

INITIAL SUBMITTAL

**HARRIS EXAM
50-400/2004-301**

**FEBRUARY 23 - 27, 2004
& MARCH 4, 2004 (WRITTEN)**

**INITIAL SUBMITTAL
SRO WRITTEN EXAMINATION**

Harris

Draft

SRO

Written

2004

QUESTION: 1

Given the following conditions:

- While operating at 100% power, a drop in PRZ pressure resulted in a Reactor Trip and Safety Injection.
- PRZ level is currently indicating >100%.
- PRZ pressure has stabilized at 1400 psig.
- Containment pressure is 3.6 psig and stable.
- KCPs have been stopped.
- RVLIS Full Range is indicating 20%.
- Core Exit Thermocouples are indicating 745°F.
- RCS Wide Range Hot Leg Temperatures are indicating 680°F.

Which of the following conditions currently exists'?

- a. A PRZ steam space break has occurred and core heat removal is ADEQUATE
- b. A PRZ steam space break has occurred and core heat removal is INADEQUATE
- c. An RCS hot leg break has occurred and core heat removal is ADEQUATE
- d. An RCS hot leg break has occurred and core heat removal is INADEQUATE

ANSWER:

- b. A PRZ steam space break has occurred and core heat removal is INADEQUATE

QUESTION NUMBER: I TIER/GROUP: 1/1
KA IMPORTANCE: RO SRO 3.4
10CFR55 CONTENT: 41(b) 43(b) 5

MA: 000008AA2.30

Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident:
Inadequate core cooling

OBJECTIVE: EOP-3.10-4

Given the following EOP steps, notes, and cautions, describe the associated basis

c. RVLIS level of 39 percent (C.1)

DEVELOPMENT REFERENCES: EOP-FRP-C.1
CSFST-Core Cooling

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since the break is located in the PRZ steam space, but heat removal is not adequate
- b. The RCS is superheated and in excess of 700°F, which indicates that inadequate heat removal is occurring. The break is in the PRZ steam space as indicated by the pressurizer being full.
- e. Plausible since RCS temperatures are stable, but the break is in the steam space and heat removal is not adequate.
- d. Plausible since RCS heat removal is not adequate, but the break is in the steam space.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must analyze plant conditions to determine location of break, determine that temperature indications support superheated conditions and that heat removal is inadequate

QUESTION: 2

Which of the following describes a condition which would require Emergency Boration and the bases for taking this action?

- a.
 - e Twenty minutes following a Main Feedwater Pump trip, Control Rods are determined to be below the rod insertion limit
 - e Control the reactivity transient associated with a steam line break
- b.
 - Twenty minutes following a Main Feedwater Pump trip, Control Rods are determined to be below the rod insertion limit
 - e Control the reactivity transient associated with an inadvertent dilution
- c.
 - e During a reactor startup, the Reactor achieves criticality with Bank C rods at 105 steps
 - e Control the reactivity transient associated with a steam line break
- d.
 - e During a reactor startup, the Reactor achieves criticality with Bank C rods at 105 steps
 - Control the reactivity transient associated with an inadvertent dilution

ANSWER:

- c.
 - e During a reactor startup, the Reactor achieves criticality with Bank C rods at 105 steps
 - Control the reactivity transient associated ~~with~~ a steam line break

QUESTION NUMBER: 2 **TIER/GROUP:** 1/2
MA IMPORTANCE: RO **SRO** 3.4
10CFR55 CONTENT: 41(b) **43(b)** 2

KA: 00002462.2.25

Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.
(Emergency Boration)

OBJECTIVE: CVCS-3.0-R4

Given a CVCS component/parameter, state whether the component/parameter is Tech Spec related

DEVELOPMENT REFERENCES: TS Bases 3/4.I.1
AOP-002 BD
GP-004

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT
BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: AOP-3.2-R1 001

