCES: ALM-0102A
LN OP51.SYS.DC1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.DC1.OB09-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** RCP breaker control power is from 1D3. A loss of this power supply prohibits tripping the pump breakers from the Control Room. Additionally, all indication of the pump breakers is lost in the Control Room.

b. Plausible since MT EHC is supplied from DC (and 480 VAC MCC), but it is 1D1 not 1D3.

c. Plausible since Train B RTB and BYB shunt trip power supplied by DC, but it is 1ED2 not 1D3.

d. Plausible since the electrical trip circuit for the feed pump is supplied by DC, but it is powered from 1D2 not 1D3.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the effect of a loss of DC bus 1D3 on RCP control / indication

QUESTION NUMBER: 16 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 4.0 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 000062.2.4.49

Ability to perform without reference to procedures those actions that require immediate operation of system components and controls (Loss of Service Water).

OBJECTIVE: SYS.SW1.OB11

Analyze how a loss or malfunction of the Station Service Water system will impact the following system(s) / component(s) / event(s):

c. Emergency Diesel Generator system
e. Continued plant operation

DEVELOPMENT REFERENCES: ABN-501
ALB-0011

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.ED1.OB04-002

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the sequencer will fire to load the EDG and the SSW pump will have an amber mismatch light until the sequencer sends a signal to start the pump. However, the white trip light is not expected and this is an indication that the pump has tripped and will not start on the sequencer timing. The immediate action per ABN-501 is to place the EDG in Pull Out.

b. Plausible since the sequencer will fire to load the EDG and the SSW pump will have an amber mismatch light until the sequencer sends a signal to start the pump. However, the white trip light is not expected and this is an indication that the pump has tripped and will not start on the sequencer timing. The immediate action per ABN-501 is to place the EDG in Pull Out.

√ **c.** With the SSW pump tripped, the EDG must be immediately tripped whether or not it is carrying the bus. A loss of a single safeguards bus does not require the unit be tripped.

d. Plausible since with the SSW pump tripped, the EDG must be immediately tripped whether or not it is carrying the bus. However, a loss of a single safeguards bus does not require the unit be tripped.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the status of SSW pump as to whether this is a normal indication based on sequencer operations or whether this is a tripped condition and comprehension that continued plant operation is permitted

QUESTION NUMBER: 17 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.5 **SRO**

10CFR55 CONTENT: **41(b)** 8 **43(b)**

KA: WE04.EK1.02

Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment) Normal, abnormal and emergency operating procedures associated with (LOCA Outside Containment).

OBJECTIVE: SM1.SGH.OB104

Given a procedural step, note, or caution, discuss the reason or bases for the step, note, or caution.

DEVELOPMENT REFERENCES: ECA-1.1
ECA-1.2

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SM1.XGH.OB04-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since Phase A isolation will have occurred, but ECA-1.1 does not address Phase B isolation since these penetrations are not considered likely sources of a LOCA outside containment.

b. Plausible since increasing the injection flow rate would increase RCS pressure, but increasing injection flow would be counterproductive to the goal of delaying RWST depletion.

√ **c.** ECA-1.1 provides actions to restore emergency coolant recirculation capability, to delay depletion of the RWST by adding makeup and reducing outflow, and to depressurize the RCS to minimize break flow.

d. Plausible since stabilizing RCS pressure would prevent the SI accumulators from injecting into the RCS and out the break, but the accumulators are an additional source of water which can be used to remove core heat.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the reason for transitioning to ECA-1.1 from ECA-1.2

QUESTION NUMBER: 18 **TIER/GROUP:** 1 / 1

KA IMPORTANCE: **RO** 3.9 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: WE11.EA1.01

Ability to operate and / or monitor the following as they apply to the (Loss of Emergency Coolant Recirculation) Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features

OBJECTIVE: EO1.XG3.OB405

Given plant/system conditions requiring Recirculation, recognize, determine, and evaluate parameters, and discuss operator actions to respond to a loss of Emergency Coolant Recirculation capability in accordance with ECA-1.1A/B.

DEVELOPMENT REFERENCES: ECA-1.1

REFERENCES SUPPLIED TO APPLICANT: ECA-1.1A, Attachment 4

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: INPO Bank 27665

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since RCS pressure might decrease to allow increased SIP injection flow, or if the attachment were read incorrectly, but this would only provide 400 gpm of the required 445 gpm.

b. Plausible since this condition would leave only a single pump running, but the RHR pump is not capable of injecting into the RCS at this pressure so the minimum flow requirement would not be met.

√ **c.** Per Attachment 4, the minimum required flow is 445 gpm. Between the CCP and SIP the total injected flow is 650 gpm which is the lowest possible value while still meeting the minimum required flow.

d. Plausible since RCS pressure might decrease to allow increased CCP and RHR pump injection flow, or if the attachment were read incorrectly, but this would only provide 250 gpm of the required 445 gpm since the RHR pump is not capable of injecting into the RCS at this pressure.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Interpret attachment for correct information and then make a determination of which combination of pumps is the lowest value of flow while still meeting or exceeding the minimum required flow

QUESTION NUMBER: 19 **TIER/GROUP:** 1 / 2

KA IMPORTANCE: **RO** 3.4 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 000024.AA2.04

Ability to determine and interpret the following as they apply to the Emergency Boration: Availability of BWST *(NOTE: BWST IS EQUIVALENT TO BORIC ACID TANK AT CPSES)*

OBJECTIVE: SYS.CS2.OB15

List and describe the following Technical Specifications (i.e., LCOs, action statements and conditional surveillance requirements of one hour or less, if applicable) for the Reactor Makeup System:
3. Borated Water Source

DEVELOPMENT REFERENCES: Technical Requirements 13.1.31
EOP-0.0A
TDM-804A

REFERENCES SUPPLIED TO APPLICANT: TDM-804A, Boric Acid Storage Tank

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since this value would be obtained if the operator chose to borate 3120 gallons (equivalent to two stuck rods), but 3 rods are not fully inserted and the level will be between 48% and 49% when completed.

b. Plausible since this value would be obtained if the operator chose to borate 3120 gallons (equivalent to two stuck rods), but 3 rods are not fully inserted and the level will be between 48% and 49% when completed.

c. Plausible since this is the actual level that will exist in the tank upon completion of the boration, but this is below the minimum required level for the TRM.

√ **d.** An initial boric acid tank level of 61% correlates to approximately 26190 gallons. The operator is required to borate 4680 gallons, which lowers tank volume to approximately 21510 gallons. This correlates to a level of between 48% and 49% which is below the minimum required level of 50% in Mode 3 per the TRM.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the amount of boric acid required for EOP actions and determination of TS limits for BAT

QUESTION NUMBER: 20 **TIER/GROUP:** 1 / 2

KA IMPORTANCE: **RO** 2.8* **SRO**

10CFR55 CONTENT: **41(b)** 8 / 10 **43(b)**

KA: 000028.AK1.01

Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions: PZR reference leak abnormalities

OBJECTIVE: SYS.PP1.OB08

Describe or state how the following concepts or conditions apply to the Pressurizer Pressure and Level Control System:

4. Response of PRZR level detectors to a reference leg leak

DEVELOPMENT REFERENCES: ABN-706
LN OP51.SYS.PP1
LN GENERIC FUNDAMENTALS - DETECTORS

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.PP1.OB08-005

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since 459 fails in a high direction and charging flow decreases in response, but actual pressurizer level decreases as a result of the lowered charging flow.

√ **b.** The reference leg leak results in 459 failing in a high direction due to a lower ΔP. Since 459 is the controlling channel, charging flow is reduced in an attempt to lower indicated level and actual level lowers.

c. Plausible since this is the response that would be expected if the variable leg of 459 were to develop a leak, but with the reference leg developing the leak the plant responds in the opposite direction.

d. Plausible since this is the response that would be expected of 459 and charging flow if the variable leg of 459 were to develop a leak, but with the reference leg developing the leak the plant response is opposite.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analyze the effect of a reference leg leak on the controlling channel of pressurizer level and determine how the control system will respond

QUESTION NUMBER: 21 **TIER/GROUP:** 1 / 2

KA IMPORTANCE: **RO** 3.5 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 000059.AA1.01

Ability to operate and / or monitor the following as they apply to the Accidental Liquid Radwaste Release: Radioactive-liquid monitor

OBJECTIVE: SYS.VD1.OB06

List and explain the Vents and Drains System design features which provide for the trips, permissives, and interlocks associated with the following:

- X-RE-5251A

DEVELOPMENT REFERENCES: ABN-903
ALM-3200
RWS-108

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.RM1.OB10-003

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since a high alarm on X-RE-5251A will open WM183A, but it closes WM182A.

√ **b.** A high alarm on X-RE-5251A will realign sump discharge from the LVW system (WM183A closes) to the COW system (WM182A opens).

c. Plausible since a high alarm on X-RE-5251A will shift the sump discharge, but it shifts it from the LVW to the COW system.

d. Plausible since a high alarm on X-RE-5251A will close WM182A, but it opens WM183A.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the automatic actions associated with high radiation alarms which will terminate accidental gaseous releases

QUESTION NUMBER: 22 **TIER/GROUP:** 1 / 2

KA IMPORTANCE: **RO** 2.7 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 000060.AK2.02

Knowledge of the interrelations between the Accidental Gaseous Radwaste Release and the following: Auxiliary building ventilation system

OBJECTIVE: SYS.GH1.OB02

State the functions, operations and interlocks of the following Gaseous Waste Processing System components:
7. X-HV-0014, GWPS Discharge to Plant Vent Stacks

DEVELOPMENT REFERENCES: ABN-902
ALM-3200

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the Waste Gas Radiation Monitor (WGS083) monitors downstream of HCV-0014, but neither of these monitors will perform this action.

b. Plausible since the Plant Vent Stack Wide Range Noble Gas Monitor (PVG684/685) will automatically close HCV-0014, but the Waste Gas Radiation Monitor (WGS083) will not perform this action.

c. Plausible since the Aux Building Vent Duct Monitor (ABV089) will automatically close HCV-0014, but the Plant Vent Noble Gas Activity Monitor (PVG384/385) will not perform this action.

√ **d.** A high radiation alarm on either the Plant Vent Stack Wide Range Noble Gas Monitor (PVG684/685) or the Aux Building Vent Duct Monitor (ABV089) will automatically close HCV-0014.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the automatic actions associated with high radiation alarms which will terminate accidental gaseous releases

QUESTION NUMBER: 23 **TIER/GROUP:** 1 / 2

KA IMPORTANCE: **RO** 3.2 **SRO**

10CFR55 CONTENT: **41(b)** 5 / 10 **43(b)**

KA: WE14.EK3.01

Knowledge of the reasons for the following responses as they apply to the (High Containment Pressure) 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.

OBJECTIVE: EO1.XG3.OB404

Given plant conditions, evaluate and describe associated actions for transferring Containment Spray from the Injection Mode to the Recirculation Mode in accordance with EOS-1.3..

DEVELOPMENT REFERENCES: EOS-1.3

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EO1.XG3.OB404-004

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** Spray is to be continued from the RWST until RWST level is <24% to ensure sufficient boric acid and NaOH mixing to maintain the pH of the containment sump water within the analyzed range.

b. Plausible since adequate containment sump level is required to maintain NPSH to all ECCS pumps, but adequate level will exist in the sump when RWST level drops below 45%.

c. Plausible since this action would be taken in the event that a transition were made to ECA-1.1, "Loss of Emergency Coolant Recirculation," but otherwise containment spray is maintained in operation until directed by plant staff.

d. Plausible since a low level condition in the RWST could result in pump cavitation, but this does not occur for ECCS pumps until level is <12% and for the CS pumps until level is <6%..

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the proper actions to take regarding RWST level and CS operation and knowledge of the reason for these actions

QUESTION NUMBER: 24 **TIER/GROUP:** 1 / 2

KA IMPORTANCE: **RO** 3.4 **SRO**

10CFR55 CONTENT: **41(b)** 10# **43(b)**

KA: WE06.EA2.01 # NO 55.41(b) tie identified in NUREG-1122

Ability to determine and interpret the following as they apply to the (Degraded Core Cooling) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

OBJECTIVE: SM3.XH4.OB104

Discuss the reason/basis for the step, note, or caution, given a procedural step, note, or caution.

DEVELOPMENT REFERENCES: FRC-0.2

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SM3.XH4.OB104-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** If FRP-0.1 is entered, the cooldown in FRC-0.2 would be stopped and a soak period would be required. This could result in core boiling and an increase in temperature to the point where the entry conditions for FRC-0.1 would be required and this would be an undesirable condition.

b. Plausible since remaining in FRC-0.2 is the proper action, but it is related to not causing core cooling conditions to deteriorate to an inadequate core cooling condition.

c. Plausible since the red path for integrity normally has a higher priority than the orange path for core cooling, but under these conditions it is desirable to remain in FRC-0.2.

d. Plausible since the red path for integrity normally has a higher priority than the orange path for core cooling, but under these conditions it is desirable to remain in FRC-0.2.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the basis for remaining in FRC-0.2 even if a red path condition occurs which would normally require a transition to another procedure

QUESTION NUMBER: 25 **TIER/GROUP:** 1 / 2

KA IMPORTANCE: **RO** 3.5 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: WE02.EK2.02

Knowledge of the interrelations between the (SI Termination) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

OBJECTIVE: SJ1.XG9.OB108

Identify the items on EOS-1.1A/B foldout page, including any equipment, parameter, set point, or condition.

DEVELOPMENT REFERENCES: EOS-1.1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SJ1.XG9.OB102-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since this is the action required if pressurizer level is below 6%, but with subcooling below the required value ECCS pumps must be started and a transition made to EOP-1.0.

b. Plausible since ECCS pumps are to started as necessary, but a transition to EOP-1.0 is also required.

√ **c.** Based on subcooling being less than 25°F, ECCS pumps must be started as necessary and a transition made to EOP-1.0.

d. Plausible since a transition to EOP-1.0 is required, but starting ECCS pumps is the action to be taken instead of manually actuating SI.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of plant conditions following SI termination to determine proper actions

QUESTION NUMBER: 26 **TIER/GROUP:** 1 / 2

KA IMPORTANCE: **RO** 3.1 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: WE16.2.4.06

Knowledge of symptom based EOP mitigation strategies (Containment High Radiation).

OBJECTIVE: ERG.XD2.OB08

State when Foldout Page items are applicable during the use of ERGs.

DEVELOPMENT REFERENCES: ODA-407
EOS-0.1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since starting additional CCPs could restore pressurizer level, but this action is not contained in FRZ-0.3A and foldout items of EOS-0.1 are required to be implemented.

b. Plausible since this is the correct action to perform, but FRZ-0.3 does not contain a foldout page item and foldout items of EOS-0.1 are required to be implemented.

c. Plausible since many foldout pages contain this statement and foldout pages are required to be implemented when performing yellow path FRGs, but the foldout page item for EOS-0.1 directs the crew back to EOP-0.0.

√ **d.** When performing yellow status FRGs, continuous actions and foldout page items of ORGs are monitored and implemented as required. Yellow path procedures are considered to be performed in parallel.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the implementation criteria for yellow path FRGs and foldout page items as directed by administrative procedures

QUESTION NUMBER: 27 **TIER/GROUP:** 1 / 2

KA IMPORTANCE: **RO** 3.7 **SRO**

10CFR55 CONTENT: **41(b)** 5 / 10 **43(b)**

KA: WE08.EK3.03

Knowledge of the reasons for the following responses as they apply to the (Pressurized Thermal Shock) Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.

OBJECTIVE: SK1.XHB.OB105

Given a procedural step, note, or caution in FRP-0.1, discuss the reason for the step, note, or caution.

DEVELOPMENT REFERENCES: FRP-0.1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: INPO Bank 27715

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since a soak period is required, but RCS temperature is held stable and pressure is lowered prior to the soak.

b. Plausible since the RCS pressure is decreased to minimize subcooling, but RCS temperatures are maintained stable once the depressurization is started to minimize subcooling.

√ **c.** RCS temperature is maintained stable and RCS pressure is decreased to minimize RCS subcooling to decrease the pressure stress and, thus, the total stress across the reactor vessel wall.

d. Plausible since RCS temperature is held stable, but the RCS must be depressurized to allow a soak period.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the actions required to minimize PTS effects and knowledge of the bases for these actions

QUESTION NUMBER: 28 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.5 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 003.K3.02

Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: S/G

OBJECTIVE: GFE.HT5.OB008

Define steam generator shrink and swell, and describe how each occurs during plant steam demand changes.

DEVELOPMENT REFERENCES: ABN-101
LN OP11.GFE.HT5

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SH5.MU5.OB101-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the increase in steam flow and SG level are indicative of SG 'swell,' but with the RCP tripped the SG will stop steaming and 'shrink' will occur.

b. Plausible since SG level does decrease as 'shrink' occurs, but when an RCP trips the SG stops steaming so steam flow would decrease.

c. Plausible since steam flow does decrease when the RCP trips, but SG level will decrease as a result of SG 'shrink'.

√ **d.** With an RCP stopped, the affected SG will stop steaming. This reduction in steam flow will result in SG 'shrink'.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Comprehension of the effect of an RCP trip on heat transfer and SG shrink and swell

QUESTION NUMBER: 29 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 2.5 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 004.K5.36

Knowledge of the operational implications of the following concepts as they apply to the CVCS: Solubility of boron in water; temperature effect

OBJECTIVE: SYS.CS1.OB10

State the physical connections and evaluate the cause-effect relationships between CVCS and the following systems, components, or events:

26. Inadvertent boration or dililution

DEVELOPMENT REFERENCES: SOER 94-02
LN OP51.SYS.CS1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.CS1.OB10-021

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since lowering the setpoint of TK-130 results in increased CCW flow, but the lower temperature causes the demins to store boron and lower RCS boron concentration.

√ **b.** Lowering the setpoint of TK-130 increases CCW flow through the HX to lower the letdown temperature. A lower letdown temperature causes the CVCS demins to remove boron from the letdown stream and lower RCS boron concentration.

c. Plausible since an increase in CVCS flow would result in a higher letdown temperature which would cause boron to be released from the demins to the RCS, but the controller affects CCW flow and RCS boron concentration decreases.

d. Plausible since RCS boron concentration decreases, but it is a result of increased CCW flow and not increased CVCS flow.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the effect of adjusting a temperature setpoint on the ability of the demineralizers to retain boron

QUESTION NUMBER: 30 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.1 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 004.A4.19

Ability to manually operate and/or monitor in the control room: CVCS letdown orifice isolation valve and valve control switches

OBJECTIVE: SYS.CS1.OB08

List and explain the CVCS design features which provide for the trips, permissives and interlocks associated with each of the following:

9. Interlocks associated with operation of orifice isolation valves

DEVELOPMENT REFERENCES: E1-0061, Sh 19 and 36
LN OP51.SYS.CS1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since both 8149A and 8149B will automatically close, but LCV-460 is not interlocked to close when 459 is closed.

b. Plausible since only one of the two sets of valves will automatically close when 459 begins to close, but it is the orifice isolation valves, not the letdown isolation valves, which close.