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since if this condition existed for 2 hours, instead of 20 minutes, Emergency Boration would be required. Additionally, in Modes 1 & 2, SDM is required to control the reactivity transient associated with a steam line break. However, it is not required during transient conditions, allowing the 2 hours to restore rod position.
- b. Plausible since if this condition existed for 2 hours, instead of 20 minutes, Emergency Boration would be required. However, it is not required during transient conditions, allowing the 2 hours to restore rod position.
- \checkmark c. Emergency boration is required if SDM is not met. Criticality at steady state conditions is considered to be a loss of SDM. In Modes 1 & 2, SDM is required to control the reactivity transient associated with a steam line break.
- d. Plausible since Emergency boration is required if SDM is not met. Criticality at steady state conditions is considered to be a loss of SDM. However, the concern for an inadvertent dilution is related to a shutdown condition.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the requirements for initiating Emergency Boration and the bases for these actions.

QUESTION: 3

Given the following conditions:

- The plant has been operating at 100% power for the past three (3) months.
- CSIP 1A-SA is operating.
- CSIP 1B-SB has just been restored to a normal alignment following maintenance on the pump impeller.
- When CSIP 1B-SB is started the operator notes that suction pressure appears normal, while discharge pressure, discharge flow, and pump current are oscillating.

Which of the following is the most likely cause of these CSIP 1B-SB indications?

- a. Inadequate venting was performed during clearance restoration
- b. The CSIP 1B-SB discharge valve was inadvertently left closed during clearance restoration
- c. A failure of the CSIP 1B-SB miniflow isolation valve has resulted in gas binding
- d. A failure of the CSIP 1B-SB miniflow isolation valve has resulted in all pump flow being recirculated to the VCT

ANSWER:

- a. Inadequate venting was performed during clearance restoration

QUESTION NUMBER: 3 **TIER/GROUP:** 2ii
KA IMPORTANCE: RO **SRO** 3.8
10CFR55 CONTENT: 41(b) **43(b)** 5

K4: 006A2.04

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

OBJECTIVE: AOP-3.2-4

Given a set of plant conditions and a copy of AOP-002, determine if the possibility of gas binding the CSIPs exists and the corrective action to be taken

DEVELOPMENT REFERENCES: UP-107
SOER 97-1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER √d):

- √ a. Gas binding of a pump results in lower than expected pressure, flow, and current. Likely cause is improper venting of pump when restoring from post maintenance activities.
- b. Plausible since improper alignment would result in low flow and current, but a closed discharge valve would cause discharge pressure to be high.
- c. Plausible since gas binding is cause of these indications, but will not occur as a result of pump recirc valve being open.
- d. Plausible since a failed open recirc valve will cause indicated flow to be low since flow is measured downstream of the recirc valve, but discharge pressure and current would be at or near normal.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must analyze given pump conditions to determine failure mode and then determine likely cause of gas binding of the pump

QUESTION: 4

Given the following conditions:

- The unit is operating at 100% power, with Control Bank D rods at 215 steps.
- ALB 13-7-1, ROD CONTROL URGENT ALARM, is in ALARM due to a failure in Power Cabinet IAC.
- Rod Control is in MAN
- A turbine trip occurs, but the Reactor fails to trip either automatically or manually.

Which of the following actions should **the** Reactor Operator be directed to take?

- a. Place the Rod Control BANK SELECTOR in AUTO and allow rods to insert
- b. Maintain the Rod Control BANK SELECTOR in MAN and manually insert rods
- c. Place the Rod Control BANK SELECTOR in BANK D and manually insert rods
- d. Maintain rods at 215 steps

ANSWER:

- d. Maintain rods at 215 steps

QUESTION NUMBER: 4 TIER/GROUP: 2/2
KA IMPORTANCE: RO SRO 4.0
10CFR55 CONTENT: 41(b) 43(b) 5

KA: 001G2.4.6

Knowledge of symptom based EOP mitigation strategies. (Control Rod Drive)

OBJECTIVE: EOP-3.19-4

Given a set of conditions during EOP implementation, determine the correct response or required action based upon the EOP User's Guide general information