√ **c.** If either LCV-459 or 460 is not fully open, the letdown orifice isolation valves will automatically close.

d. Plausible since closing 459 has no effect on LCV-460, but the orifice isolation valves will close when 459 begins to close.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of interlocks between CVCS letdown valves

QUESTION NUMBER: 31 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 2.7* **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 005.K2.03

Knowledge of bus power supplies to the following: RCS pressure boundary motor-operated valves

OBJECTIVE: SYS.AC2.OB03

Draw and explain a one-line diagram of the AC Distribution System including breakers, power supplies, transformers and major loads for each of the following:

3. uEB1 – uEB4

DEVELOPMENT REFERENCES: SOP-101

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since these are safety related DC buses which supply power to the PRZR PORVs, but not the block valves.

b. Plausible since the power supplies are safety related power supplies, but the block valves use 480 VAC, not 118 VAC.

√ **c.** The power supply for PORV Block 8000A is 1EB3-2 and the power supply for PORV Block 8000B is 1EB4-2.

d. Plausible since these are both safety related power supplies, but the power supplies are 1EB3-2 and 1EB4-2.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 4

EXPLANATION: Recall of PRZR PORV Block valve power supplies

QUESTION NUMBER: 32 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.0 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 006.K6.05

Knowledge of the effect of a loss or malfunction on the following will have on the ECCS: HPI/LPI cooling water

OBJECTIVE: SYS.RH1.OB15

State the physical connections and evaluate the cause-effect relationship between the Residual Heat Removal System and the following systems, components, or events:

2. CCW System

DEVELOPMENT REFERENCES: EOS-1.3
FRC-0.1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** Train B RHR can be operated in any mode available since CCW flow is available. Train A RHR can only be operated when the water temperature being pumped is $\leq 120^{o}F$. The RWST, used in injection mode, is maintained below this temperature, but the sump water used for recirc will be higher than this limit and Train A RHR cannot be operated in recirc without CCW.

b. Plausible since Train A RHR can only be operated in injection mode, but Train B can be operated in injection or recirc mode since it has CCW available.

c. Plausible since Train B RHR can be operated in injection or recirc mode since it has CCW available, but Train A can only be operated in injection mode without CCW available.

d. Plausible since both trains of RHR can be operated in injection mode, but only Train B RHR can be operated in recirc mode.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 4

EXPLANATION: Must analyze the effect of the LOCA on sump water temperature to determine that temperature will exceed the limitations of RHR operation without CCW

QUESTION NUMBER: 33 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.1 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 007.K5.02

Knowledge of the operational implications of the following concepts as they apply to PRTS: Method of forming a steam bubble in the PZR

OBJECTIVE: SYS.RC1.OB15

Describe the basis for the precautions, limitations, and major procedure steps relative to the Reactor Coolant System for:

7. SOP-101, Reactor Coolant System

DEVELOPMENT REFERENCES: SOP-101
LN OP51.SYS.RC1

REFERENCES SUPPLIED TO APPLICANT: Steam Tables

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since this is similar to an alternate method of establishing a bubble, however the preferred method is by establishing a bubble while a vacuum still exists in the RCS.

b. Plausible since this is similar to an alternate method of establishing a bubble, however the preferred method is by establishing a bubble while a vacuum still exists in the RCS.

c. Plausible since the bubble is established under vacuum conditions, but the level in the pressurizer is maintained constant at approximately 50% instead of filling solid.

√ **d.** During vacuum fill of the RCS a bubble in the pressurizer is established while the RCS is at a vacuum. Charging and letdown are adjusted as needed to maintain level and pressure constant in preparation for establishing a bubble.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the preferred method of drawing a bubble in the pressurizer

QUESTION NUMBER: 34 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 2.9 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 008.A1.02

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

OBJECTIVE: SO1.NC1.OB104

Discuss ABN-501, Station Water System Malfunctions, to include the following:
2. Symptoms
3. Plant Indications
5. Notes and Cautions

DEVELOPMENT REFERENCES: ABN-501

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: S01.NC1.OB104-002

NRC EXAM HISTORY:

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since this would remove any non-safeguards heat loads being carried by the CCW pump, but procedure requires that the pump be secured.

√ **b.** ABN-501 requires that the affected train CCW pump be secured if the CCW heat exchanger outlet temperature exceeds 122°F.

c. Plausible since the CCW trains are normally cross-tied via the non-safeguards loop, but SSW trains are not cross-tied.

d. Plausible since this is a possible action to be taken in the event of a complete loss of SSW in a Unit, but with one train of SSW available this action would not be taken.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the procedural requirements for an elevated temperature in CCW

QUESTION NUMBER: 35 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.4 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 008.2.1.32

Ability to explain and apply all system limits and precautions. (Component Cooling Water).

NOTE: THIS QUESTION HAS BEEN DETERMINED TO BE REQUIRED KNOWLEDGE OF A REACTOR OPERATOR.

OBJECTIVE: SO1.NC1.OB101

Discuss SOP-502, Component Cooling Water System, to include the following:

2. Precautions
3. Limitations
4. Notes and Cautions

DEVELOPMENT REFERENCES: SOP-502

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: S01.NC1.OB101-002

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the reason for establishing additional flow paths is to prevent relief valves from lifting, but opening HS-4537 will not provide an additional flow path prior to starting the pump since the valve will only remain open if the pump is running and a low flow condition exists.

b. Plausible since HS-4537 will automatically open when the pump starts, but additional flow paths are used to prevent relief valves from lifting.

√ **c.** Running two CCW pumps during low heat load conditions (at power conditions) will cause pressure to increase. Providing an additional flow path for the system minimizes the pressure spike and prevents lifting reliefs. These valves are used since they can be throttled open.

d. Plausible since these CCW valves are used to establish additional flow paths, but the reason additional flow paths are provided is to minimize the likelihood of lifting relief valves.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Comprehension of the operation of the various valves in the CCW system and knowledge of the effect of operating pumps during low heat loads

QUESTION NUMBER: 36 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 2.7 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 010.K6.01

Knowledge of the effect of a loss or malfunction on the following will have on the PZR PCS: Pressure detection systems

OBJECTIVE: SYS.PP1.OB07

List and explain the Pressurizer Pressure and Level Control System design features which provide for the trips, permissives, and interlocks associated with the following:

1. PRZR PORV Open Interlocks in AUTO
4. PRZR High Pressure Reactor Trip
5. PRZR Low Pressure Reactor Trip
6. PRZR Low Pressure Safety Injection

DEVELOPMENT REFERENCES: ABN-705

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since a low pressure reactor trip and safety injection would occur with no operator action if PT-455 were to fail high, but with PT-456 failing high pressure stabilizes around 2185 psig.

√ **b.** With 456 failing high, PORV 456 opens and actual pressure begins lowering. The spray valves remain closed and the heaters will energize as pressure sensed by 455 decreases, but the open PORV causes pressure to continue to lower. When PT-457 senses pressure below 2185 psig, the open interlock for PORV 456 is lost and the PORV closes. As pressure increases above 2185 psig due to the heaters, the open interlock for the PORV is restored and pressure will cycle around 2185 psig.

c. Plausible since pressure would increase and cycle around 2335 psig with no operator action if PT-455 were to fail low, but with PT-456 failing high pressure stabilizes around 2185 psig.

d. Plausible since pressure would increase with no operator action if PT-455 were to fail low and, if PORV 456 were to also fail, a high pressure reactor trip would occur, but with PT-456 failing high pressure stabilizes around 2185 psig.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of how pressurizer pressure will respond to a transmitter failure

QUESTION NUMBER: 37 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.3* **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 012.K5.01

Knowledge of the operational implications of the following concepts as the apply to the RPS: DNB

OBJECTIVE: SYS.NT1.OB09

Reproduce the Overtemperature and Overpower N-16 Setpoint formulas and explain how the inputs apply a penalty/credit to the Setpoints.

DEVELOPMENT REFERENCES: Tech Spec 3.3.1
Tech Spec Bases B 3.3.1
Core Operating Limit Report Unit 1 Cycle 11

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since T-cold is an input to the OT N-16 setpoint, but lowering T-cold brings the plant further away from a boiling condition which increases the OT N-16 setpoint.

√ **b.** Lowering pressure brings the plant closer to a boiling condition which is protected against by reducing the OT N-16 setpoint.

c. Plausible since Δ-I is an input to the OT N-16 setpoint, but Δ-I must increase to > + 7.4% before any reduction in the setpoint occurs.

d. Plausible since RCS flow is a DNB parameter, but the setpoint is based on the assumption that a minimum of 397,000 gpm total flow exists. Changing RCS flow has no effect on the OT N-16 setpoint.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analyze each of the plant changes to determine whether the plant is operating closer or further away from DNB conditions

QUESTION NUMBER: 38 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.6 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 012.A4.05

Ability to manually operate and/or monitor in the control room: Channel defeat controls

OBJECTIVE: SYS.ES1.OB05

List and explain the coincidence and setpoints associated with the following ESF actuation signals:

1. Safety Injection
4. Steamline Isolation

DEVELOPMENT REFERENCES: ALM-0065
IPO-005
LN OP51.SYS.ES1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.ES1.OB05-013

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since action is taken to block the steamline isolation and SI signals, but the blocking enables a negative pressure rate signal to close the MSIVs.

b. Plausible since action is taken to block the steamline isolation and an SI could occur if the break were inside containment, but the blocking enables a negative pressure rate signal to close the MSIVs.

√ **c.** With the actions taken to block the low steamline pressure SI signal, a main steamline isolation will still occur on a large steam break due to the blocking actions enabling a negative pressure rate signal to close the MSIVs.

d. Plausible since the main steamline isolation will occur and an SI would still occur if the break were inside containment, but the SI will not occur with the break location.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the effect of blocking ESF actuation signals on plant operations

QUESTION NUMBER: 39 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 2.7* **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 013.K6.01

Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: Sensors and detectors

OBJECTIVE: SYS.CT1.OB09

List and explain the Containment Spray System design features which provide for the trips, permissives, and interlocks associated with the following:

5. Containment Spray/Phase B Isolation automatic actuation

DEVELOPMENT REFERENCES: ALM-0022

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: NRC Exam LC14

NRC EXAM HISTORY: RO 112002 – Q59

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the HI-1 containment pressure coincidence and setpoint is 2/3 $\geq$ 3.2 psig, but HI-3 requires 2/4 $\geq$ 18.2 psig.

b. Plausible since the setpoint for HI-3 is $\geq$ 18.2 psig, but with one detector failed low the coincidence becomes 2/3.

√ **c.** The coincidence and setpoint for HI-3 containment pressure is 2/4 $\geq$ 18.2 psig. With a detector failed low, the coincidence is changed to 2/3.

d. Plausible since the coincidence for HI-3 containment pressure with a failed detector is 2/3, but the setpoint for HI-3 is $\geq$ 18.2 psig.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of coincidence required for ESF actuation with failed detector

QUESTION NUMBER: 40 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.1 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 022.A2.05

Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Major leak in CCS

OBJECTIVE: SYS.CH2.0B06

Identify and describe the Main Control Board / Plant Computer controls, alarms, and indications associated with the Ventilation Chilled Water System.

DEVELOPMENT REFERENCES: ALM-0022
ALM-0113
M1-0307A, Sheet A

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since turning off the fan closes the vent chilled water return valve from the individual fans, but the supply valve for each fan is manual so the leak is not isolated.

b. Plausible since turning off the fan closes the vent chilled water return valve from the individual fans, but the supply valve for each fan is manual so the leak is not isolated.

√ **c.** Turning off the fan closes the vent chilled water return valve from the individual fans, but the supply valve for each fan is manual so the leak is not isolated. A containment entry must be made to manually isolate the supply valve.

d. Plausible since turning off the fan closes the vent chilled water return valve from the individual fans, but the supply valve for each fan is manual so the leak is not isolated. Also, the return valve control switch is on the vent panel, but the supply is manual and a containment entry is required to isolate the leak.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the vent chilled water system supply and return to containment fan coolers

QUESTION NUMBER: 41 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.6 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 022.A4.01

Ability to manually operate and/or monitor in the control room: CCS fans

OBJECTIVE: SYS.CL1.OB04

State the location (if applicable) of the following indications and controls, and describe how each is interpreted or used to predict, monitor, or control changes in the Containment Ventilation System:

7. Fan and damper hand switches (Control Room)

DEVELOPMENT REFERENCES: EOP-0.0
ALM-0031
E1-0033, Sheet 15

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: INPO Bank 20192

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since these are the indications that would be available if the fan tripped due to an overcurrent condition, but the white light will remain off.

√ **b.** The fan is load shed via a shunt trip of the breaker upon receipt of an SI signal. With the hand switch in the Auto After Start position, this will cause the amber light to energize. The green light is on because the breaker is open, which is also why the red light is off, and the white light only energizes on a fault which causes an overcurrent.

c. Plausible since the green and red light indications are correct for the conditions, but the amber and white lights are identified backwards.

d. Plausible since these are the indications that would be available if the fan were still operating which would occur if the signal were a Blackout instead of an SI, but the fan will load shed on the SI.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the hand switch indications on the control board

QUESTION NUMBER: 42 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 4.1 **SRO**

10CFR55 CONTENT: **41(b)** 2 - 9 **43(b)**

KA: 026.K1.02

Knowledge of the physical connections and/or cause effect relationships between the CSS and the following systems: Cooling water

OBJECTIVE: SYS.CT1.OB15

Evaluate the effect a loss of the following systems has on the Containment Spray system:

2. Component Cooling Water
3. Station Service Water

DEVELOPMENT REFERENCES: SOP-204A
LN OP51.SYS.CT1

REFERENCES SUPPLIED TO APPLICANT:

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.RH1.OB02-034

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since CCW does supply cooling to the seal coolers, but SSW supplies cooling to the bearing coolers.

b. Plausible since CCW and SSW supply the coolers, but CCW supplies the seal coolers and SSW supplies the bearing coolers.

√ **c.** SSW supplies cooling to the pump bearing coolers and CCW supplies the pump seal coolers as well as the CS heat exchanger.

d. Plausible since SSW does supply cooling to the bearing coolers, but CCW supplies cooling to the seal coolers.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the cooling water supplies to Containment Spray

QUESTION NUMBER: 43 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.7 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 039.K4.05

Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: Automatic isolation of steam line

OBJECTIVE: SYS.MR1.OB28

Describe the following with regard to the Main Steam Isolation signal:

1. Initiating signals and coincidence

DEVELOPMENT REFERENCES: ALM-0063
ALM-0022
ABN-603

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** With a loss of 1PC2, the input relays for channel II steam pressure and containment pressure are in the tripped (de-energized) condition which causes the low steam pressure isolation and the high containment pressure isolation signals to now have a coincidence of 1/2 remaining channels. The first steam pressure below 605 psig or the first containment pressure above 6.2 psig causes a main steam line isolation.

b. Plausible since this would cause a steam line isolation signal, but an earlier signal was generated by the low steam line pressure.

c. Plausible since other high containment pressure signals (HI-3) are energized to actuate, but the low steam pressure and HI-2 signals (6.2 psig) are de-energized to actuate so earlier signals would have caused the isolation.

d. Plausible since other ESF actuation signals (Containment HI-3) are energized to actuate, but the low steam pressure and HI-2 signals (6.2 psig) are de-energized to actuate so earlier signals would have caused the isolation.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Comprehension of the loss of power on the input relays in SSPS and how the coincidence for steam line isolation is affected

QUESTION NUMBER: 44 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 2.6 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 056.A2.04

Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps

OBJECTIVE: SYS.CO1.OB02

State the functions, operations, and interlocks of the following Condensate System components:

2. Condensate Pumps
3. Reject Valve (LV-2211/12)
8. Low Pressure FW Heater Bypass Valve (PV-2286)

DEVELOPMENT REFERENCES: ABN-302
LN OP51.SYS.AF1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since normally PV-2286 would open and LV-2211/12 would close, but with generator output below 15% this does not occur. Section 7 of ABN-302 addresses 2286 opening at power, but the valve will not open and only Section 3 need be addressed.

b. Plausible since normally PV-2286 would open and LV-2211/12 does remain closed, but with generator output below 15%, 2286 does not open. Section 7 of ABN-302 addresses 2286 opening at power, but the valve will not open and only Section 3 need be addressed.

c. Plausible since a trip of both Condensate Pumps will cause LV-2211/12 to automatically close under normal "at power" conditions, but this occurs only above 15% power. The crew should respond per ABN-302 Section 3 to the Condensate Pump trip.

√ **d.** On a trip of both Condensate Pumps, PV-2286 automatically opens and LV-2211/12 automatically closes ONLY if power level is above 15%. Since power is below 15%, the valves remain in position and the crew is to respond per Section 3 to the Condensate Pump trip.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the interlocks between the condensate pumps and the condensate system valves and the procedure to be addressed

QUESTION NUMBER: 45 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.6 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 059.K3.02

Knowledge of the effect that a loss or malfunction of the MFW will have on the following: AFW system

OBJECTIVE: SYS.AF1.OB08

List and explain the Auxiliary Feedwater System design features which provide for the automatic starts, trips, permissives, and interlocks associated with the following:

5. Motor Driven Auxiliary Feedwater Pumps

DEVELOPMENT REFERENCES: M1-2206
EOS-0.1
FSAR Section 10.4.9.1
Tech Spec Bases 3.7.5
DBD-ME-0206

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.AF1.OB21-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since only the MDAFW pumps receive an autostart signal on a trip of both MFW pumps, but the system is designed to ensure that at least two SGs receive flow.

√ **b.** On a trip of both MFW pumps, only the MDAFW pumps receive an autostart signal. The design of the AFW system is to ensure the system is capable of supplying the minimum required flow to at least two SGs.

c. Plausible since ERGs require only one SG level be above the narrow range level to ensure an adequate heat sink, but the design of the AFW system is to ensure at least two SGs are fed. Also, the TDAFW pump does not receive an autostart signal.

d. Plausible since the design of the AFW system is to ensure that at least two SGs receive minimum required flow, but the TDAFW pump does not receive an autostart signal on a trip of both MFW pumps.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the automatic AFW pump starts and the bases for the AFW system

QUESTION NUMBER: 46 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.7* **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 061.K2.02

Knowledge of bus power supplies to the following: AFW electric drive pumps

OBJECTIVE: SYS.AF1.OB05

State the specific power supply, including source of control power voltage, for the Motor Driven Auxiliary Feedwater Pumps.

DEVELOPMENT REFERENCES: ALM-0102
ABN-602

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since this would be the status of the AFW pumps if the lockout relay actuation was an 86-2 instead of an 86-1, but with an 86-1 lockout the bus stays de-energized and no power is available to MDAFW pump 1-01.

b. Plausible since MDAFW pump 1-02 will be operating and MDAFW pump 1-01 will be stopped, but the TDAFW pump will be operating.

c. Plausible since the TDAFW pump receives an autostart signal on the BOS operator lockout, but MDAFW pump 1-02 continues to operate.

√ **d.** An 86-1 lockout relay causes bus 1EA1 to de-energize. MDAFW pump 1-01 will have no power available, MDAFW pump 1-02 will continue to operate, and the TDAFW pump will autostart on the BOS operator lockout.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analyze the effect of a lockout relay actuation on a safeguards bus and the effect of the bus condition on the AFW pumps

QUESTION NUMBER: 47 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.0 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 061.2.1.02

Knowledge of operator responsibilities during all modes of plant operation (Auxiliary Feed Water).

OBJECTIVE: SO8.AF1.OB303

Given plant conditions that warrant feeding the steam generators with AFW, startup the AFW system and maintain SG levels within the guidelines set forth by the Unit Supervisor or appropriate procedure.

DEVELOPMENT REFERENCES: Operations Guideline 3

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** MDAFW pumps should be manually started following a reactor trip with no SI or blackout present and flow should be throttled to approximately 150 gpm per SG. If a MDAFW pump is not available, then the TDAFW pump is to be started to ensure AFW is available to all SGs.

b. Plausible since the MDAFW pump and TDAFW pump are to be manually started and flow throttled to approximately 150 gpm. However, the MDAFW pump flow control valves are maintained in MAN and 100% open above 10% power.

c. Plausible since the MDAFW pump must be manually started and 460 gpm is the minimum flow required to prevent a heat sink red path condition if SG levels are off-scale low, but the TDAFW pump is to be manually started and flows adjusted to approximately 150 gpm per SG.

d. Plausible since the MDAFW pump must be manually started and 460 gpm is the minimum flow required to prevent a heat sink red path condition if SG levels are off-scale low, but the TDAFW pump is to be manually started and flows adjusted to approximately 150 gpm per SG.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the Ops Guideline requirements for AFW operation

QUESTION NUMBER: 48 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 4.1 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 062.K3.02

Knowledge of the effect that a loss or malfunction of the ac distribution system will have on the following: ED/G

OBJECTIVE: SYS.AC2.OB07

List and explain the AC Distribution design features which provide for the trips, permissives, and interlocks associated with the following:

3. Safeguards Bus Feeder Breakers
9. EDG Output Breakers

DEVELOPMENT REFERENCES: ABN-601
LN OP51.SYS.AC1
LN OP51.SYS.AC2

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the Unit 1 safeguards buses will be powered by XST1, but XST1 is the preferred power supply for Unit 2 safeguards buses and slow transfers do not occur from alternate to preferred.

b. Plausible since XST2 will re-energize as soon as the fault is isolated on transformer 1ST and XST2 is the alternate supply for Unit 2 safeguards, but on a loss of power to XST2 the feeder breakers to Unit 2 safeguards will open and will not reclose.

√ **c.** On a loss of 1ST, XST2 is momentarily lost and then restored. Any safeguards buses being powered from XST2 will transfer from XST2. Since XST2 is the alternate power supply for Unit 2 safeguards buses, there is no automatic transfer to the preferred power supply of XST1. The buses will be energized by the EDGs.

d. Plausible since the EDGs will automatically start, there are no automatic transfers to the preferred source of XST1, and XST2 de-energizes for a period of time, but the EDG output breakers will close.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the interlocks and bus transfers associated with the safeguards buses when in an alternate alignment

QUESTION NUMBER: 49 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 2.7 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 063.A3.01

Ability to monitor automatic operation of the DC electrical system, including: Meters, annunciators, dials, recorders, and indicating lights

OBJECTIVE: SYS.DC1.OB06

State the location (if applicable) of the following indications and controls, and describe how each is interpreted or used to predict, monitor, or control changes in the DC Electrical System:

1. 125 Volt DC Switch Panels 1ED1, 1ED2, 1ED3, and 1ED4 voltage (Control Room)
2. Batteries BT1ED1, BT1ED2, BT1ED3, and BT1ED4 current (Control Room)
4. Battery Charger indication, circuit breakers, and switches (Local)
   - Bus voltage
   - Selector switch (Float / Equalize)
5. DC Buses (Local(
   - Ground detection switches and lamps

DEVELOPMENT REFERENCES: ALM-0102

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the battery panel voltage is lower than the battery charger voltage, but is within the undervoltage alarm setpoint and is the cause for the negative current, indicating that the charger is charging the battery.

b. Plausible since the battery charger voltage is higher than the battery panel voltage, but is within the overvoltage alarm setpoint and is the cause for the negative current, indicating that the charger is charging the battery.

c. Plausible since a difference exists between the positive and negative indications, but the dimmer light is the terminal with the ground condition.

√ **d.** When performing a ground test, if one light is dimmer than the other, a ground condition is associated with the terminal for the dimly lit light. Voltages are normal for the given conditions.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 4

EXPLANATION: Analysis of given DC conditions to determine the cause of the conditions

QUESTION NUMBER: 50 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.4 **SRO**

10CFR55 CONTENT: **41(b)** 10# **43(b)**

KA: 063.2.2.22 # NO 55.41(b) tie identified in NUREG-1122

Knowledge of limiting conditions for operations and safety limits (DC Electrical Distribution).

OBJECTIVE: SYS.DC1.OB18

List and describe the following Technical Specifications and Technical Manual Requirements (i.e., LCOs, action statements and conditional surveillance requirements of hone hour and less, if applicable) for the DC Electrical System:

1. 3.8.4 and 3.8.5, DC Sources – Operating and Shutdown

DEVELOPMENT REFERENCES: Tech Spec 3.8.4
Tech Spec Bases 3.8.4

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.DC1.OB18-002

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since battery charger BC1ED1-2 is already out of service, but depressing the equalize push button causes battery charger output voltage to be 138 – 140 VDC which is an operable condition.

√ **b.** Each battery is required to have a minimum float voltage of 2.13 volts per cell or 128 volts total.

c. Plausible since 0 amps may indicate that the battery is not performing its function, but a float current of 0 amps indicates that the battery charger has fully charged the battery and the battery charger is supplying all bus loads.

d. Plausible since one battery charger is already out of service, but BC1ED4-1 is a different train and BC1ED4-2 would be placed in service prior to placing BC1ED4-1 under clearance.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the minimum requirements for DC electrical system Tech Specs

QUESTION NUMBER: 51 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.5 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 064.K4.10

Knowledge of ED/G system design feature(s) and/or interlock(s) which provide for the following: Automatic load sequencer: blackout

OBJECTIVE: SYS.ES3.OB01

State the function and overall design criteria of the Safety Injection and Blackout Sequencers.

DEVELOPMENT REFERENCES: DBD-ME-011
LN OP51.SYS.ES3

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.ES3.OB05-004

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** The SI sequencer immediately stops upon receipt of a blackout signal, loads are shed due to the UV condition, the SI sequencer resets, and loads are loaded once the EDG breaker is closed by the SI sequencer, beginning with Step 1.

b. Plausible since load shedding occurs and the EDG output breakers close, but SI loads and not blackout loads are loaded by the sequencer.

c. Plausible since the SI sequencer does stop until the EDG output breakers close and loads are sequenced on by the SI sequencer, but the SI sequencer resets and begins again at Step 1.

d. Plausible since the SI sequencer does stop until the EDG output breakers close, but the loads are sequenced by the SI sequencer, not the blackout sequencer.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the effect of a blackout signal on the sequencer operations while the sequencer is firing from a previous event

QUESTION NUMBER: 52 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.6 **SRO**

10CFR55 CONTENT: **41(b)** 2 - 9 **43(b)**

KA: 073.K1.01

Knowledge of the physical connections and/or cause effect relationships between the PRM system and the following systems: Those systems served by PRMs

OBJECTIVE: SYS.HV1.OB08

Describe how the following signals affect the Control Room Ventilation System:
3. High Radiation at Air Intake

DEVELOPMENT REFERENCES: ABN-203
ALM-3200

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.HV1.OB12-003

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. A high radiation alarm or loss of power to the RM-80 from any of the four intake radiation monitors will initiate an actuation signal to both trains of Control Room vent, but it will place the system in Emergency Recirculation and not Isolation.

b. Plausible since CR vent will receive an actuation signal, but it only requires a single rad monitor in alarm and it shifts to Emergency Recirculation.

√ **c.** A high radiation alarm or loss of power to the RM-80 from any of the four intake radiation monitors will initiate an Emergency Recirculation signal to both trains of Control Room vent.

d. Plausible since CR vent will go to the Emergency Recirculation mode, but it only requires any one of the four monitors in a high alarm condition.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the response of the CR vent system to a high rad condition

QUESTION NUMBER: 53 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.5* **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 076.A2.01

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

OBJECTIVE: SYS.SW1.OB11

Describe the following procedures which govern the operation of the Station Service Water System, including significant prerequisites, precautions, notes, and steps associated with each operating procedure, and where applicable, the bases for performing those steps:

a. SOP-501A/B, Station Service Water System
e. ABN-501, Station Service Water System Malfunction

DEVELOPMENT REFERENCES: ABN-501
SOP-501

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.CT1.OB12-002

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** Although either SSW from Unit 2 or Fire Protection Water can be aligned to provide cooling flow to the CCP, only SSW from Unit 2 can supply the EDG.

b. Plausible since Fire Protection Water can be aligned to provide cooling flow to the CCP, but only SSW from Unit 2 can supply the EDG.

c. Plausible since SSW from Unit 2 can be aligned to provide cooling flow to the SIP and SSW is an emergency suction source for the AFW pumps, but SSW does not provide cooling to the AFW pumps.

d. Plausible since Fire Protection can be aligned to supply the SIP and SSW is an emergency suction source for the AFW pumps, but SSW does not provide cooling to the AFW pumps.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the preferred and emergency method of providing SSW flow and the components that can be cooled in each condition

QUESTION NUMBER: 54 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.1 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 078.A3.01

Ability to monitor automatic operation of the IAS, including: Air pressure

OBJECTIVE: SYS.IA1.OB08

List and explain the Instrument Air System design features which provide for the trips, permissives, and interlocks associated with the following:

4. Decreasing / Increasing Instrument Air Receiver pressure
5. Decreasing or loss of Instrument Air Header pressure

DEVELOPMENT REFERENCES: SOP-509A
ALM-0011A
LN OP51.SYS.IA1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.IA1.OB08-014

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since 1-02 will be running and loaded, but X-01 will be shut down due to being unloaded for more than 10 minutes. Also plausible since the shut down time for 1-02 running unloaded is 20 minutes.

√ **b.** The Instrument Air Header pressure and Containment Instrument Air Header pressure alarms occur at 85 psig and 84 psig, respectively. 1-01 compressor, as the lead, loads at 105 psig and remains loaded until pressure reaches 115 psig. 1-02 compressor, as the backup, loads at 105 psig and remains loaded until pressure reaches 115 psig. X-01 compressor, in auto / standby, starts and loads at 90 psig, unloads at 99 psig, and shuts down if it has been unloaded for more than 10 minutes.

c. Plausible since 1-02 will be running, but will be loaded (unloads at 115 psig) and X-01 will be shut down due to being unloaded for more than 10 minutes. Also plausible since the shut down time for 1-02 running unloaded is 20 minutes.

d. Plausible since 1-02 will be running and X-01 will be shut down, but 1-02 will be loaded (unloads at 115 psig.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of plant conditions and times to determine current status of air compressors following transient resulting in starts

QUESTION NUMBER: 55 **TIER/GROUP:** 2 / 1

KA IMPORTANCE: **RO** 3.7 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 103.A1.01

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

OBJECTIVE: SYS.CL1.OB14

Analyze the indications and describe the mitigation strategy and major steps relative to the Containment Ventilation System, both initial and subsequent, for:

2. ALM-0031A, Alarm Procedure 1-ALB-03A

DEVELOPMENT REFERENCES: SOP-801A
ALM-0031A
Tech Spec 3.6.4
Tech Spec Bases 3.6.4
Tech Spec 3.6.5

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.CL1.OB16-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** Containment pressure is exceeding the upper limit of 1.3 psig while containment temperature is within the upper limit of 120°F. With the Unit in Mode 4 (>200°F) only the Containment Pressure Relief System is to be used to adjust Containment pressure.

b. Plausible since Containment pressure is exceeding Tech Spec limits, but the Containment Purge Supply and Exhaust System is only permitted to be used in Modes 5 and 6.

c. Plausible since Containment temperature is higher than normal and a high Containment temperature alarm would exist, but temperature is within limits and pressure needs to be reduced.

d. Plausible since Containment temperature is higher than normal and a high Containment temperature alarm would exist, but temperature is within limits and pressure needs to be reduced.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of containment conditions to determine limit exceeded and determination of mode of operation to identify system to be used

QUESTION NUMBER: 56 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 3.3 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 002.2.4.31

Knowledge of annunciators, alarms, and indications, and use of the response instructions (Reactor Coolant System).

OBJECTIVE: SYS.RC2.OB11

Analyze the indications and describe the mitigation strategy and major steps taken for ALM-0053, Reactor Vessel Flange Leakoff Temperature High.

DEVELOPMENT REFERENCES: ALM-0053
LN OP51.SYS.RC2

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.RC1.OB04-009

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** The alarm is valid since the setpoint is 140°F and containment temperature is below the indicated temperature. The inner seal is normally aligned, so the high temperature indicates that the inner seal is leaking and must be isolated, then placing the outer seal in service.

b. Plausible since this action would be taken in the event that containment temperature was higher and the cause of the alarm was high ambient temperature conditions, but with containment temperature at the given value it is well within limits.

c. Plausible since this action would be taken in the event that the alarm were determined to be a problem alarm, but based on the given indications the alarm is valid.

d. Plausible since it is a valid alarm and a containment entry is required to isolate one flange leakoff valve and place the other in service, but the inner seal is leaking, not the outer.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Analysis of indication to determine validity of alarm and response

QUESTION NUMBER: 57 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 3.3 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 011.K4.06

Knowledge of PZR LCS design feature(s) and/or interlock(s) which provide for the following: Letdown isolation

OBJECTIVE: SYS.PP1.OB16

Describe how the Pressurizer Pressure and Level Control System main control board / plant computer controls, alarms, and indications are used to predict, monitor, and control changes in the system.

DEVELOPMENT REFERENCES: ALM-0052
ABN-706
7247D05, Sh 11
LN OP51.SYS.PP1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since both isolation valves will close and the Pressurizer PRESSURE control system responds to controller output to actuate components, but the Pressurizer LEVEL controller only positions FCV-121 and actual pressurizer low level causes the isolation.

b. Plausible since LCV-459 will close, but LCV-460 will also close as actual pressurizer level decreases.

c. Plausible since this would be the response if the controller were reverse acting, but as LK-459 output is lowered actual charging flow decreases and pressurizer level decreases.

√ **d.** LK-459 being lowered to 0% will cause FCV-121 to go to minimum flow. Actual pressurizer level will decrease. At 17%, LCV-459 and LCV-460, as sensed by LT-461 and LT-460 respectively, will automatically close.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the effect of a previous failure causing an abnormal control configuration while controlling level in manual

QUESTION NUMBER: 58 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 3.6 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 014.A2.03

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

OBJECTIVE: SYS.RI1.OB08

List the cause, effect, and annunciators associated with the following DRPI indications:
4. Rod Deviation Alarm
8. Rod At Bottom

DEVELOPMENT REFERENCES: ALM-0064
ABN-712
LN OP51.SYS.RI1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since these are the correct actions to be taken, but the indications are for a dropped rod, not a DRPI data failure. Additional indications for the DRPI data failure would include a flashing GW light and DATA failure LEDs lit on DRPI.

b. Plausible since these are indications that could occur for a data failure, but additional indications for the DRPI data failure would include a flashing GW light and DATA failure LEDs lit on DRPI.

√ **c.** The given indications are indicative of a dropped rod. ABN-712 requires that all rods be inserted to the CBO position in the event of a single dropped rod with the reactor not critical.

d. Plausible since the given indications are indicative of a dropped rod, but the reactor is not required to be tripped unless more than one rod has dropped into the core.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of DRPI indications to determine cause and application of required procedural response

QUESTION NUMBER: 59 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 2.7 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 015.K5.02

Knowledge of the operational implications of the following concepts as they apply to the NIS: Discriminator/compensation operation

OBJECTIVE: SYS.EC1.OB12

Describe gamma compensation for the Excore Nuclear Instrumentation System, to include the following information / concepts:

2. Definition of overcompensation including how overcompensation affects indications
3. Definition of undercompensation including how undercompensation affects indications

DEVELOPMENT REFERENCES: IPO-002
ALM-0065

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.EC1.OB12-009

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since N-35 could be considered to be undercompensated without taking into account the SR channels and indications of proper overlap, but considering the SR channels and overlap it is N-36 which is overcompensated.

b. Plausible since N-35 could be considered to be undercompensated without taking into account the SR channels and indications of proper overlap and the startup should be suspended to prevent a reactor trip, but considering the SR channels and overlap it is N-36 which is overcompensated.

c. Plausible since N-36 is overcompensated, but continuing the startup in an attempt to block the SR channels above P-6 will result in a reactor trip.

√ **d.** A SR high flux trip will occur at 5E5 cps which is only approximately 1/2 decade from the current power level. Proper overlap between the SR and IR would have the IR channels indicating approximately 1E-10 amps at this point. P-6 should occur at approximately this time which allows blocking the SR channels. With IR N-36 more than 1/2 decade away from the P-6 setpoint, continuing the reactor startup will result in a reactor trip.

DIFFICULTY ANALYSIS:

☑ **COMPREHENSIVE / ANALYSIS** ☐ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of NIS indications to determine the cause of the indications and application of the proper response

QUESTION NUMBER: 60 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 3.1* **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 027.K2.01

Knowledge of bus power supplies to the following: Fans

OBJECTIVE: OP51.SYS.CL1

State the general power supply, including source of control power voltage for 480 V bus loads (safeguards or non-safeguards) for the following:
1. Supply fans
2. Exhaust fans

DEVELOPMENT REFERENCES: SOP-801
EOP-0.0
ABN-602
LN OP51.SYS.CL1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☑ **SIGNIFICANTLY MODIFIED** ☐ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.CL1.OB06-001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since these fans are typically only run prior to Containment entry which normally occurs in Mode 5 and ESF actuations are for the most part blocked in Mode 5, but they are powered by Safeguards MCCs which load shed on a blackout or safety injection signal.

b. Plausible since these fans are powered by safeguards MCCs and are load shed on a blackout, but they are also load shed on a safety injection.

c. Plausible since these fans are powered by safeguards MCCs and are load shed on a safety injection, but they are also load shed on a blackout.