- z. Use of "Bank Select" during an ATWS

DEVELOPMENT REFERENCES: EOP-USERS GUIDE
EOP-FRP-S.1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since this is an RNO action for a failure of the reactor to trip, but will not be successful due to the urgent failure in rod control.
- b. Plausible since this is an RNO action for a failure of the reactor to trip, but will not be successful due to the urgent failure in rod control.
- c. Plausible since this will allow Bank D rods to move inward, and is the only method of inserting rods with the rod control failure, but should not be used due to the potential to cause unanalyzed flux shapes.
- d. Due to the urgent failure: rods will not move in AUTO or MAN. Although they will move in BANK D with this particular failure, moving rods in individual banks may result in unanalyzed flux shapes which could result in fuel damage.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must analyze the effect of an urgent rod control failure and then apply the failure results to the plant conditions to determine the proper actions

QUESTION: 5

Four Operators worked the following schedule in the Control Room over the past six days:

HOURS WORKED (Shift turnover time not included. Do **NOT** assume any hours worked before or after this period.)

OPERATOR	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6
1	10	14	off	12	12	12
2	14	12	14	10	off	11
3	off	off	off	13	11	14
4	11	13	14	off	11	12

Which of the operators would be permitted to work a 12-hour shift on Day 7 **WITHOUT** requiring permission to exceed normal overtime limits?

- a. Operator 1
- b. Operator 2
- c. Operator 3
- d. Operator 4

ANSWER:

- a. Operator 1

QUESTION NUMBER: 5 TIER/GROUP: 3
KA IMPORTANCE: RO SRO 4.0
10CFR55 CONTENT: 41(b) 43(b) 5

KA: 2.1.2

Knowledge of operator responsibilities during all modes of plant operation

OBJECTIVE: PP-2.0-SI

STATE the requirements contained in Administrative Controls Section, including requirements for the following:

- Unit staff, including overtime limitations

DEVELOPMENT REFERENCES: AP-012

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: Robinson NRC 2001

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER [√]d):

- [√] a. Working a 12 hour shift on Day 7 would result in this operator working 24 hours out of 48, and 72 hours in 7 days, both of which are permissible.
- b. Plausible since this operator would not exceed the 24 hours out of 48 limit and has had a recent day off, but would work 73 hours in 7 days which exceeds limit.
- c. Plausible since this operator would not exceed the 72 hours in 7 day limit and has several recent days off, but would work more than 24 hours in 48 which exceeds limit.
- d. Plausible since this operator would not exceed the 24 hours out of 48 limit and has had a recent day off, but would work 73 hours in 7 days which exceeds limit.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Required to compare given data to administrative limits to determine which operator would remain within acceptable overtime limits

QUESTION: 6

Given the following conditions:

- A Reactor Trip with SI occurs.
- The operators perform the immediate action steps, verify ECCS flow, and check AFW flow.
- SG levels are < 25% and the required AFW flow cannot be established, so the operators enter EOP-FRP-H.1, "Response to Loss of Secondary Heat Sink."
- KCS pressure is 175 psig.
- All SG pressures are between 300 psig and 350 psig.

Which of the following actions is to be taken?!

- a. Continue in EOP-FRP-H.1 since EOP-FRP-H.1 has a higher priority than PATH-1 and attempt to establish AFW or Main Feedwater flow.
- b. Continue in EOP-FRP-H.1 since EOP-FRP-H.1 has a higher priority than PATH-1 and initiate RCS feed and bleed.
- c. Return to EOP-PATH-1 at the step that was in effect since a secondary heat sink is **NOT** required following a large break LOCA.
- d. Return to EOP-PATH-1 at Entry Point C since a secondary heat sink is **NOT** required following a large break LOCA.

ANSWER:

- c. Return to EOP-PATH-1 at the step that was in effect since a secondary heat sink is **NOT** required following a large break LOCA.