√ **d.** Train A fan is powered from MCC 1EB1-2 and Train B from MCC 1EB2-2. Both of these MCCs are load shed by either a blackout signal or a safety injection signal.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 4

EXPLANATION: Knowledge of the power supply to the pre-access filtration system fans and how they are affected by ESF signals

QUESTION NUMBER: 61 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 3.8 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 029.A3.01

Ability to monitor automatic operation of the Containment Purge System including: CPS isolation

OBJECTIVE: SYS.CL1.OB04

State the location (if applicable) of the following indications and controls, and describe how each is interpreted or used to predict, monitor, or control changes in the Containment Ventilation System:

7. Fan and damper hand switches (Control Room)
8. Annunciators

DEVELOPMENT REFERENCES: EOP-0.0

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since hand switch position indication is not available due to the fuses being pulled.

b. Plausible since the locked valve deviation log book is used to track the position of all locked valves which these dampers are.

c. Plausible since position indication would be available on the hand switch if the fuses were installed, but fuses are required to be removed in Modes 1-4.

√ **d.** In Modes 1-4 these dampers have the fuses removed so no position indication is available on the hand switches. Position is determined by checking the green CVI lights on MLBs 45A and 45B.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the means to identify position of dampers which normally have fuses removed

QUESTION NUMBER: 62 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 2.6 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 034.K6.02

Knowledge of the effect of a loss or malfunction on the following will have on the Fuel Handling System: Radiation monitoring systems

OBJECTIVE: SYS.RM1.OB11

Evaluate the effect a loss of the Digital Radiation Monitoring System has on the following:

2. Continued operation of associated equipment

DEVELOPMENT REFERENCES: ALM-3200
ALM-0032
7247D05, Sheet 8

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT:

NRC EXAM HISTORY:

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since containment ventilation is caused by a high alarm condition which does not exist, but a loss of power to an RM-80 causes the bistables to deenergize which is the condition that the high alarm also creates. Also plausible since it has no affect on lifting any fuel assemblies.

b. Plausible since containment ventilation is caused by a high alarm condition which does not exist, but a loss of power to an RM-80 causes the bistables to deenergize which is the condition that the high alarm also creates.

√ **c.** A loss of power to an RM-80 causes the associated automatic actions to occur. Automatic actions occurring due to CAG197 reaching the high alarm setpoint include causing a containment ventilation isolation.

d. Plausible since a containment ventilation isolation automatically occurs when the RM-80 loses power, but there is no affect on the ability to lift fuel assemblies.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the effect of a loss of power to an RM-80 and knowledge of the automatic actions associated with the rad monitor

QUESTION NUMBER: 63 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 4.4 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 035.K3.01

Knowledge of the effect that a loss or malfunction of the S/GS will have on the following: RCS

OBJECTIVE: MCO.TA8.OB01

Discuss the excessive increase in secondary steam flow transient, to include comparing and contrasting plant response to the transient of both beginning-of-life (BOL) and end-of-life (EOL) cases, with rod control in manual and automatic.

DEVELOPMENT REFERENCES: FSAR Section 15.1.3
LP LO24.RXS.TA1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the cooldown at BOL will be greater than at EOL, but the power level achieved will be approximately the same since steam demand will be approximately the same.

√ **b.** The SG safety opening will result in the same steam demand at BOL and EOL, thus power will be approximately the same. The lower MTC at BOL will require a greater cooldown to add the same amount of reactivity to compensate for the increase in fuel temperature due to the power demand resulting from the steam flow.

c. Plausible since there will be a difference in RCS temperature for BOL and EOL, but BOL will result in a lower RCS temperature due to the smaller value of the MTC.

d. Plausible since power will stabilize at approximately the same value for both the BOL and EOL case, but the temperature drop will be more severe at BOL due to the smaller value of the MTC.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the effect of the moderator temperature coefficient at different times in core age following an increase in steam demand

QUESTION NUMBER: 64 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 3.3 **SRO**

10CFR55 CONTENT: **41(b)** 5 **43(b)**

KA: 045.A1.06

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: Expected response of secondary plant parameters following T/G trip

OBJECTIVE: SH5.MU5.OB102

Discuss ABN-403, "Turbine Trip Response," to include the following:
c. Plant indications

DEVELOPMENT REFERENCES: ABN-403

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since these actions would occur if the plant were above P-9, but below P-9 the reactor does not get a trip signal.

b. Plausible since the reactor does remain critical and steam load is transferred to the steam dumps. However, with rods in manual there is nothing to reduce the heat production of the core so steam dumps will not slowly close, but will maintain current heat load.

√ **c.** Below P-9 (50% power) a reactor trip signal is not generated. With rods in manual, a large temperature deviation will occur which will cause steam dumps to open and assume the entire heat load of the previous reactor power. Steam dumps are armed by C-7 since a reactor trip does not occur. MFW flow is maintained to the SGs, but at a lower temperature since extraction steam to heat the FW is lost on the turbine trip.

d. Plausible since the reactor remains critical and steam load is transferred to the steam dumps, as well as MFW being maintained, but at a lower temperature. However, with rods in manual there is nothing to reduce the heat production of the core so steam dumps will not slowly close, but will maintain current heat load.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the effect of a turbine trip without a reactor trip on steam dump operation, feed temperature, and reactor power

QUESTION NUMBER: 65 **TIER/GROUP:** 2 / 2

KA IMPORTANCE: **RO** 3.5 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 086.A4.02

Ability to manually operate and/or monitor in the control room: Fire detection panels

OBJECTIVE: SYS.FP1.OB04

Draw, label, and explain a one-line diagram of the Fire Detection sub-system to include the following major components:

1. Fire Detection Main Control Panel
2. Fire Detection Local Control Panels

DEVELOPMENT REFERENCES: ABN-901

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since the CPX number is the local fire detection panel, but the diamond is the detector type and the 23 is the detector zone.

√ **b.** The diamond is indication of an ionization detector and can be various other symbols depending on the type of detector, the CPX number is the local fire detection panel, and the 23 is the detector zone.

c. Plausible since the diamond is the detector type, but the CPX number is the local fire detection panel and the 23 is the detector zone.

d. Plausible since the 23 is the detector zone, but the diamond is the detector type and the CPX number is the local fire detection panel number.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 4

EXPLANATION: Knowledge of the various indications on the fire detection panel

QUESTION NUMBER: 66 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 3.9 **SRO**

10CFR55 CONTENT: **41(b)** 7 **43(b)**

KA: 2.1.30

Ability to locate and operate components, including local controls.

OBJECTIVE: SYS.AF1.OB20

Describe resetting of the TDAFWP Trip and Throttle Valve.

DEVELOPMENT REFERENCES: ABN-305

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SYS.AF1.OB20-004

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** The overspeed trip linkage must first be reset, the hand wheel must be engaged by depressing and holding the clutch lever, the hand wheel is rotated in the CW direction until the latch is fully engaged, and the hand wheel is rotated then in the CCW direction until the actuator if fully up.

b. Plausible since these actions would cause the valve to reset if the CCW and CW operations were reversed and the correct order used, but the valve will not reset using these actions.

c. Plausible since these actions would cause the valve to reset if the CCW and CW operations were reversed, but the valve will not reset using these actions.

d. Plausible since all actions that are required are included, but the order of actions is not correct.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the means to locally reset the TDAFW pump trip and throttle valve

QUESTION NUMBER: 67 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 3.7 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 2.1.01

Knowledge of conduct of operations requirements.

OBJECTIVE: ADM.XA1.OB06

Conduct the required on-shift training and control the actions of trainees in accordance with station procedures

DEVELOPMENT REFERENCES: ODA-102
IPO-002

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: ADM.XA1.OB06- 002

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since if the trainee meets all other requirements, the Shift Manager must approve the training and a licensed operator must directly observe.

b. Plausible since the PEO is not permitted to perform the evolution, but the reason is that the PEO is not currently enrolled in a licensed operator program.

c. Plausible since the Shift Operations Manager must approve a trainee performing a reactor start up, but the PEO cannot perform this evolution because other requirements are not met.

√ **d.** Manipulation of controls by a non-licensed person (Trainee), is permissible only if that person is currently enrolled in the replacement license program as described in TRA-203, has successfully completed classroom instructions for the given evolution, is directly supervised by a Licensed Operator, and approval is granted by the SM. For a Reactor startup, the Shift Ops Manager must also approve a trainee performing the evolution.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the Operations Department requirements for trainee performance

QUESTION NUMBER: 68 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 3.0 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 2.2.12

Knowledge of surveillance procedures.

OBJECTIVE: ADM.XA5.OB126

Describe the purpose of the Master Surveillance Test List (MSTL)

DEVELOPMENT REFERENCES: STA-702

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: ☐ **NEW** ☐ **SIGNIFICANTLY MODIFIED** ☑ **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: ADM.XA5.OB04- 001

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** The MSTL cross-ties Technical Specification and the surveillance procedure number, the frequency of performance, the plant operational applicability, and any special considerations that are associated with the surveillance.

b. Plausible since the MSTL is related to Technical Specification surveillances, but it is a cross-tie of Technical Specifications and the surveillance procedures used to satisfy the Technical Specification surveillance requirements.

c. Plausible since the MSTL is related to Technical Specification surveillances, but it is a cross-tie of Technical Specifications and the surveillance procedures used to satisfy the Technical Specification surveillance requirements.

d. Plausible since the MSTL is related to Technical Specification surveillances, but it is a cross-tie of Technical Specifications and the surveillance procedures used to satisfy the Technical Specification surveillance requirements.

DIFFICULTY ANALYSIS:

☐ **COMPREHENSIVE / ANALYSIS** ☑ **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the function of the MSTL

QUESTION NUMBER: 69 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 3.6 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 2.2.13

Knowledge of tagging and clearance procedures.

OBJECTIVE: ADM.XAA.OB04

Given that a Clearance is to be implemented and a type of component to be tagged, describe the proper method of positioning and tagging the component as described in OWI-110 and supporting procedures.

DEVELOPMENT REFERENCES: STA-605
OWI-110

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** Pump breaker should be tagged first, followed by discharge path, suction path, and then vents/drains.

b. Plausible since the pump breaker is tagged first, but discharge should be tagged before suction.

c. Plausible since drain valve is tagged last, but pump breaker should be tagged before mechanical tags.

d. Plausible since the pump breaker is tagged first, but suction should be tagged before vents/drains.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Application of required tagging sequence for motor and mechanical components

QUESTION NUMBER: 70 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 3.1 **SRO**

10CFR55 CONTENT: **41(b)** 10# **43(b)**

KA: 2.2.03 # NO 55.41(b) tie identified in NUREG-1122

Knowledge of the design, procedural, and operational differences between units.

OBJECTIVE: SYS.MF1.OB31

Describe Unit differences between Unit 1 and Unit 2 Main Feedwater Systems.

DEVELOPMENT REFERENCES: Unit Differences
ABN-709

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since these would be the correct pressures to maintain if the differential program were ramped from 0% - 100%, but the program is ramped from 20% - 100%.

b. Plausible since these would be the correct pressures to maintain if the differential program were ramped from 0% - 100% and the Units were reversed, but the program is ramped from 20% - 100%.

√ **c.** Unit 1 differential pressure program is 80 psid – 170 psid from 20% to 100% power, while Unit 2 is 80 psid – 182 psid. At 60% power, differential pressure should be 125 psid for Unit 1 and 131 psid for Unit 2, resulting in a feed pressure of 1025 psig and 1031 psig, respectively.

d. Plausible since these are the correct pressures to maintain, but the Units are reversed.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Calculation of the required feed header pressure for both units and knowledge of the difference between units

QUESTION NUMBER: 71 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 2.5 **SRO**

10CFR55 CONTENT: **41(b)** 12 **43(b)**

KA: 2.3.02

Knowledge of facility ALARA program.

OBJECTIVE: RWT.GE1.OB01

Identify the administrative radiation dose limits.

DEVELOPMENT REFERENCES: STA-655
STA-651

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since from an ALARA standpoint this is the least total exposure, but Worker #2 will exceed the CPSES administrative exposure limit.

b. Plausible since from an ALARA standpoint this is a lower total exposure than the correct response, but Worker #1 will exceed the CPSES administrative exposure limit.

√ **c.** CPSES administrative limit for TEDE is 4000 mRem (annual). None of the workers will exceed this limit by receiving the given amount of dose and the total dose by the workers is less than others listed which meet limits, meeting ALARA guidelines.

d. Plausible since this meets the CPSES administrative exposure limits, but for ALARA considerations the total exposure exceeds the total of distracter 'C'.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the different total exposures and comparison to limits to determine proper response

QUESTION NUMBER: 72 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 2.7 **SRO**

10CFR55 CONTENT: **41(b)** 10# **43(b)**

KA: 2.3.11 # NO 55.41(b) tie identified in NUREG-1122

Ability to control radiation releases.

OBJECTIVE: SYS.MR1.OB40

Analyze the indications and describe the mitigation strategy and major steps taken, both initial and subsequent, for:

1. ABN-106, High Secondary Activity

DEVELOPMENT REFERENCES: ABN-106
LN OP51.SYS.MR1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** The RCS is cooled down below the temperature equivalent to the saturation pressure for the SG ARVs to prevent the ARVs from lifting once the affected SG is isolated.

b. Plausible since overfilling a ruptured SG is a concern, but cooling down to this temperature prior to isolating the MSIV has no effect on overfill concerns.

c. Plausible since one goal is to depressurize a ruptured SG, but ruptured SG pressure will always be higher than unaffected SG since a ΔT and ΔP must exist between the RCS and unaffected SG to remove heat.

d. Plausible since cooldowns often imply PTS concerns, but PTS will not be a concern on a SGTR event if cooldown limits are maintained.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Comprehension of the relationship between RCS pressure and the ruptured SG pressure to prevent a release

QUESTION NUMBER: 73 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 2.9 **SRO**

10CFR55 CONTENT: **41(b)** 10# **43(b)**

KA: 2.3.10 # NO 55.41(b) tie identified in NUREG-1122

Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

OBJECTIVE: SI2.MU7.OB101

Discuss ABN-102, High Reactor Coolant Activity, to include the following:
3. Indications
5. Operator Actions

DEVELOPMENT REFERENCES: ABN-102

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since isolating letdown will prevent the activity from spreading to the Aux and Safeguards Buildings, but it will be of no use in reducing RCS activity to allow the outage work to be performed under ALARA conditions.

b. Plausible since reducing letdown will minimize the activity from spreading to the Aux and Safeguards Buildings while still allowing some cleanup of the RCS, but it will not maximize the reduction in RCS activity to allow the outage work to be performed under ALARA conditions.

c. Plausible since maintaining letdown flow will be of greater assistance than isolating or reducing letdown flow, but letdown flow should be maximized to reduce RCS activity.

√ **d.** Letdown flow should be increased to a maximum value, but less than 140 gpm, to allow mechanical filtration of the letdown flow via the mixed bed demineralizers.

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the actions required in response to high RCS activity

QUESTION NUMBER: 74 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 3.3 **SRO**

10CFR55 CONTENT: **41(b)** 10# **43(b)**

KA: 2.4.39 # NO 55.41(b) tie identified in NUREG-1122

Knowledge of the RO's responsibilities in emergency plan implementation.

OBJECTIVE: AC1.AG1.OB09

Describe the process for Emergency Action Classification and discuss the use of the EPP-201 Emergency Action Classification Charts and Bases

DEVELOPMENT REFERENCES: EPP-201 Chart 2

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

a. Plausible since, in most cases, pressurizer level is an indication of RCS inventory, but for those cases where either a pressurizer steam space break has occurred or saturation has occurred in the RCS, the pressurizer level indication may not provide accurate indication of the status of the injection flow versus break flow.

b. Plausible since this is indication that the core is covered, but RCS inventory may not have yet decreased to the point where the core begins to uncover.

c. Plausible since this is within the capacity of the charging pumps, but flow indication can be affected by other things beside the status of the injection flow versus break flow balance.

√ **d.** To make the determination that RCS leakage is within the capacity of the CCPs, RCS pressure must stabilize above the shutoff head of the SI pumps which this pressure is.

DIFFICULTY ANALYSIS:

[√] **COMPREHENSIVE / ANALYSIS** [ ] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 3

EXPLANATION: Analysis of plant conditions to determine when RCS leakage is within capacity of pumps

QUESTION NUMBER: 75 **TIER/GROUP:** 3

KA IMPORTANCE: **RO** 4.3 **SRO**

10CFR55 CONTENT: **41(b)** 10 **43(b)**

KA: 2.4.01

Knowledge of EOP entry conditions and immediate action steps.

OBJECTIVE: SJ1.XG1.OB103

State the Immediate Action Steps of EOP-0.0 to include the Action/Expected Response and the Response Not Obtained

DEVELOPMENT REFERENCES: EOP-0.0A
FRS-0.1A
ECA-0.0A
ODA-407

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: [√] **NEW** [ ] **SIGNIFICANTLY MODIFIED** [ ] **DIRECT**

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: None

NRC EXAM HISTORY: None

DISTRACTER JUSTIFICATION (CORRECT ANSWER √'d):

√ **a.** EOP-0.0 can be directly entered and an immediate action is to emergency borate 3160 gallons in the event that DRPI is not available.

b. Plausible since this is an immediate action of FRS-0.1, but FRS-0.1 must be entered via EOP-0.0 or a Red Path on criticality.

c. Plausible since this is an important action and used to be an immediate operator action of FRS-0.1, but it is no longer an immediate action and FRS-0.1 cannot be entered directly.

d. Plausible since restoring power to a safeguards bus is a high priority of ECA-0.0 and this action is an immediate action of EOP-0.0, but it is not an immediate operator action of ECA-0.0

DIFFICULTY ANALYSIS:

[ ] **COMPREHENSIVE / ANALYSIS** [√] **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of which EOPs can be directly entered and the associated immediate operator actions

QUESTION: 1

Given the following conditions:

- Unit 1 is at 52% power.
- Solid State Protection System (SSPS) Train 'B' Actuation Logic testing is being performed.
- Train ‘B’ SSPS Mode Selector switch is in the ‘TEST’ position.
- Train ‘B’ SSPS Input Error Inhibit switch is in the ‘INHIBIT’ position.

Which of the following describes the status of the reactor if a loss of one of the two 48 VDC instrument power supply were to occur on Train 'A' SSPS?

a. Reactor at 52% power with a General Warning for Train 'A' SSPS ONLY

b. Reactor Trip with a General Warning for BOTH Train 'A' and Train 'B' SSPS and **NO** First Out Alarm illuminated

c. Reactor at 52% power with a General Warning for Train 'B' SSPS ONLY

d. Reactor Trip with a General Warning for BOTH Train 'A' and Train 'B' SSPS and a First Out Alarm illuminated

ANSWER:

d. Reactor Trip with a General Warning for BOTH Train 'A' and Train 'B' SSPS and a First Out Alarm illuminated

QUESTION: 2

Unit 2 was operating at 30% reactor power when a Reactor Trip and Safety Injection occurred due to a Pressurizer steam space break.

Which of the following indications would be expected in the Pressurizer five (5) minutes after the Reactor Trip and Safety Injection?

a. Level decreasing and pressure increasing

b. Level increasing and pressure decreasing

c. Level decreasing and pressure decreasing

d. Level increasing and pressure increasing

ANSWER:

b. Level increasing and pressure decreasing

QUESTION: 3

Given the following conditions:

- Unit 1 is recovering from a small break LOCA.
- EOS-1.2A, "Post LOCA Cooldown and Depressurization," has directed that the number of running ECCS pumps be reduced.
- Centrifugal Charging Pump 1-01 has just been stopped.

Which of the following Safety Injection Pumps (SIP) should be stopped next?

a. SIP 1-01 should be stopped to increase the probability that BOTH hot leg and cold leg recirculation capability will be maintained if Residual Heat Removal Pump 1-01 should subsequently trip

b. SIP 1-02 should be stopped to increase the probability that BOTH hot leg and cold leg recirculation capability will be maintained if either Residual Heat Removal Pump should subsequently trip

c. SIP 1-01 should be stopped to increase the probability that ECCS injection flow will be maintained if power is subsequently lost to 6.9 KV Safeguards Bus 1EA1

d. SIP 1-02 should be stopped to increase the probability that ECCS injection flow will be maintained if power is subsequently lost to either 6.9 KV Safeguards Bus

ANSWER:

d. SIP 1-02 should be stopped to increase the probability that ECCS injection flow will be maintained if power is subsequently lost to either 6.9 KV Safeguards Bus

QUESTION: 4

Given the following conditions:

- Unit 1 has experienced a large break loss of coolant accident (LOCA).
- Containment pressure is 35.6 psig and slowly decreasing.
- Core Exit Thermocouple temperatures are 650^{o}F and slowly increasing.
- RCS pressure is approximately the same as Containment pressure.
- Centrifugal Charging Pump (CCP) 1-02 tripped after automatically starting.
- All other ECCS equipment is operating properly.

Reactor Coolant Pumps (RCP) should be tripped …

a. to minimize the inventory loss from the RCS.

b. to minimize the heat input to the RCS.

c. due to a loss of CCW flow to the RCP motor and bearing coolers.

d. due to a loss of CCW flow to the RCP thermal barriers.

ANSWER:

c. due to a loss of CCW flow to the RCP motor and bearing coolers.

QUESTION: 5

Given the following conditions:

- The Positive Displacement Pump (PDP) is in operation.
- Both Centrifugal Charging Pumps are in standby.
- Letdown is established at 75 gpm.
- LCV-112A, VCT LVL CTRL VLV, is in the 'AUTO' position.
- Actual VCT level is 56%.

Assuming all controls are in automatic and **NO** operator action occurs after the failure, which of the following describes the response of VCT level if LT-112 fails high?

a. Level will decrease to 46% and automatic makeup will cause level to cycle between 46% and 56%

b. Level will decrease to 46% when an automatic makeup will occur, but level will continue to decrease

c. **NO** automatic makeup will occur and level will decrease to 2% when the PDP suction will automatically shift to the RWST

d. **NO** automatic makeup will occur and level will decrease until the PDP loses suction source and begins cavitating

ANSWER:

d. **NO** automatic makeup will occur and level will decrease until the PDP loses suction source and begins cavitating

QUESTION: 6

While operating at reduced inventory with a cold leg opening in the Reactor Coolant System (RCS), a large hot leg vent path in the RCS is needed.

How does this requirement mitigate the consequences of a loss of RHR cooling?

a. WITHOUT the vent path, the core heatup could pressurize the vessel, causing core uncovery by forcing water out the RCS cold leg

b. WITHOUT the vent path, the core heatup could pressurize the vessel, applying excessive stress at the reactor vessel flange

c. WITH the vent path, the core heatup and pressurization of the Reactor Vessel will force water out of the RCS hot leg and cool the core

d. WITH the vent path, the time to reach saturation conditions in the RCS is extended

ANSWER:

a. WITHOUT the vent path, the core heatup could pressurize the vessel, causing core uncovery by forcing water out the RCS cold leg

QUESTION: 7

Given the following conditions:

- The Reactor Vessel head has just been installed and is being tensioned following a Unit 2 refueling outage.
- RCS temperature is currently 110°F.
- Maintenance reports that Component Cooling Water (CCW) Pump 2-02 has a failed motor bearing.

Under these conditions, which of the following is the **HIGHEST** RCS temperature that Unit 2 can be increased to **WITHOUT** violating Technical Specifications?

a. 135°F

b. 195°F

c. 315°F

d. 345°F

ANSWER:

b. 195°F

QUESTION: 8

Given the following conditions:

- Unit 1 is operating at 100% power.
- PS-455F, PRZR PRESS CTRL CHAN SELECT, is in the '457/456' position.
- PT-457, PRZR PRESS CHAN III, fails high.
- The Reactor Operator has placed PK-455A, PRZR MASTER PRESS CTRL, in MANUAL and is adjusting the controller for current RCS pressure of 2205 psig.

Which of the following identifies any additional actions required of the Reactor Operator **PRIOR** to having placed PK-455A in MANUAL?

a. Report that **NEITHER** PCV-455A, PRZR PORV, nor PCV-456, PRZR PORV, has opened

b. Close **ONLY** PCV-455A, PRZR PORV, and the associated isolation valve 8000A, PRZR PORV BLK VLV

c. Close **ONLY** PCV-456, PRZR PORV, and the associated isolation valve 8000B, PRZR PORV BLK VLV

d. Close **BOTH** PCV-455A, PRZR PORV, and PCV-456, PRZR PORV and the associated isolation valves 8000A, PRZR PORV BLK VLV, and 8000B, PRZR PORV BLK VLV

ANSWER:

b. Close **ONLY** PCV-455A, PRZR PORV, and the associated isolation valve 8000A, PRZR PORV BLK VLV

QUESTION: 9

Given the following conditions:

- A Steam Generator Tube Rupture has occurred on Unit 1.
- EOP-3.0A, "Steam Generator Tube Rupture," is being performed.
- All Reactor Coolant Pumps have been tripped.
- Step 20 states, "Depressurize RCS Using PRZR PORV to Minimize Break Flow and Refill PRZR."

Which of the following is a possible result of performing this step?

a. A rapid drop in core ΔT as natural circulation flow is enhanced

b. A rapid rise in pressurizer level due to voiding in the Reactor Vessel upper head during natural circulation operations

c. A rapid drop in the ruptured SG cold leg temperature due to the loop being stagnant during the pressure reduction

d. A rapid rise in containment pressure due to overpressurization of the Pressurizer Relief Tank and subsequent rupture disc failure

ANSWER:

b. A rapid rise in pressurizer level due to voiding in the Reactor Vessel upper head during natural circulation operations

QUESTION: 10

Given the following conditions:

- A large steam line break has occurred on Steam Generator 2-01.
- The crew has transitioned to EOP-2.0B, "Faulted Steam Generator Isolation," from EOP-0.0B, "Reactor Trip or Safety Injection."
- The Unit Supervisor has directed the Reactor Operator to "Check Main Steamline Isolation and Bypass Valves – CLOSED."
- The Reactor Operator rotates both MSL ISOL MAN ACT/RESET hand switches to the 'CLOSE' position and also rotates all MSIV hand switches to the 'CLOSE' position.
- All Main Steamline Isolation Valves (MSIV) remain open.

Which of the following instructions should the Reactor Operator provide to the local Plant Equipment Operator?

a. Close ONLY MSIV 2-01 by shutting the air isolation valve to the hydraulic pump, and deenergizing the solenoid valve

b. Close ALL MSIVs by shutting the air isolation valves to the hydraulic pumps, and deenergizing the solenoid valves

c. Close ONLY MSIV 2-01 by using an adjustable wrench to rotate the operating nut in the clockwise direction

d. Close ALL MSIVs by using an adjustable wrench to rotate the operating nuts in the clockwise direction

ANSWER:

d. Close ALL MSIVs by using an adjustable wrench to rotate the operating nuts in the clockwise direction

QUESTION: 11

ECA-2.1A, "Uncontrolled Depressurization of All Steam Generators," requires that Auxiliary Feedwater flow to each Steam Generator with a narrow range level of less than 5% must be controlled at a minimum of 100 gpm.

Which of the following is the reason for the minimum flow requirement?

a. Prevent Steam Generator dryout

b. Ensure adequate RCS subcooling margin

c. Maintain a verifiable RCS cooldown rate

d. Prevent further Steam Generator depressurization

ANSWER:

a. Prevent Steam Generator dryout

QUESTION: 12

Why are all Reactor Coolant Pumps (RCP) tripped during the performance of FRH 0.1A, "Response To Loss Of Secondary Heat Sink"?

a. Minimize heat input from the RCPs and conserve Steam Generator inventory

b. Minimize heat input from the RCPs and protect the RCP seal package from overheating

c. Minimize inventory loss from the Reactor Coolant System and conserve Steam Generator inventory

d. Minimize inventory loss from the Reactor Coolant System and establish natural circulation flow while Steam Generator inventory is still available

ANSWER:

a. Minimize heat input from the RCPs and conserve Steam Generator inventory

QUESTION: 13

Unit 1 is operating at 100% power when a loss of the **NORMAL** offsite power source to Unit 1 occurs.

Which of the following describes the expected response of the Unit 1, Train A, 6.9 KV Safeguards Bus, 1EA1, and Emergency Diesel Generator (EDG) 1-01 to this event?

a. 1EA1-1, INCOMING BKR (from XST2), closes within 1.0 seconds of the loss of voltage and EDG 1-01 starts to ensure an immediate emergency power supply in the event of a subsequent loss of power from XST2

b. 1EA1-1, INCOMING BKR (from XST2), closes within 1.0 seconds of the loss of voltage and EDG 1-01 remains off to minimize the number of unnecessary EDG starts

c. 1EA1-2, INCOMING BKR (from XST1), closes within 1.0 seconds of the loss of voltage and EDG 1-01 starts to ensure an immediate emergency power supply in the event of a subsequent loss of power from XST1

d. 1EA1-2, INCOMING BKR (from XST1), closes within 1.0 seconds of the loss of voltage and EDG 1-01 remains off to minimize the number of unnecessary EDG starts

ANSWER:

d. 1EA1-2, INCOMING BKR (from XST1), closes within 1.0 seconds of the loss of voltage and EDG 1-01 remains off to minimize the number of unnecessary EDG starts

QUESTION: 14

Given the following conditions:

- Unit 1 is operating at 60% power.
- All control systems are in their normal alignment.
- The input breaker for Protection Bus 1PC1 opens.
- The Unit Supervisor directs the BOP operator to control Steam Generator levels and Main Feed Water Pump ΔP.

Which of the following responses is required of the BOP operator to establish proper Main Feed Water Pump ΔP?

a. RAISE Main Feed Water Pump speed to establish a ΔP of 125 psid

b. RAISE Main Feed Water Pump speed to establish a ΔP of 134 psid

c. LOWER Main Feed Water Pump speed to establish a ΔP of 125 psid

d. LOWER Main Feed Water Pump speed to establish a ΔP of 134 psid

ANSWER:

a. RAISE Main Feed Water Pump speed to establish a ΔP of 125 psid

QUESTION: 15

A bus fault has caused 125/250 VDC Electrical Distribution Bus 1D3 to deenergize.

Which of the following is an effect of the loss of DC power?

a. Reactor Coolant Pump breaker position is **NOT** available in the Control Room and an Operator must locally trip the breakers, if required

b. Main Turbine Generator EHC Pump breaker position is **NOT** available in the Control Room and an Operator must locally trip the breakers, if required

c. Train 'B' Reactor Trip Breaker position is available in the Control Room, but the shunt trip of the breaker is **NOT** available either from the Control Room or locally

d. Main Feed Pump 'B' controller position is available in the Control Room, but the electrical trip of the pump is **NOT** available either from the Control Room or locally

ANSWER:

a. Reactor Coolant Pump breaker position is **NOT** available in the Control Room and an Operator must locally trip the breakers, if required

QUESTION: 16

Given the following conditions:

- Unit 1 is operating at 70% power when an 86-2 Lockout Relay (LOR) fault occurs on Bus 1EA2.
- The LOR trips both 1EA2-1, INCOMING BKR, and 1EA2-2, INCOMING BKR.
- Emergency Diesel Generator (EDG) 1-02 automatically starts and DG 2 BKR 1EG2 automatically closes.
- ALB-01, 1.8, SSWP 1/2 OVERLOAD/TRIP, alarms.
- The amber MISMATCH light on SSWP 2 hand switch is LIT.
- The white TRIP light on SSWP 2 hand switch is LIT.

Which of the following actions should be taken?

a. Wait for the Blackout Sequencer to complete its timing and verify proper Service Water Flow to EDG 1-02; Continue plant operations at approximately 70% power

b. Wait for the Blackout Sequencer to complete its timing and verify proper Service Water Flow to EDG 1-02; Enter and perform the actions of EOP-0.0A, "Reactor Trip or Safety Injection"

c. Place EDG 1-02 EMER STOP/START hand switch in PULL OUT; Continue plant operations at approximately 70% power

d. Place EDG 1-02 EMER STOP/START hand switch in PULL OUT; Enter and perform the actions of EOP-0.0A, "Reactor Trip or Safety Injection"

ANSWER:

c. Place EDG 1-02 EMER STOP/START hand switch in PULL OUT; Continue plant operations at approximately 70% power

QUESTION: 17

In ECA-1.2A, "LOCA Outside Containment," the operator is instructed to check RCS pressure to determine if the break has been isolated by previous actions. If the break has **NOT** been isolated, the operator transitions to ECA-1.1A, "Loss of Emergency Coolant Recirculation."

What effect does the transition to ECA-1.1A have on mitigating the accident?

a. Actions are taken to ensure all Containment Isolation Phase A and Containment Isolation Phase B valves are closed

b. Actions are taken to increase the injection flow rate to restore Reactor Coolant System pressure

c. Actions are taken to minimize Refueling Water Storage Tank depletion by reducing injection flow

d. Actions are taken to stabilize RCS pressure to prevent the Safety Injection Accumulators from dumping out the break

ANSWER:

c. Actions are taken to minimize Refueling Water Storage Tank depletion by reducing injection flow

QUESTION: 18

Given the following conditions:

- Unit 1 has experienced a loss of coolant accident exactly 30 minutes ago.
- Neither 8811A, CNTMT SMP TO RHRP 1 SUCT ISOL VLV, nor 8811B, CNTMT SMP TO RHRP 2 SUCT ISOL VLV, can be opened.
- As a result of these valve failures, the crew has transitioned to ECA-1.1A, "Loss of Emergency Coolant Recirculation."
- Only Train 'A' Centrifugal Charging (CCP), Safety Injection (SIP), and Residual Heat Removal (RHRP) pumps are running.
- Reactor Coolant System (RCS) pressure is currently 340 psig.
- FI-917, CCP SI FLO, is indicating 250 gpm.
- FI-918, SIP 1 DISCH FLO, is indicating 400 gpm.
- The crew has determined that ECCS **CANNOT** be terminated due to inadequate subcooling and are in the process of establishing minimum ECCS flow.

Given Attachment 4, "Minimum Required ECCS Flow," from ECA-1.1A, which of the following describes how the crew should establish minimum ECCS flow?

a. Secure CCP 1-01 and RHRP 1-01, allowing only SIP 1-01 to inject into the RCS

b. Secure CCP 1-01 and SIP 1-01, allowing only RHRP 1-01 to inject into the RCS

c. Secure RHRP 1-01, allowing both CCP 1-01 and SIP 1-01 to inject into the RCS

d. Secure SIP 1-01, allowing both CCP 1-01 and RHRP 1-01 to inject into the RCS

ANSWER:

c. Secure RHRP 1-01, allowing both CCP 1-01 and SIP 1-01 to inject into the RCS

QUESTION: 19

Given the following conditions:

- A Reactor Trip has occurred on Unit 1.
- All control rods fully inserted with the exception of three (3) rods in Control Bank C, which are at the following positions:
  B8 – 228 steps
  F6 – 210 steps
  F10 – 6 steps
- After noting Boric Acid Tank X-01 level is indicating 61%, the Reactor Operator commences Emergency Boration.

Given TDM-804A, "Boric Acid Storage Tank 01/02," which of the following identifies Boric Acid Storage Tank X-01 level following completion of the Emergency Boration?

a. Level will be between 52% and 53%, which meets the minimum required level for plant conditions

b. Level will be between 52% and 53%, which **DOES NOT** meet the minimum required level for plant conditions

c. Level will be between 48% and 49%, which meets the minimum required level for plant conditions

d. Level will be between 48% and 49%, which **DOES NOT** meet the minimum required level for plant conditions

ANSWER:

d. Level will be between 48% and 49%, which **DOES NOT** meet the minimum required level for plant conditions

QUESTION: 20

Given the following conditions:

- LS-459D, PRZR LVL CTRL CHAN SELECT, is in the 459 / 460 position.
- With actual pressurizer level at 50%, Pressurizer Level Transmitter LT-459 develops a slow leak in the reference leg.

Which of the following describes the response of LI-459, actual pressurizer level, and charging flow in response to the reference leg leak?

	LI-459	**ACTUAL PRZR LEVEL**	**CHARGING FLOW**
a.	Increasing	Increasing	Decreasing
b.	Increasing	Decreasing	Decreasing
c.	Decreasing	Increasing	Increasing
d.	Decreasing	Decreasing	Increasing

ANSWER:

b.	Increasing	Decreasing	Decreasing

QUESTION: 21

A radioactive spill in the vicinity of SFGD Sump 1-03 causes X-RE-5251A (ABP074), LVW/EVAP POND VNT & DRN HDR RADIATION DETECTOR, to go into a high (red) alarm condition.

Assuming X-HV-WM182A, VALVE TO CO-CURRENT WASTE HOLD-UP TANKS, and X-HV-WM183A, VALVE TO LVW POND, are in their normal alignment, which of the following is the expected automatic response of the valves?