QUESTION NUMBER: 6 **TIER/GROUP:** 1/1
KA IMPORTANCE: RO **SRO** 4.0
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 000011G2.4.6

Knowledge of symptom based FOP mitigation strategies. (Large Break LOCA)

OBJECTIVE: EOP-3.11-4

Given the following EOP steps, notes, and cautions, describe the associated basis

- e. Requirements for a heat sink (H.1)

DEVELOPMENT REFERENCES: EOP-FRP-H.1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EOP-3.11-R1 003

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since these are actions that are taken upon entry into FRP-H.1, but a secondary heat sink would not be required with RCS pressure < SG pressure.
- h. Plausible since these are actions that might be taken upon entry into FRP-H.1, but a secondary heat sink would not be required with RCS pressure < SG pressure.
- \checkmark c. Since RCS pressure is less than SG pressure, a secondary heat sink is not required since the SG would act as a heat source rather than a heat sink. Return is to procedure and step in effect.
- d. Plausible since RCS pressure is less than SG pressure and a secondary heat sink is not required. Return is to procedure and step in effect, not Entry Point C.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must interpret first that a secondary heat sink is not required based on RCS pressure being greater than SG pressure and then must recognize the entry point conditions for returning to PATH-I

QUESTION: 7

Given the following conditions:

- e The Reactor has been taken critical and power is being increased.
- e NIS IR channels N35 and N36 are both indicating 5×10^{-11} amps.
- e NIS SR channel N31 is indicating 8×10^3 cps.
- e Due to improper adjustment of the high voltage setting, NIS SR channel N32 is indicating 7×10^4 cps.

Power should be stabilized ..

- a. at or above 10^{-10} amps, and the SR High Flux trip should then be blocked.
- b. at the current power level, and the SR High Flux trip should then be blocked.
- c. at or above 10^{-10} amps, but the SR High Flux trip should **NOT** be blocked.
- d. at the current power level, but the **SR High Flux** trip should **NOT** be blocked.

ANSWER:

- d. at the current power level, but the SR High Flux trip should **NOT** be blocked.

QUESTION NUMBER: 7 **TIENGROUP:** 1/2
KA IMPORTANCE: RO **SRO** 2.9
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 000032AA2.09

Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: Effect of improper HV setting

OBJECTIVE: GP-3.4-1

Recognize off-normal conditions during a reactor start-up, including
a. Availability of excore nuclear instrumentation channels (SR, IR, PR)

DEVELOPMENT REFERENCES: GP-004
ALB-012-4-5

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since power must be increased above 10^{10} amps before blocking trips, but increasing power to this level will result in SR high flux trip.
- b. Plausible since power cannot be increased above 10^{10} amps, but the block of the SR high flux trip is interlocked at this power level.
- c. Plausible since the SR high flux trip is not permitted to be blocked without at least 1 decade of overlap between SR and IR, but increasing power above 10^{10} amps will result in a SR high flux trip.
- \checkmark d. Less than 1 decade of overlap exists between SR and IR channel before trip would occur. Increasing power to allow blocking SR would result in trip before reaching power level and attempting to block at current power level will not be successful.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must determine that increasing power above 10^{10} amp will result in a reactor trip due to SR high flux, and that attempting to block the SR high flux trip below 10^{10} amps will not be successful. Required to not block SR high flux trip if < 1 decade of overlap exists.

QUESTION: 8

Given the following conditions:

- EOP-FRP-S.1, "Response to Nuclear Power Generation/ATWS," is being implemented.
- An SI actuation has occurred.
- The Foldout page is applicable.

Which of the following actions should be taken?

- a. Continue with EOP-FRP-S.1 while verifying proper operation of safeguard equipment
- b. Continue with EOP-FRP-S.1 until **the** reactor is tripped or made subcritical, then immediately exit to EOP-PATH-1
- c. Transition to EOP-PATH-1 and verify all automatic actions required for an SI have occurred, then return to EOP-FRP-S. 1 only when directed by PATH-1
- d. Reset SI and FW isolation as soon as possible to restore feed flow to the steam generators, then continue with EOP-FRP-S.1

ANSWER:

- a. Continue with EOP-FRP-S.1 while verifying proper operation of safeguard equipment

QUESTION NUMBER: 8 **TIER/GROUP:** 2/1
KA IMPORTANCE: RO **SRO** 4.0
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 012G2.4.6

Knowledge of symptom based EOP mitigation strategies. (Reactor Protection)

OBJECTIVE: EOP-3.15

Describe the purpose of the following EOPs including type of event for which they were designed and the major actions performed

- FRP-S.1

DEVELOPMENT REFERENCES: EOP-FRP-S.1
EOP User's Guide

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT
BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EOP-3.15 021

NRC EXAM HISTORY: Harris NRC 2000

DISTRACTOR JUSTIFICATION (CORRECT ANSWER [√]d):

- [√] a. If a safety injection occurs while implementing FRP-S.1, proper operation of SI equipment is verified while continuing with FRP-S.1.
- b. Plausible since PATH-1 provides instructions for a response to safety injection, but FRP-S.1 must be performed until completion.
- c. Plausible since PATH-1 provides instructions for a response to safety injection, but FRP-S.6 must be performed until completion.
- d. Plausible since a safety injection will result in a loss of MFW, but AFW flow is capable of providing minimum required flow.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of procedural requirements in EOP-FRP-S.1

QUESTION: 9

Given the following conditions:

- The plant is in Mode 3 with all Shutdown Rods withdrawn.
- All power is lost to the Digital Rod Position Indication display and **CANNOT** be restored.

Which of the following actions is to be taken'?

- a. Verify that **all** Shutdown Bank Rods are fully withdrawn using Demand Position indication
- b. Determine that all Shutdown Bank Rods are fully withdrawn using the movable incore detectors
- c. Commence a boration of the RCS to ensure adequate Shutdown Margin
- d. Open the Reactor **Trip** Breakers

ANSWER:

- d. Open the Reactor Trip Breakers

QUESTION NUMBER: 9 **TIER/GROUP:** 2/1
KA IMPORTANCE: RO **SRO** 3.6
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 014A2.02

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

OBJECTIVE: RODCS-3.1-R4

Given a copy of Technical Specifications and a plant mode, determine if rod position indication components and actual rod positions meet their Limiting Conditions for Operation; if they do not, then the applicable ACTION statements

DEVELOPMENT REFERENCES: TS 3.1.3.3

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since this would be required in the event of a loss of a single indication while operating in Mode 1 or 2, but with both indications lost in Mode 3 the Reactor Trip Breakers are to be opened.
- b. Plausible since this would be required in the event of a loss of a single indication while operating in Mode 1 or 2, but with both indications lost in Mode 3 the Reactor Trip Breakers are to be opened.
- c. Plausible since Loss of indication of DRPI may lead to belief that SDM cannot be verified; which would require Emergency Boration.
- \checkmark d. With both DRPI indications inoperable in Mode 3, 4, or 5, TS requires that the Reactor Trip Breakers be opened immediately.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of Tech Spec immediate action requirements in the event of a Loss of both DRPI indications

QUESTION: 10

A licensed Reactor Operator has failed to meet the required number of hours this past calendar quarter to maintain an active license.

Assuming all other requirements have been met to activate the license, which of the following watches completed under instruction would satisfy the requirement to allow activation of the license?

- a. 24 hours as the Control Operator during Mode 5 AND 36 hours as the Control Operator during Mode 4
- b. 48 hours as the Balance of Plant Operator during Mode 5 AND 12 hours as the Control Operator during Mode 4
- c. 40 hours as the Control Operator during Mode 5
- d. 40 hours as the Balance of Plant Operator during Mode 4

ANSWER :

- d. 40 hours as the Balance of Plant Operator during Mode 4

QUESTION NUMBER: 10 **TIER/GROUP:** 3
KA IMPORTANCE: RO **SRO** 3.8
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 2.1.1

Knowledge of conduct of operations requirements

OBJECTIVE: PP-3.1-1

Given a situation, STATE whether or not an off-going operator may be relieved during the shift turnover process

DEVELOPMENT REFERENCES: OMM-001

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since this exceeds the required 40 hours for the CO or BOP position, but only those hours when the plant is above 200°F are acceptable.
- b. Plausible since this exceeds the required 40 hours for the CO or BOP position, but only those hours when the plant is above 200°F are acceptable.
- c. Plausible since this meets the required 40 hours for the CO or BOP position and this has the most hours in the CO position, but only those hours when the plant is above 200°F are acceptable.
- d. 40 hours are required in either the CO or BOP position when the plant is above 200°F.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 2

EXPLANATION: Must recall requirement for activating an inactive license from OMM-001

QUESTION: 11

Following a loss of off-site power during recovery from a SGTR, the crew is required to transition from EPP-019, "Post SGTR Cooldown Using Steam Dump," to either:

- EPP-017, "Post SGTR Cooldown Using Backfill"
- EPP-018, "Post SGTR Cooldown Using Blowdown"

Which of the following describe how RCS and SG pressure control in EPP-017 compares to that in EPP-018?