	X-HV-WM182A	**X-HV-WM183A**
a.	Opens	Opens
b.	Opens	Closes
c.	Closes	Opens
d.	Closes	Closes

ANSWER:

b.	Opens	Closes

QUESTION: 22

A Radwaste Operator has inadvertently opened HCV-0014, WASTE GAS DISCHARGE CONTROL VALVE, while transferring Waste Gas Decay Tanks. Radiation levels in the ventilation system are increasing rapidly.

Given the following radiation monitors:

1. XRE-5250 (WGS083), WASTE GAS RADIATION MONITOR
2. XRE-5567A/B (PVG384/385), PLANT VENT NOBLE GAS ACTIVITY RADIATION MONITOR
3. X-RE-5570A/B (PVG684/685), PLANT VENT STACK WIDE RANGE GAS RADIATION MONITOR
4. X-RE-5701 (ABV089), AUX BUILDING VENT DUCT MONITOR

Which of the following identifies ALL of the above radiation monitors that will cause an automatic closure of HCV-0014?

a. 1 & 2

b. 1 & 3

c. 2 & 4

d. 3 & 4

ANSWER:

d. 3 & 4

QUESTION: 23

Given the following conditions:

- A large break loss of coolant accident has occurred inside Unit 1 Containment.
- Attachment 2 of EOP-0.0A has been completed.
- A transition has been made to EOS-1.3A, "Transfer to Cold Leg Recirculation."
- Refueling Water Storage Tank (RWST) level is 28% and lowering slowly.
- Containment pressure peaked at 26 psig and is currently 2 psig.

Regarding Containment Spray Pump (CSP) operation, which of the following actions should be taken and what is the reason for performing the action?

a. Wait until RWST level is <24% before transferring CSP suction to the Containment Sump to maintain the pH of the Containment Sump water within the analyzed range

b. Wait until RWST level is <24% before transferring CSP suction to the Containment Sump to ensure adequate Containment Sump level to maintain the required NPSH

c. Stop all CSPs and place the system in standby due to Containment pressure <3 psig to reduce the loss of RWST inventory

d. Transfer CSP suction to the Containment Sump to prevent pump cavitation as a result of the Lo-Lo level in the RWST

ANSWER:

a. Wait until RWST level is <24% before transferring CSP suction to the Containment Sump to maintain the pH of the Containment Sump water within the analyzed range

QUESTION: 24

Given the following conditions:

- Due to an ORANGE path condition on CORE COOLING, the crew is performing the actions of FRC-0.2A, "Response to Degraded Core Cooling."
- A CAUTION prior to the step to depressurize all intact steam generators to 170 psig states, "The following step will cause accumulator injection which may cause a RED path condition in the INTEGRITY status tree."
- When the crew performs the steam generator depressurization, a RED path condition on INTEGRITY does occur.

Which of the following describes the expected response of the crew to this condition?

a. Remain in FRC-0.2A since a transition to the RED path procedure for INTEGRITY, FRP-0.1A, "Response to Imminent Pressurized Thermal Shock," will require stopping any cooldown and this could result in subsequent core boiling and a RED path condition on CORE COOLING

b. Remain in FRC-0.2A since a transition to the RED path procedure for INTEGRITY, FRP-0.1A, "Response to Imminent Pressurized Thermal Shock," would violate the ERG rules of usage since CORE COOLING is a higher priority than INTEGRITY

c. Immediately transition to the RED path procedure for INTEGRITY, FRP-0.1A, "Response to Imminent Pressurized Thermal Shock," since subsequent actions in FRC-0.2A to start Reactor Coolant Pumps could result in a pressure spike in the RCS and a subsequent failure of the Reactor Vessel

d. Immediately transition to the RED path procedure for INTEGRITY, FRP-0.1A, "Response to Imminent Pressurized Thermal Shock," since the ERG rules of usage identify a RED path on INTEGRITY as a higher priority than an ORANGE path on CORE COOLING

ANSWER:

a. Remain in FRC-0.2A since a transition to the RED path procedure for INTEGRITY, FRP-0.1A, "Response to Imminent Pressurized Thermal Shock," will require stopping any cooldown and this could result in subsequent core boiling and a RED path condition on CORE COOLING

QUESTION: 25

Given the following conditions:

- Following a Reactor Trip and Safety Injection, the crew has transitioned to EOS-1.1A, "Safety Injection Termination."
- Centrifugal Charging Pump 1-02 and both Safety Injection Pumps have been stopped and placed in standby.
- Containment pressure is 1.2 psig and stable.
- Reactor Coolant System subcooling is currently 19^{o}F and slowly degrading.
- Pressurizer level is 18% and slowly decreasing.

Which of the following actions is to be taken?

a. Manually control charging flow as necessary and continue in EOS-1.1A, "Safety Injection Termination"

b. Manually operate Emergency Core Cooling Pumps as necessary and continue in EOS-1.1A, "Safety Injection Termination"

c. Manually operate Emergency Core Cooling Pumps as necessary and transition to EOP-1.0A, "Loss of Reactor or Secondary Coolant"

d. Manually actuate Safety Injection and transition to EOP-1.0A, "Loss of Reactor or Secondary Coolant"

ANSWER:

c. Manually operate Emergency Core Cooling Pumps as necessary and transition to EOP-1.0A, "Loss of Reactor or Secondary Coolant"

QUESTION: 26

Given the following conditions:

- A Reactor Trip occurred and the crew is performing EOS-0.1A, "Reactor Trip Response."
- As a result of a small RCS leak, Containment pressure has increased to 0.2 psig.
- The Shift Technical Advisor informs the Unit Supervisor that Containment radiation levels have reached 22 R/hr, resulting in a YELLOW path condition on CONTAINMENT, and the Unit Supervisor enters FRZ-0.3A, "Response to High Containment Radiation Level," in response.
- While performing FRZ-0.3A, the RCS leak worsens and Pressurizer level drops off-scale low.

Which of the following actions should be taken?

a. Continue in FRZ-0.3A since responding to the high Containment radiation level requires starting additional Centrifugal Charging Pumps to restore Pressurizer level

b. Based on the Foldout Page criteria of FRZ-0.3A, manually initiate Safety Injection and transition to EOP-0.0A, "Reactor Trip or Safety Injection"

c. Based on the Foldout Page criteria of EOS-0.1A, manually start Emergency Core Cooling Pumps as necessary and transition to EOP-1.0A, "Loss of Reactor or Secondary Coolant"

d. Based on the Foldout Page criteria of EOS-0.1A, manually initiate Safety Injection and transition to EOP-0.0A, "Reactor Trip or Safety Injection"

ANSWER:

d. Based on the Foldout Page criteria of EOS-0.1A, manually initiate Safety Injection and transition to EOP-0.0A, "Reactor Trip or Safety Injection"

QUESTION: 27

Given the following conditions:

- A large steam line break has occurred on Unit 2.
- Following the performance of EOP-0.0B, "Reactor Trip or Safety Injection," and EOP-2.0B, "Faulted Steam Generator Isolation," the crew has transitioned to FRP-0.1B, "Response to Imminent Pressurized Thermal Shock Condition."

Which of the following actions are performed and why?

a. Allow the RCS temperature to increase and hold RCS pressure stable to prepare for the required soak period

b. Allow the RCS temperature to increase and decrease RCS pressure to minimize RCS subcooling

c. Hold RCS temperature stable and decrease RCS pressure to minimize RCS subcooling

d. Hold RCS temperature stable and hold RCS pressure stable to prepare for the required soak period

ANSWER:

c. Hold RCS temperature stable and decrease RCS pressure to minimize RCS subcooling

QUESTION: 28

Unit 1 is operating at 30% power when Reactor Coolant Pump 1-02 trips.

Assuming **NO** operator actions, which of the following describes how steam flow and SG level in SG 1-02 respond initially (within one minute)?

	STEAM FLOW	**SG LEVEL**
a.	Increases	Increases
b.	Increases	Decreases
c.	Decreases	Increases
d.	Decreases	Decreases

ANSWER:

d.	Decreases	Decreases

QUESTION: 29

TK-130, LTDN HX OUT TEMP CTRL, has been adjusted from a setpoint of 95°F to a setpoint of 85°F.

Which of the following describes how adjusting the setpoint affects the plant?

a. Increased Component Cooling Water flow through the Letdown Heat Exchanger results in an increase in RCS boron concentration

b. Increased Component Cooling Water flow through the Letdown Heat Exchanger results in a decrease in RCS boron concentration

c. Increased Chemical and Volume Control System flow through the Letdown Heat Exchanger results in an increase in RCS boron concentration

d. Increased Chemical and Volume Control System flow through the Letdown Heat Exchanger results in a decrease in RCS boron concentration

ANSWER:

b. Increased Component Cooling Water flow through the Letdown Heat Exchanger results in a decrease in RCS boron concentration

QUESTION: 30

CVCS Letdown is aligned with the following valves open:

- LCV-459, LTDN ISOL VLV
- LCV-460, LTDN ISOL VLV
- 8149A, LTDN ORIFICE ISOL VLV (45 GPM)
- 8149B, LTDN ORIFICE ISOL VLV (75 GPM)

Assuming **NO** operator action, which of the following describes the effect on the letdown valves if LCV-459 begins to drift closed due to a leak in the instrument air line to the valve operator?

a. LCV-460, 8149A, and 8149B all close

b. LCV-460 closes; 8149A and 8149B remain open

c. LCV-460 remains open; 8149A and 8149B close

d. LCV-460, 8149A, and 8149B all remain open

ANSWER:

c. LCV-460 remains open; 8149A and 8149B close

QUESTION: 31

Which of the following identifies the power supplies for the PRZR PORV BLOCK VLVs, 8000A and 8000B?

	8000A	**8000B**
a.	DC DIST PNL 1ED1-1	DC DIST PNL 1ED2-1
b.	118 VAC DIST PNL 1EC1	118 VAC DIST PNL 1EC2
c.	480 VAC MCC 1EB3-2	480 VAC MCC 1EB4-2
d.	480 VAC MCC 1EB2-1	480 VAC MCC 1EB1-2

ANSWER:

c. 480 VAC MCC 1EB3-2 480 VAC MCC 1EB4-2

QUESTION: 32

Given the following conditions:

- A large break LOCA has occurred inside Unit 1 containment.
- RCS and Containment pressure are both approximately 30 psig.
- Component Cooling Water (CCW) Pump 1-01 has tripped.
- CCW trains are split and **CANNOT** be cross-tied.

Which of the following describes the effect of these events on the modes of Emergency Core Cooling operation of the Residual Heat Removal (RHR) System?

a.
- Train 'A' RHR can be operated in the Injection Mode ONLY
- Train 'B' RHR can be operated in BOTH the Injection Mode and Cold Leg Recirculation Mode

b.
- Train 'A' RHR can be operated in the Injection Mode ONLY
- Train 'B' RHR can be operated in the Injection Mode; it can also be operated in the Cold Leg Recirculation Mode only if the RHR trains are cross-tied

c.
- Train 'A' RHR can be operated in the Injection Mode; it can also be operated in the Cold Leg Recirculation Mode only if the RHR trains are cross-tied
- Train 'B' RHR can be operated in BOTH the Injection Mode and Cold Leg Recirculation Mode

d.
- Train 'A' RHR can be operated in the Injection Mode; it can also be operated in the Cold Leg Recirculation Mode only if the RHR trains are cross-tied
- Train 'B' RHR can be operated in the Injection Mode; it can also be operated in the Cold Leg Recirculation Mode only if the RHR trains are cross-tied

ANSWER:

a.
- Train 'A' RHR can be operated in the Injection Mode ONLY
- Train 'B' RHR can be operated in BOTH the Injection Mode and Cold Leg Recirculation Mode

QUESTION: 33

Given the following conditions:

- After being used to draw a vacuum in the Reactor Coolant System (RCS), the Pressurizer Relief Tank has been isolated from the Pressurizer (PRZR).
- The RCS is at a vacuum (5 psia).
- RCS and PRZR temperatures are equalized at 130^{o}F.
- Actual PRZR level is 50%.

Which of the following describes the PREFERRED method of establishing a steam bubble in the pressurizer in accordance with SOP-101A, "Reactor Coolant System"?

a. Adjust charging and letdown to raise PRZR pressure to approximately 50 psig and raise PRZR level to 100%; Energize PRZR heaters to heat up the PRZR, establishing a steam bubble at approximately 298^{o}F in the PRZR

b. Adjust charging and letdown to raise PRZR pressure to approximately 50 psig while maintaining PRZR level constant; Energize PRZR heaters to heat up the PRZR, establishing a steam bubble at approximately 298^{o}F in the PRZR

c. Adjust charging and letdown to raise PRZR level to 100% while maintaining PRZR pressure constant; Energize PRZR heaters to heat up the PRZR, establishing a steam bubble at approximately 162^{o}F in the PRZR

d. Adjust charging and letdown to maintain PRZR pressure and PRZR level constant; Energize PRZR heaters to heat up the PRZR, establishing a steam bubble at approximately 162^{o}F in the PRZR

ANSWER:

d. Adjust charging and letdown to maintain PRZR pressure and PRZR level constant; Energize PRZR heaters to heat up the PRZR, establishing a steam bubble at approximately 162^{o}F in the PRZR

QUESTION: 34

Given the following conditions:

- Station Service Water (SSW) Pump 1-01 has tripped.
- Component Cooling Water (CCW) Pump 1-02 automatically started.
- CCW Heat Exchanger 1-01 outlet temperature exceeds 122°F.

Which of the following actions is required?

a. Isolate the Train 'A' CCW Safeguards loop

b. Secure Train 'A' CCW Pump 1-01

c. Cross-tie Unit 1 SSW trains to supply cooling to CCW Train 'A'

d. Cross-tie Unit 1 and Unit 2 Train 'A' SSW

ANSWER:

b. Secure Train 'A' CCW Pump 1-01

QUESTION: 35

Given the following conditions:

- Unit 1 is operating at 100% power.
- Component Cooling Water (CCW) Pump 1-01 is operating.
- The crew is preparing to start CCW Pump 1-02 for equipment rotation.

Which of the following identifies an action that should be taken prior to starting CCW Pump 1-02 and the reason for the action?

a. Open HS-4537, CCWP 2 RECIRC VLV, to prevent CCW system relief valves from lifting due to high system pressure

b. Open HS-4537, CCWP 2 RECIRC VLV, to prevent CCW heat exchanger tube damage due to excessive flow vibration

c. Throttle open HS-4573, RHR HX 2 CCW RET VLV, or HS-4575, CS HX 2 CCW RET VLV, to prevent CCW system relief valves from lifting due to high system pressure

d. Throttle open HS-4573, RHR HX 2 CCW RET VLV, or HS-4575, CS HX 2 CCW RET VLV, to prevent CCW heat exchanger tube damage due to excessive flow vibration

ANSWER:

c. Throttle open HS-4573, RHR HX 2 CCW RET VLV, or HS-4575, CS HX 2 CCW RET VLV, to prevent CCW system relief valves from lifting due to high system pressure

QUESTION: 36

Given the following conditions:

- Unit 1 is operating at 50% power.
- PS-455F, PRZR PRESS CTRL CHAN SELECT, is in the '455/456' position.
- PT-456, PRZR PRESS CHAN II, fails high.

Assuming **NO** operator action, which of the following is the expected plant response?

a. A low pressure Reactor Trip and Safety Injection occur

b. The unit remains at power, with pressure being controlled by PORV-456 at approximately 2185 psig

c. The unit remains at power, with pressure being controlled by PORV-456 at approximately 2355 psig

d. A high pressure Reactor Trip occurs

ANSWER:

b. The unit remains at power, with pressure being controlled by PORV-456 at approximately 2185 psig

QUESTION: 37

Assuming actual core power remains constant, which of the following changes in plant operating conditions will cause the plant to operate closer to a Reactor Protection System setpoint designed to protect against Departure from Nucleate Boiling?

a. T-cold decreasing from 560°F to 556°F due to xenon building in

b. PRZR pressure decreasing from 2245 psig to 2225 psig due to de-energizing a group of backup heaters

c. Δ-I increasing from -10% to -3% due to rod withdrawal while borating

d. RCS total flow increasing from 400,000 gpm to 410,000 gpm due to SG replacement

ANSWER:

b. PRZR pressure decreasing from 2245 psig to 2225 psig due to de-energizing a group of backup heaters

QUESTION: 38

Given the following conditions:

- A plant cooldown and depressurization is in progress.
- Reactor Coolant System pressure is 1925 psig.
- The Reactor Operator has taken both 1/1-PPSIRBA, PRZR PRESS SI RESET / BLOCK, and 1/1-PPSIRBB, PRZR PRESS SI RESET / BLOCK, to the 'Block' position.
- The Balance of Plant Operator has taken both 1/1-SLSIRBA, MSL ISOL SI RESET / BLOCK, and 1/1-SLSIRBB, MSL ISOL SI RESET / BLOCK, to the 'Block' position.

Assuming **NO** further operator actions, if a large steam break were to subsequently occur outside Containment, which of the following describes the protection system response?

a. **NEITHER** Safety Injection, **NOR** Main Steam Line Isolation will occur

b. Safety Injection will occur, but Main Steam Line Isolation will **NOT** occur

c. Main Steam Line Isolation will occur, but Safety Injection will **NOT** occur

d. **BOTH** Safety Injection **AND** Main Steam Line Isolation will occur

ANSWER:

c. Main Steam Line Isolation will occur, but Safety Injection will **NOT** occur

QUESTION: 39

With one (1) high Containment pressure detector failed low, an Engineered Safety Features (ESF) Containment HI-3 pressure signal would require:

a. 2/2 remaining high Containment pressure detectors sensing pressure $\geq$ 3.2 psig

b. 2/2 remaining high Containment pressure detectors sensing pressure $\geq$ 18.2 psig

c. 2/3 remaining high Containment pressure detectors sensing pressure $\geq$ 18.2 psig

d. 2/3 remaining high Containment pressure detectors sensing pressure $\geq$ 3.2 psig

ANSWER:

c. 2/3 remaining high Containment pressure detectors sensing pressure $\geq$ 18.2 psig

QUESTION: 40

Given the following conditions:

- Unit 1 is operating at 50%.
- ALB-02B, 1.12, CNTMT FN CLR 3 & 4 CNDS LVL HI, is alarming.
- ALB-02B, 3.12, CNTMT FN CLR 3 & 4 CND FILL RATE HI, is alarming.
- ALB-11C, CH WTR SRG TK LVL HI-HI/LO-LO, is alarming intermittently due to a low level.
- Diagnosing a Containment Ventilation Chilled Water system leak, the Unit Supervisor directs the Reactor Operator to place HS-5413A, CNTMT FN CLR FN 3, and HS-5417A, CNTMT FN CLR FN 4, in STOP.

Which of the following describes the impact of the Reactor Operator's actions?

a. The Ventilation Chilled Water leak will be isolated; the Unit must be tripped and EOP-0.0A, "Reactor Trip or Safety Injection," must be entered

b. The Ventilation Chilled Water leak will be isolated; continued plant operations per IPO-003A, "Power Operations," is permitted

c. The Ventilation Chilled Water leak will **NOT** be isolated; a Containment entry per STA-620, "Containment Entry," must be made to locally isolate the leak

d. The Ventilation Chilled Water leak will **NOT** be isolated; the leak must be isolated on Ventilation Panel CV-03 per SOP-814, "Ventilation Chilled Water"

ANSWER:

c. The Ventilation Chilled Water leak will **NOT** be isolated; a Containment entry per STA-620, "Containment Entry," must be made to locally isolate the leak

QUESTION: 41

Assuming Containment Recirculation Cooler Fan 1-01 was operating, which of the following identifies the expected hand switch indication for HS-5405A, CNTMT FN CLR FN 1, two (2) minutes following a Safety Injection?

	GREEN FAN LIGHT	AMBER MISMATCH LIGHT	WHITE TRIP LIGHT	RED FAN LIGHT
a.	ON	ON	ON	OFF
b.	ON	ON	OFF	OFF
c.	ON	OFF	ON	OFF
d.	OFF	OFF	OFF	ON

ANSWER:

b.	ON	ON	OFF	OFF

QUESTION: 42

Which of the following describes how cooling water is supplied to the Containment Spray Pump (CSP) bearing coolers and seal coolers?

a. Component Cooling Water supplies BOTH the CSP bearing coolers and seal coolers

b. Component Cooling Water supplies the CSP bearing coolers; Station Service Water supplies the CSP seal coolers

c. Station Service Water supplies the CSP bearing coolers; Component Cooling Water supplies the CSP seal coolers

d. Station Service Water supplies BOTH the CSP bearing coolers and seal coolers

ANSWER:

c. Station Service Water supplies the CSP bearing coolers; Component Cooling Water supplies the CSP seal coolers

QUESTION: 43

Given that Unit 1 was operating at 100% power and the following time sequence:

TIME	EVENT
1401	Safeguards Bus 1PC2 de-energizes
1402	Steam break on Main Steam Line 2 occurs inside Unit 1 Containment
1405	PT-524A, MSL 2 PRESS CHAN I, senses pressure < 605 psig
1406	PT-934, CNTMT PRESS (IR) CHAN IV, senses pressure > 6.2 psig
1407	PT-935, CNTMT PRESS (IR) CHAN III, senses pressure > 6.2 psig
1408	PT-526A, MSL 2 PRESS CHAN III, senses pressure < 605 psig

Which of the following identifies when a Main Steam Line Isolation signal should have been FIRST generated?

a. 1405

b. 1406

c. 1407

d. 1408

ANSWER:

a. 1405

QUESTION: 44

Given the following conditions:

- A plant startup is in progress on Unit 1 with the Reactor currently at 8% power.
- Main Feed Water Pump 1-01 and Condensate Pump 1-01 are both operating.
- Main Feed Water Pump 1-02 is wind milling and Condensate Pump 1-02 is secured.
- LV-2211/12, CNDS REJ LVL CTRL VLV, is open due to a high Condenser hotwell level when Condensate Pump 1-01 trips.

What is the effect of the pump trip on the Condensate System?

a. PV-2286, LP FW HTR BYP VLV, automatically opens, LV-2211/12 automatically closes, and the crew should respond per ABN-302, "Feedwater, Condensate, Heater Drain System Malfunction," Section 7, "LP Htr Bypass Vlv Opening At Power"

b. PV-2286, LP FW HTR BYP VLV, automatically opens, LV-2211/12 remains open, and the crew should respond per ABN-302, "Feedwater, Condensate, Heater Drain System Malfunction," Section 7, "LP Htr Bypass Vlv Opening At Power"

c. PV-2286, LP FW HTR BYP VLV, remains closed, LV-2211/12 automatically closes, and the crew should respond per ABN-302, "Feedwater, Condensate, Heater Drain System Malfunction," Section 3, "Condensate Pump Trip"

d. PV-2286, LP FW HTR BYP VLV, remains closed, LV-2211/12 remains open, and the crew should respond per ABN-302, "Feedwater, Condensate, Heater Drain System Malfunction," Section 3, "Condensate Pump Trip"

ANSWER:

d. PV-2286, LP FW HTR BYP VLV, remains closed, LV-2211/12 remains open, and the crew should respond per ABN-302, "Feedwater, Condensate, Heater Drain System Malfunction," Section 3, "Condensate Pump Trip"

QUESTION: 45

While operating at 30% power, both Main Feed Water Pumps trip on Unit 1.

Which of the following describes the response of the Auxiliary Feed Water System?

a. ONLY the Motor Driven Auxiliary Feed Water Pumps automatically start to ensure sufficient feed flow to at least one (1) SG

b. ONLY the Motor Driven Auxiliary Feed Water Pumps automatically start to ensure sufficient feed flow to at least two (2) SGs

c. The Motor Driven Auxiliary Feed Water Pumps AND the Turbine Driven Auxiliary Feed Water Pump automatically start to ensure sufficient feed flow to at least one (1) SG

d. The Motor Driven Auxiliary Feed Water Pumps AND the Turbine Driven Auxiliary Feed Water Pump automatically start to ensure sufficient feed flow to at least two (2) SGs

ANSWER:

b. ONLY the Motor Driven Auxiliary Feed Water Pumps automatically start to ensure sufficient feed flow to at least two (2) SGs

QUESTION: 46

Given the following conditions:

- Unit 1 is in Mode 3 with the Shutdown Rods withdrawn.
- Steam generator levels are being maintained between 65% and 70% using the Motor Driven Auxiliary Feed Water (AFW) pumps.
- An electrical perturbation results in an 86-1 Lockout Relay actuation on 6.9 KV Safeguards Bus 1EA1.

Assuming **NO** operator actions, which of the following describes the status of the AFW pumps?

	Motor Driven AFW Pump 1-01	**Motor Driven AFW Pump 1-02**	**Turbine Driven AFW Pump**
a.	Running	Running	Running
b.	Stopped	Running	Stopped
c.	Running	Stopped	Running
d.	Stopped	Running	Running

ANSWER:

d.	Stopped	Running	Running

QUESTION: 47

Given the following conditions:

- Unit 2 is operating at 35% power with Main Feed Water Pump 'A' operating and Main Feed Water Pump 'B' tripped and on the turning gear.
- Motor Driven Auxiliary Feed Water (AFW) Pump 2-02 is tagged out for motor breaker maintenance.
- A Reactor Trip occurs.
- Main Feed Water Pump 'A' remains operating.

Which of the following actions is expected regarding the operation of the Auxiliary Feed Water System upon completion of the Immediate Operator Actions of EOP-0.0B, "Reactor Trip or Safety Injection"?

a. Manually start Motor Driven AFW Pump 2-01 and the Turbine Driven AFW Pump, maintain the Motor Driven AFW Pump throttle valves in MANUAL, and throttle AFW flow to approximately 150 gpm per steam generator

b. Manually start Motor Driven AFW Pump 2-01 and the Turbine Driven AFW Pump, transfer the Motor Driven AFW Pump throttle valves from AUTO to MANUAL, and throttle AFW flow to approximately 150 gpm per steam generator

c. Manually start Motor Driven AFW Pump 2-01, transfer the Motor Driven AFW Pump throttle valves from AUTO to MANUAL, and throttle AFW flow to the steam generators to ensure a minimum of 460 gpm total; verify the Turbine Driven AFW Pump is operating properly if an auto start occurs

d. Manually start Motor Driven AFW Pump 2-01, maintain the Motor Driven AFW Pump throttle valves in MANUAL, and throttle AFW flow to the steam generators to ensure a minimum of 460 gpm total; verify the Turbine Driven AFW Pump is operating properly if an auto start occurs

ANSWER:

a. Manually start Motor Driven AFW Pump 2-01 and the Turbine Driven AFW Pump, maintain the Motor Driven AFW Pump throttle valves in MANUAL, and throttle AFW flow to approximately 150 gpm per steam generator

QUESTION: 48

Given the following conditions:

- In preparation for maintenance on Startup Transformer XST1, the Unit 2 6.9 KV Safeguard Buses (2EA1 and 2EA2) have been placed in an alternate alignment with XST2 supplying the buses.
- Startup Transformer XST1 is still energized from the switchyard.
- A differential current relay actuation occurs on Station Service Transformer 1ST.

Which of the following describes the expected status of the Unit 2 6.9 KV Safeguards Buses (2EA1 and 2EA2)?

a. Energized by Startup Transformer XST1

b. Energized by Startup Transformer XST2

c. Energized by the Emergency Diesel Generators

d. De-energized with the Emergency Diesel Generators running

ANSWER:

c. Energized by the Emergency Diesel Generators

QUESTION: 49

Given the following conditions:

- ALB-10B, 1.13, 125V SWITCH PNL 1ED1 TRBL, is alarming.
- All other alarms are clear.
- A-BT1ED1, BATT BT1ED1 CURRENT, is indicating (–) 10 amps.
- V-1ED1, 125 VDC SWITCH PNL 1ED1 VOLT, is indicating 130 volts.
- A Plant Equipment Operator (PEO) reports that 125 VDC BATTERY CHARGER BC1ED1-1 is aligned in the "Float" mode with a DC VOLTS indication of 134 volts.
- The PEO also reports that when the GROUND TEST switch at Panel 1ED1 is placed in "Test", both the NEGATIVE-GND and POSITIVE-GND white lights are lit, with the NEGATIVE-GND white light slightly brighter than the POSITIVE-GND white light.

Which of the following is the cause of the trouble alarm on 125 VDC Panel 1ED1?

a. An undervoltage condition on the panel

b. An overvoltage condition from the battery charger

c. A ground condition on the negative terminal of the panel

d. A ground condition on the positive terminal of the panel

ANSWER:

d. A ground condition on the positive terminal of the panel

QUESTION: 50

With Unit 1 in Mode 3 and Battery Charger BC1ED1-2 inoperable, which of the following would require entry into Technical Specification 3.8.4, "DC Sources – Operating," action statements?

a. Battery Charger BC1ED1-1 "EQUALIZE" push button is depressed

b. Battery BT1ED2 voltage is 125 VDC

c. Battery BT1ED3 float current is 0 amps

d. Battery Charger BC1ED4-1 is placed under clearance

ANSWER:

b. Battery BT1ED2 voltage is 125 VDC

QUESTION: 51

Given the following sequence of events:

- A large break Loss of Coolant Accident has occurred on Unit 1.
- The Safety Injection Sequencer begins loading the buses.
- Immediately after RHR pumps 1-01 and 1-02 start, a Loss of Offsite Power occurs.

Which of the following describes the response of the plant to these events?

a. Load shedding occurs; the Emergency Diesel Generator output breakers close; the Safety Injection Sequencer restarts at Step 1; and the Safety Injection loads begin loading at the proper step timing

b. Load shedding occurs; the Emergency Diesel Generator output breakers close: the Blackout Sequencer starts at Step 1; and the Blackout loads begin loading at the proper step timing

c. The Safety Injection Sequencer stops until the Emergency Diesel Generator output breakers close; previously sequenced loads immediately start due to their breakers being closed; and the Safety Injection Sequencer continues to load additional loads according to the step timers

d. The Safety Injection Sequencer stops until the Emergency Diesel Generator output breakers close; previously sequenced loads immediately start due to their breakers being closed; and the Blackout Sequencer continues to load additional loads according to the step timers

ANSWER:

a. Load shedding occurs; the Emergency Diesel Generator output breakers close; the Safety Injection Sequencer restarts at Step 1; and the Safety Injection loads begin loading at the proper step timing

QUESTION: 52

Given the following radiation monitors:

- CRV053 (X-RE-5895A), CR VENT N. INTK
- CRV054 (X-RE-5895B), CR NORTH VENT GPM
- CRV091 (X-RE-5896A), CR SOUTH VENT GPM
- CRV092 (X-RE-5896B), CR VENT S. INTK

Which of the following describes the relationship between these radiation monitors and the Control Room Ventilation System?

a. A high radiation condition on ANY of these four (4) radiation monitors will cause the Control Room Ventilation System to shift to the Isolation Mode
b. A high radiation condition must exist on at least two of these four (2/4) radiation monitors to cause the Control Room Ventilation System to shift to the Isolation Mode
c. A high radiation condition on ANY of these four (4) radiation monitors will cause the Control Room Ventilation System to shift to the Emergency Recirculation Mode
d. A high radiation condition must exist on at least two of these four (2/4) radiation monitors to cause the Control Room Ventilation System to shift to the Emergency Recirculation Mode

ANSWER:

c. A high radiation condition on ANY of these four (4) radiation monitors will cause the Control Room Ventilation System to shift to the Emergency Recirculation Mode

QUESTION: 53

Given the following conditions:

- Unit 1 was shutdown due to Station Service Water Pump 1-01 requiring motor replacement following a bearing failure.
- While in Mode 3, a fire resulted in Station Service Water Pump 1-02 becoming unavailable.

Which of the following describes the effect of the loss of both Station Service Water (SSW) pumps?

a. Cooling water has been lost to Unit 1 Centrifugal Charging Pumps and Emergency Diesel Generators; If operation of this equipment is required, Unit 2 Service Water will be aligned to supply cooling to these components in accordance with SOP-501, "Station Service Water"

b. Cooling water has been lost to Unit 1 Centrifugal Charging Pumps and Emergency Diesel Generators; If operation of this equipment is required, Fire Protection Water will be aligned to supply cooling to these components in accordance with ABN-501, "Station Service System Malfunction"

c. Cooling water has been lost to Unit 1 Safety Injection Pumps and Motor Driven Auxiliary Feedwater Pumps; If operation of this equipment is required, Unit 2 Service Water will be aligned to supply cooling to these components in accordance with SOP-501, "Station Service Water"

d. Cooling water has been lost to Unit 1 Safety Injection Pumps and Motor Driven Auxiliary Feedwater Pumps; If operation of this equipment is required, Fire Protection Water will be aligned to supply cooling to these components in accordance with ABN-501, "Station Service System Malfunction"

ANSWER:

a. Cooling water has been lost to Unit 1 Centrifugal Charging Pumps and Emergency Diesel Generators; If operation of this equipment is required, Unit 2 Service Water will be aligned to supply cooling to these components in accordance with SOP-501, "Station Service Water"

QUESTION: 54

Given the following conditions:

- Instrument Air Compressor 1-01 is operating as the LEAD compressor.
- Instrument Air Compressor 1-02 is in an AUTO-START condition as the BACKUP compressor.
- Instrument Air Compressor X-01 is in STANDBY (AUTO) and aligned to Unit 1 through Air Dryer X-01.

The following sequence of events occur:

- 1415 - ALB-01, 2.4, CNTMT INSTR AIR HDR PRESS LO, alarms as pressure drops to 85 psig.
- 1416 - ALB-01, 3.3, INSTR AIR HDR PRESS LO, alarms as pressure drops to 84 psig.
  All other Unit 1 Control Room alarms related to the Instrument Air System remain clear.
- 1420 - A Plant Equipment Operator is dispatched and causes a stuck-open relief valve on Air Dryer 1-01 to reseat.
- 1422 - Both Instrument Air alarms (ALB-01, 2.4 and 3.3) clear.
- 1424 - The Reactor Operator notifies the Unit Supervisor that both PI-3488, INST AIR AFTFILT OUT PRESS, and PI-3490, CNTMT INSTR AIR HDR PRESS, are 100 psig.
- 1425 - Instrument Air header pressure stabilizes at 107 psig.

At 1437, assuming **NO** additional operator actions, and with Instrument Air Compressor 1-01 running and loaded, what is the expected status of Instrument Air Compressors 1-02 and X-01?

	AIR COMP 1-02	**AIR COMP X-01**
a.	Running and Loaded	Running and Unloaded
b.	Running and Loaded	Shutdown
c.	Running and Unloaded	Running and Unloaded
d.	Running and Unloaded	Shutdown

ANSWER:

b. Running and Loaded Shutdown

QUESTION: 55

Given the following conditions:

- The Reactor Coolant System is at 260^{o}F during a Unit 1 heatup following a maintenance outage.
- Three (3) Containment Recirculation Air Coolers are in service.
- Three (3) Ventilation Chillers are in service.
- Containment air temperature is 108^{o}F.
- Containment pressure is 1.4 psig.

Which of the following actions are required to restore Containment conditions within limits?

a. Reduce Containment pressure by placing the Containment Pressure Relief System in service

b. Reduce Containment pressure by placing the Containment Purge Supply and Exhaust System in service

c. Reduce Containment temperature by placing an additional Containment Recirculation Air Cooler in service

d. Reduce Containment temperature by placing an additional Ventilation Chiller in service

ANSWER:

a. Reduce Containment pressure by placing the Containment Pressure Relief System in service

QUESTION: 56

Given the following conditions:

- Unit 1 is operating at 100% power.
- ALB-05C, 1.1, RV FLANGE LKOFF TEMP HI, is alarming.
- TI-5400A, CNTMT AVE TEMP, is indicating 95^{o}F.
- TI-401, RV FLANGE LKOFF TEMP, is indicating 165^{o}F.
- Three (3) Containment Recirculation Air Coolers are in service.

Which of the following actions should be taken?

a. Make a Containment Entry to close 1-RC-8069B, RV 1-01 HEAD INNER SL LKOFF ISOL VLV, and open 1-RC-8069A, RV 1-01 HEAD OUTER SL LKOFF ISOL VLV

b. Start an additional Containment Recirculation Air Cooler in accordance with SOP-801A, "Containment Ventilation System"

c. Initiate a work request to repair the annunciator and delete the alarm point from the Plant Computer in accordance with ODA-401, "Control of Annunciators, Instruments, and Protective Relays"

d. Make a Containment Entry to close 1-RC-8069A, RV 1-01 HEAD OUTER SL LKOFF ISOL VLV, and open 1-RC-8069B, RV 1-01 HEAD INNER SL LKOFF ISOL VLV

ANSWER:

a. Make a Containment Entry to close 1-RC-8069B, RV 1-01 HEAD INNER SL LKOFF ISOL VLV, and open 1-RC-8069A, RV 1-01 HEAD OUTER SL LKOFF ISOL VLV

QUESTION: 57

Given the following conditions:

- Unit 1 is at 2% power during a plant startup.
- The crew has just completed the actions of ABN-706, "Pressurizer Level Instrumentation Malfunction," in response to a failure of Pressurizer Level Channel 459, with the exception of restoring automatic level control.
- Letdown has been restored at 120 gpm.
- FK-121, CCP CHRG FLO CTRL, is in AUTO.
- LK-459, PRZR LVL CTRL, is in MAN.
- While attempting to restore automatic level control, the Reactor Operator inadvertently places LK-459 at 0% output.