- a.
 - EPP-017 maintains RCS pressure below the ruptured SG pressure
 - EPP-018 maintains RCS pressure below the ruptured SG pressure
- b.
 - EPP-017 maintains RCS pressure below the ruptured SG pressure
 - EPP-018 maintains RCS pressure the same as the ruptured SG pressure
- c.
 - EPP-017 maintains RCS pressure the same as the ruptured SG pressure
 - EPP-018 maintains RCS pressure below the ruptured SG pressure
- d.
 - EPP-017 maintains RCS pressure the same as the ruptured SG pressure
 - EPP-018 maintains RCS pressure the same as the ruptured SG pressure

ANSWER:

- b.
 - EPP-017 maintains RCS pressure below the ruptured SG pressure
 - EPP-018 maintains RCS pressure the same as the ruptured SG pressure

QUESTION NUMBER: 11 **TIEWGROUP:** 1/1
KA IMPORTANCE: RO **SRO** 4.4
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 000038EA2.08

Ability to determine or interpret the following as they apply to a SGTR: Viable alternatives for placing plant in safe condition when condenser is not available

OBJECTIVE: EOP-3.4-1

Describe the purpose of the following EOPs including the type of event for which they were designed and the major actions performed

- EPP-017
- EPP-018
- EPP-019

DEVELOPMENT REFERENCES: EPP-017
EPP-018

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EPP-3.4 010

NRC EXAM HISTORY: Harris 2002

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since EPP-017 maintains pressure below ruptured SG pressure, but EPP-018 maintains pressure the same as the ruptured SG pressure.
- \checkmark b. EPP-017 maintains pressure below SG pressure to allow backfill from the SG to the KCS, while EPP-018 maintains pressure the same as SG pressure to minimize SG leakage.
- c. Plausible since either EPP-017 or EPP-018 maintains pressure below SG pressure and either EPP-017 or EPP-018 maintains pressure the same as SG pressure, but this distracter has the correct condition reversed.
- d. Plausible since EPP-018 maintains pressure the same as the ruptured SG pressure, but EPP-017 maintains pressure below ruptured SG pressure.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of different mitigation strategies for EPP-017 and EPP-018

QUESTION: 12

A LOCA occurred several hours ago. Only one (1) Containment Spray Pump is running due to actions taken in EPP-012, "Loss of Emergency Coolant Recirculation."

A transition has just been made to FRP-J.1, "Response to High Containment Pressure." Containment Pressure is 14 psig.

Which of the following actions should be **taken**?

- a. Start the second Containment Spray Pump if Containment pressure does **NOT** decrease below 10 psig before exiting FRP-J.1.
- b. Start the second Containment Spray Pump since pressure is above 10 psig.
- c. Continue operation with one Containment Spray Pump regardless of any increase in Containment pressure.
- d. Continue operation with one Containment Spray Pump unless Containment pressure begins increasing, then start the second pump.

ANSWER

- c. Continue operation with one Containment Spray Pump regardless of any increase in Containment pressure.

QUESTION NUMBER: 12 **TIER/GROUP:** 1/2
KA IMPORTANCE: RO **SRO** 3.8
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: WE14EA2.2

Ability to determine and interpret the following as they apply to the (High Containment Pressure)
Adherence to appropriate procedures and operation within the limitations in the facility's license and
amendments

OBJECTIVE: EOP-3.13-5

Given the following FOP steps, notes, and cautions, describe the associated basis: h. CNMT spray
operation (EPP-012 or FRP-J.1)

DEVELOPMENT REFERENCES: EOP-FRP-J.1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EOP-3.13-R4 00X