Assuming LK-459 remains at 0% output, and **NO** further operator actions are taken, which of the following describes the response of LCV-459 and LCV-460, LTDN ISOL VLVs?

a. LCV-459 and LCV-460 both close as the output from LK-459 decreases below 17%

b. LCV-459 closes as the output from LK-459 decreases below 17%; LCV-460 remains open as actual pressurizer level increases

c. LCV-459 and LCV-460 both remain open as actual pressurizer level increases

d. LCV-459 and LCV-460 both close as actual pressurizer level decreases below 17%

ANSWER:

d. LCV-459 and LCV-460 both close as actual pressurizer level decreases below 17%

QUESTION: 58

Given the following conditions:

- A Reactor start up is in progress on Unit 1.
- Control Bank 'B' rods are being withdrawn.
- ALB-06D, 3.5, DRPI ROD DEV, alarms.
- ALB-06D, 3.7, ANY ROD AT BOT, alarms.
- The LEDs on the Digital Rod Position Indication (DRPI) panel labeled **ROD DEVIATION 1**, **R**, and **2** light.
- The LED on the DRPI panel labeled **RB** for Control Bank 'A' rod F-8 lights.
- All other LEDs associated with Control Bank 'A' rod F-8 are off.

Which of the following identifies the cause of these indications and the proper response?

a. A DRPI data failure has occurred for rod F-8; insert all Control Bank rods to the Control Bank Offset position in accordance with ABN-712, "Rod Control System Malfunction"

b. A DRPI data failure has occurred for rod F-8; trip the Reactor and go to EOP-0.0A, "Reactor Trip or Safety Injection"

c. Rod F-8 has dropped to the bottom of the core; insert all Control Bank rods to the Control Bank Offset position in accordance with ABN-712, "Rod Control System Malfunction"

d. Rod F-8 has dropped to the bottom of the core; trip the Reactor and go to EOP-0.0A, "Reactor Trip or Safety Injection"

ANSWER:

c. Rod F-8 has dropped to the bottom of the core; insert all Control Bank rods to the Control Bank Offset position in accordance with ABN-712, "Rod Control System Malfunction"

QUESTION: 59

Given the following conditions:

- A Reactor start up is in progress on Unit 1.
- Source Range (SR) channel N31 indicates 9E+4 cps.
- Source Range (SR) channel N32 indicates 1E+5 cps.
- Intermediate Range (IR) channel N35 indicates 1E-10 amps.
- Intermediate Range (IR) channel N36 indicates 3E-11 amps.

Which of the following describes the cause for these indications and the proper operator response?

a. IR channel N35 is undercompensated; continue the Reactor start up and block both SR channels when above P-6

b. IR channel N35 is undercompensated; suspend the Reactor start up to prevent a Reactor Trip

c. IR channel N36 is overcompensated; continue the Reactor start up and block both SR channels when above P-6

d. IR channel N36 is overcompensated; suspend the Reactor start up to prevent a Reactor Trip

ANSWER:

d. IR channel N36 is overcompensated; suspend the Reactor start up to prevent a Reactor Trip

QUESTION: 60

Which of the following describes the power supplies to the Containment Pre-access Filtration System fans?

a. Powered by Non-safeguards 480 VAC MCCs; the MCCs are unaffected by either a Blackout or a Safety Injection

b. Powered by Safeguards 480 VAC MCCs; the MCCs are load shed by a Blackout, but are unaffected by a Safety Injection

c. Powered by Safeguards 480 VAC MCCs; the MCCs are unaffected by a Blackout, but are load shed by a Safety Injection

d. Powered by Safeguards 480 VAC MCCs; the MCCs are load shed by either a Blackout or a Safety Injection

ANSWER:

d. Powered by Safeguards 480 VAC MCCs; the MCCs are load shed by either a Blackout or a Safety Injection

QUESTION: 61

Given the following conditions:

- While operating at 100% power, an inadvertent Safety Injection occurs on Unit 1.
- EOP-0.0A, "Reactor Trip or Safety Injection," directs the crew to verify that a Containment Ventilation Isolation (CVI) has occurred.

Which of the following describes how it is verified that the Containment Purge Supply and Exhaust System is isolated?

a. Verification of the position of these dampers is performed locally due to control power fuses being pulled for these dampers

b. Verification of the position of these dampers is performed by checking the locked valve deviation log book

c. Verification of the position of these dampers is performed by checking green indicating lights LIT on the damper hand switches on the Control Board

d. Verification of the position of these dampers is performed by checking green windows LIT on Monitor Light Box Panels 45A and 45B

ANSWER:

d. Verification of the position of these dampers is performed by checking green windows LIT on Monitor Light Box Panels 45A and 45B

QUESTION: 62

Given the following conditions:

- Refueling Operations are being performed in Unit 1 Containment.
- The Containment Purge Supply and Exhaust System is in operation.
- While lifting a fuel assembly from the core into the mast, power is lost to the RM-80 for RE-5503 (CAG197), CONTAINMENT AIR GAS.

Which of the following describes the status of this evolution following the loss of power?

a. The Containment Purge Supply and Exhaust System remains in operation; lifting of the fuel assembly is unaffected

b. The Containment Purge Supply and Exhaust System remains in operation; lifting of the fuel assembly is automatically stopped

c. The Containment Purge Supply and Exhaust System automatically isolates; lifting of the fuel assembly is unaffected

d. The Containment Purge Supply and Exhaust System automatically isolates; lifting of the fuel assembly is automatically stopped

ANSWER:

c. The Containment Purge Supply and Exhaust System automatically isolates; lifting of the fuel assembly is unaffected

QUESTION: 63

Given the following conditions:

- Unit 1 Reactor is stable at approximately 10^{-8} amps.
- A Steam Generator safety valve fails open.
- **NO** Reactor Trip or Safety Injection actuation occurs.

Which of the following describes the difference in the plant response if this event were to occur at beginning-of-life (BOL) and end-of-life (EOL)?

a. The RCS will stabilize at a lower temperature at BOL than at EOL; Reactor power will stabilize at a higher value at BOL than at EOL

b. The RCS will stabilize at a lower temperature at BOL than at EOL; Reactor power will stabilize at approximately the same value at BOL and EOL

c. The RCS will stabilize at a lower temperature at EOL than at BOL; Reactor power will stabilize at a higher value at BOL than at EOL

d. The RCS will stabilize at a lower temperature at EOL than at BOL; Reactor power will stabilize at approximately the same value at BOL and EOL

ANSWER:

b. The RCS will stabilize at a lower temperature at BOL than at EOL; Reactor power will stabilize at approximately the same value at BOL and EOL

QUESTION: 64

Given the following conditions:

- Unit 1 is stable at approximately 28% holding for Chemistry during a plant startup.
- Rod Control is being maintained in MANUAL.
- The Main Turbine trips.

Assuming **NO** operator action, which of the following describes the effect of the Main Turbine trip on the plant?

a. The Reactor trips; steam load is transferred to the Steam Dump System and steam flow slowly lowers until RCS temperature stabilizes at approximately 557^{o}F; Main Feed Water flow to the steam generators isolates

b. The Reactor remains critical; steam load is transferred to the Steam Dump System and steam flow slowly lowers until RCS temperature stabilizes at approximately 557^{o}F; Main Feed Water flow to the steam generators isolates

c. The Reactor remains critical; steam load is transferred to the Steam Dump System and steam flow remains at approximately 28%; Main Feed Water flow is maintained to the steam generators, but at a lower temperature than prior to the Main Turbine trip

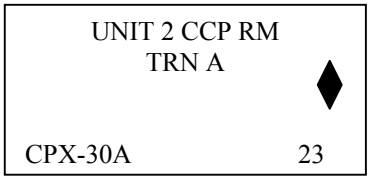
d. The Reactor remains critical; steam load is transferred to the Steam Dump System and steam flow slowly lowers until Reactor Power stabilizes at approximately 2-3%; Main Feed Water flow is maintained to the steam generators, but at a lower temperature than prior to the Main Turbine trip

ANSWER:

c. The Reactor remains critical; steam load is transferred to the Steam Dump System and steam flow remains at approximately 28%; Main Feed Water flow is maintained to the steam generators, but at a lower temperature than prior to the Main Turbine trip

QUESTION: 65

When responding to a fire alarm on the Main Fire Detection Board Auxiliary Building Panel, the following alarm window is LIT:



Which of the following identifies the indications associated with this alarm window?

	♦	**CPX-30A**	**23**
a.	Type of Fire Suppression System	Local Fire Detection Panel Number	Fire Preplan Instruction Number
b.	Type of Fire Detector	Local Fire Detection Panel Number	Detector Zone Number
c.	Type of Fire Detector	Valve Associated with Alarm Zone	Fire Preplan Instruction Number
d.	Type of Fire Suppression System	Valve Associated with Alarm Zone	Detector Zone Number

ANSWER:

b.	Type of Fire Detector	Local Fire Detection Panel Number	Detector Zone Number

QUESTION: 66

Which of the following steps, in the proper sequence, are required to locally reset the trip and throttle valve for the Turbine Driven Auxiliary Feed Water Pump following an overspeed trip?

1. Turn the hand wheel on the motor operator in the counterclockwise (CCW) direction until the latch mechanism is fully engaged.
2. Turn the hand wheel on the motor operator in the clockwise (CW) direction until the latch mechanism is fully engaged.
3. Turn the hand wheel on the motor operator in the counterclockwise (CCW) direction until the actuator is fully up.
4. Turn the hand wheel on the motor operator in the clockwise (CW) direction until the actuator is fully up.
5. Depress and hold the clutch handle on the motor operator.
6. Reset the overspeed trip linkage

a. 6 - 5 - 2 - 3

b. 1 - 5 - 4 - 6

c. 6 - 5 - 1 - 4

d. 5 - 3 - 6 - 2

ANSWER:

a. 6 - 5 - 2 - 3

QUESTION: 67

Given the following conditions:

- A startup of Unit 2 Reactor is planned to begin within the next 10 minutes.
- An on-shift PEO, who is scheduled to attend an Initial License Class beginning in two (2) weeks, has requested to perform the startup under the direct supervision of the Unit Reactor Operator.
- This PEO has previously been licensed as an RO and an SRO at another Westinghouse 4-loop plant similar to CPSES
- The PEO has attended the startup briefing.

Should the PEO be allowed to perform the start up and why or why not?

a. YES, but only if directly supervised by a Senior Licensed Operator

b. NO, the PEO has **NOT** successfully completed adequate on the job training

c. YES, but only if approval is granted by the Operations Manager

d. NO, the PEO is **NOT** currently enrolled in the Initial License Program

ANSWER:

d. NO, the PEO is **NOT** currently enrolled in the Initial License Program

QUESTION: 68

Which of the following describes the use of the Master Surveillance Test List (MSTL)?

a. A reference used to cross-tie Technical Specification surveillances to the appropriate surveillance procedure

b. A log that used to track and document Technical Specification limiting condition for operations entries that result from the performance of surveillances

c. A reference used to determine which Technical Specification surveillances are scheduled to be performed in the upcoming 30 days

d. A log used to track and document Technical Specification special condition surveillance test results

ANSWER:

a. A reference used to cross-tie Technical Specification surveillances to the appropriate surveillance procedure

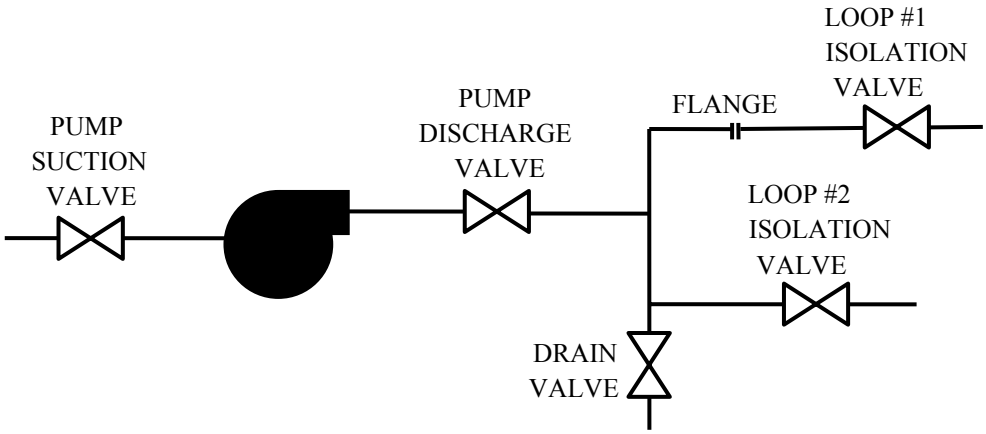
QUESTION: 69

Given the following conditions:

- The system is being tagged out for repairs on the flange AND realignment of the motor to the pump coupling.
- Tags are to be placed on the following components:

  1. PUMP SUCTION VALVE - CLOSED
  2. PUMP SUPPLY BREAKER - OPEN
  3. LOOP #1 ISOLATION VALVE - CLOSED
  4. LOOP #2 ISOLATION VALVE - CLOSED
  5. DRAIN VALVE - OPEN

- The PUMP DISCHARGE VALVE is **NOT** to be tagged.



Which of the following would be a satisfactory **SEQUENCE** for performing this tagging?

a. 2 – 3 – 4 – 1 – 5

b. 2 – 1 – 3 – 4 – 5

c. 1 – 2 – 4 – 3 – 5

d. 2 – 3 – 4 – 5 – 1

ANSWER:

a. 2 – 3 – 4 – 1 – 5

QUESTION: 70

Given the following conditions:

- A failure of the Main Feed Water Pump speed control has occurred with the plant at 60% power.
- Steam header pressure is currently 900 psig.

Which of the following identifies the feed header pressure the operator should attempt to control for both Unit 1 and Unit 2?

a. Unit 1 should be maintained at 1002 psig and Unit 2 at 1009 psig

b. Unit 1 should be maintained at 1009 psig and Unit 2 at 1002 psig

c. Unit 1 should be maintained at 1025 psig and Unit 2 at 1031 psig

d. Unit 1 should be maintained at 1031 psig and Unit 2 at 1025 psig

ANSWER:

c. Unit 1 should be maintained at 1025 psig and Unit 2 at 1031 psig

QUESTION: 71

Given the following conditions:

- Three (3) fully qualified radiation workers are planning to be involved in a task inside the Radiologically Controlled Area.
- The current annual exposure history for each of the three workers is:

  Worker #1 – 2800 mRem
  Worker #2 – 3000 mRem
  Worker #3 – 1900 mRem

Which of the following identifies acceptable exposures received while performing the task to ensure meeting the CPSES administrative exposure limits (without any extensions) AND complying with ALARA guidelines?

	Worker #1	**Worker #2**	**Worker #3**
a.	100 mRem	1100 mRem	700 mRem
b.	1300 mRem	500 mRem	200 mRem
c.	600 mRem	800 mRem	1000 mRem
d.	400 mRem	500 mRem	1600 mRem

ANSWER:

c.	600 mRem	800 mRem	1000 mRem

QUESTION: 72

Given the following conditions:

- ABN-106A, "High Secondary Activity," is being performed in response to an identified SG tube leak on SG 1-03.
- SG tube leakage has been determined to be approximately 350 gallons per day.
- Unit 1 has been placed in MODE 3 and the RCS has been cooled down below 550^{o}F.

Which of the following describes why RCS temperature is lowered PRIOR to closing the Main Steam Isolation Valve on SG 1-03?

a. Minimize the likelihood of a release to the environment

b. Prevent overfilling the ruptured SG

c. Depressurize the ruptured SG below the unaffected SG pressures

d. Minimize the likelihood of a later Pressurized Thermal Shock event

ANSWER:

a. Minimize the likelihood of a release to the environment

QUESTION: 73

Given the following conditions:

- Unit 1 is in Mode 3 during a cool down for a mid-cycle outage to replace a damaged seal package on a Reactor Coolant Pump.
- Reactor Coolant System temperature is 390^{o}F and pressure is 780 psig.
- Centrifugal Charging Pump 1-01 is in operation with one 75 gpm orifice isolation valve open.
- 1-RE-0406 (FFL160), FAILED FUEL MONITOR, has alarmed.
- Chemistry reports that Reactor Coolant System specific activity has increased steadily over the past several days.

In order to minimize personnel exposure during the upcoming outage, which of the following actions should be taken in accordance with ABN-102, "High Reactor Coolant Activity"?

a. Isolate letdown flow

b. Decrease letdown flow

c. Maintain current letdown flow

d. Increase letdown flow

ANSWER:

d. Increase letdown flow

QUESTION: 74

Given the following conditions:

- A Reactor Trip and Safety Injection have occurred on Unit 1.
- The Shift Manager is using Chart 2, "Loss of Reactor Coolant Boundary," of EPP-201, "Assessment of Emergency Action Levels, Emergency Classification, and Plan Activation," to determine the accident classification.
- A decision block states, "RCS Leak > Capacity of Available CCPs Following SI Actuation."

Which of the following pieces of information could the Reactor Operator provide which would be most useful to the Shift Manager in making the determination that the leak is within the capacity of the available Centrifugal Charging Pumps?

a. Pressurizer level is increasing

b. Reactor Vessel Level Indicating System indicates full

c. CCP injection flow is 400 gpm and stable

d. RCS pressure is 1720 psig and stable

ANSWER:

d. RCS pressure is 1720 psig and stable

QUESTION: 75

Which of the following is an IMMEDIATE OPERATOR ACTION that can be performed without direction from the Unit Supervisor in an Emergency Operating Procedure which can be directly entered?

a. Commence emergency boration in the event of a loss of Digital Rod Position Indication during the performance of EOP-0.0A, "Reactor Trip or Safety Injection"

b. Close the Main Steam Isolation Valves in the event of a failure of the Main Turbine to trip during the performance of FRS-0.1A, "Response to ATWT / Nuclear Power Generation"

c. Manually start the Turbine Driven Auxiliary Feed Water Pump in the event AFW flow is less than 860 gpm during the performance of FRS-0.1A, "Response to ATWT / Nuclear Power Generation"

d. Emergency start an Emergency Diesel Generator in the event of a loss of both 6.9 KV Safeguards Buses during the performance of ECA-0.0A, "Loss of All AC Power"

ANSWER:

a. Commence emergency boration in the event of a loss of Digital Rod Position Indication during the performance of EOP-0.0A, "Reactor Trip or Safety Injection"