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION(CORRECT ANSWER ✓d):

- a. Plausible since this would be a normal action directed by FRP-J.1
- b. Plausible since this would be a normal action directed by FRP-J.1
- ✓ c. EPP-012 directs the operators to run Containment Spray Pumps based upon Containment pressure and Fan Cooler operation. These actions are taken to minimize RWST depletion. This configuration is to be maintained even if FRP-J.1 is implemented.
- d. Plausible since would better serve the intent of EPP-012, but would be contradictory to the intent of FRP-J.1 which has a higher priority concerning the operation of the Spray Pumps.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must compare the relative actions in the 2 procedures and make a judgement of
which condition takes precedent

QUESTION: I3

During operation at 100% power, an inadvertent SI occurs on 'B' Train **ONLY**.

Which of the following actions is required?

- a. Manually actuate **SI** on 'A' Train and continue in PATH-I
- b. Continue in PATH-I noting which 'A' Train ESF equipment is **NOT** running
- c. Start **ONLY** the 'A' Train of ESF equipment for which the redundant 'B' Train equipment failed
- d. Transition directly to EPP-008, **SI** Termination

ANSWER:

- a. Manually actuate **SI** on 'A' Train and continue in **PATH-I**

QUESTION NUMBER: 13 **TIEWGROUP:** 2/i
KA IMPORTANCE: RO **SRO** 4.6
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 013A2.01

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

OBJECTIVE: IE-3.10-R4

Describe the expected operator actions associated with an imminent RPS or ESFAS actuation

DEVELOPMENT REFERENCES: EOP User's Guide

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED /DIRECT: IE-3.10-R4 001

NHC EXAM HISTORY: Harris 2000

DISTRACTOR JUSTIFICATION (CORRECT ANSWER ✓d):

- ✓ a. Preferred method of manual actuation although it would be acceptable to start reposition all equipment which would be actuated regardless of the perceived need since diagnostics have not yet been performed.
- b. Plausible since only a single train actuation is analyzed, but efforts are to be made to initiate both trains.
- c. Plausible since starting equipment as needed would provide adequate protection, but since diagnostics have not yet been completed the equipment required may not yet be known.
- d. Plausible since one of the goals following an inadvertent SI is to terminate SI as soon as criteria are met to prevent overfilling / pressurizing the KCS, but procedures are written assuming both trains started.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Required knowledge of procedural requirements for a single train of ESF actuation

QUESTION: 14

Given the following conditions:

- e 1CS-235, Charging Line Isolation, was closed to establish a clearance boundary for maintenance on ICs-238.
- 1CS-235 had to be manually torqued shut.
- 1CS-235 is a Limitorque SMB-00/SB-00 motor-operated valve.

Prior to declaring 1CS-235 operable after the clearance is removed, the valve must be ...

- a. verified to have the torque switch calibrated correctly
- b. stroked with the control switch.
- c. monitored for seat leakage.
- d. manually stroked full open.

ANSWER:

- b. stroked with the control switch.

QUESTION NUMBER. 14 TIER/GROUP: 3
 KA IMPORTANCE: RO SRO 3.1
 10CFR55 CONTENT: 41(b) 43(b) 5

KA: 2.2.19

Knowledge of maintenance work order requirements

OBJECTIVE: PP-2.4-1

Identify the primary functions and explain the responsibilities of the Work Coordination Center

DEVELOPMENT REFERENCES: OMM-014

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: B00 028

NRC EXAM HISTORY: Harris 2000

DISTKACTION JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since the valve has been manually torqued onto the seat, hut the requirement is that the valve must he stroked electrically from the control switch.
- b. All Limitorque SMB-00/SB-00 motor operated valves, if manually operated, are required to be stroked electrically from the control switch to be declared operable.
- c. Plausible since over torquing a valve may result in seat leakage, but **the** requirement is that the valve must he stroked electrically from the control switch.
- d. Plausible since the valve was manually torqued closed, hut the requirement is that the valve must be stroked electrically from the control switch.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of administrative post-work practices required

QUESTION: 15

Given the following conditions:

- Following a Reactor Trip and Safety Injection, a transition has eventually been made to EOP-EPP-015, “Uncontrolled Depressurization of All Steam Generators.”
- Both Main and Auxiliary Feed Flow have been isolated to all SGs.
- Directions have just been given to locally isolate steam flows from all SGs.
- SG ‘A’ pressure appears to have stabilized at approximately 100 psig, while the other SGs have completely depressurized.

Which of the following actions should be taken?

- a. Transition to EOP-EPP-014, “Faulted SG Isolation,” since this is indication that SG ‘A’ has been isolated.
- b. Continue in EOP-EPP-015 and re-establish AFW flow to SG ‘A’ at minimum flow.
- c. Transition to EOP-PATH-2 if local radiation surveys indicate primary-to-secondary leakage is occurring.
- d. Transition to EOP-EPP-008, “SI Termination,” to prevent overpressurizing the RCS.

ANSWER:

- c. Transition to EOP-PATH-2 if local radiation surveys indicate primary-to-secondary leakage is occurring.

QUESTION NUMBER: 15

TIER/GROUP: 1/1

KA IMPORTANCE: RO SRO 3.8
10CFR55 CONTENT: 41(b) 43(b) 2

KA: 000040G2.1.32

Ability to explain and apply all system limits and precautions. (Steam Line Rupture - Excessive Heat Transfer)

OBJECTIVE: EOP-3.9-7

Given a step, caution, or note from an emergency procedure, slate its purpose

DEVELOPMENT REFERENCES: EOP-EPP-015

REVERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since once a SG is confirmed to be isolated in EPP-015, a foldout page item directs a transition to EPP-014.
- b. Plausible since without indications of a SG tube leak, actions would be taken to remain in EPP-015 and maintain feed flow at minimum.
- c. A SG may be suspected to be ruptured if it fails to dry out following isolation of feed flow. Local checks for radiation can be used to confirm primary-to-secondary leakage.
- d. Plausible since a desired goal after isolating a faulted SG is to terminate SI as soon as conditions are met to prevent overfilling and overpressurizing the RCS.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must analyze the cause of the failure of the SG to depressurize and then determine the correct actions based on the analysis.

QUESTION: 16

The unit has tripped due to a LOCA and ESF equipment has failed to start. As a result, EOP-FRP-C.2, "Response to Degraded Core Cooling," has been entered.

A depressurization of the Steam Generators (SGs) to 80 psig is being performed, in accordance with the procedure, when the STA reports that a Red Path condition for Integrity has occurred.

Which of the following actions should be taken?

- a. Immediately transition to EOP-FRP-P.1, "Response to Imminent Pressurized Thermal Shock Conditions"
- b. Stop the S/G depressurization and, if the red path does not clear, transition to EOP-FRP-P.1, "Response to Imminent Pressurized Thermal Shock Conditions"
- c. Complete EOP-FRP-C.2 and then transition to EOP-FRP-P.1, "Response to Imminent Pressurized Thermal Shock Conditions," if the red path still exists
- d. Complete the S/G depressurization and then transition to EOP-FRP-P.1, "Response to Imminent Pressurized Thermal Shock Conditions," if the red path still exists

ANSWER:

- c. Complete EOP-FRP-C.2 and then transition to EOP-FRP-P.1, "Response to Imminent Pressurized Thermal Shock Conditions," if the red path still exists

QUESTION NUMBER: 16 **TIEWGROUP:** 1/2
KA IMPORTANCE: RO **SRO** 3.8
10CFR55 CONTENT: 41(b) **43(b)** 2

KA: WE06G2.1.32

Ability to explain and apply all system limits and precautions. (Degraded Core Cooling)

OBJECTIVE: EOP-3.10-4

Given the following EOP steps, notes, and cautions, describe the associated basis

g. Stopping SG depressurization at 80 psig (C.2)

DEVELOPMENT REFERENCES: EOP-FRP-C.2

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DETRACTOR JUSTIFICATION (CORRECT ANSWER ✓d):

- a. Plausible since the red path for integrity has a higher priority than the orange path that caused entry into EOP-FRP-C.2, but under these particular conditions a transition should not occur until completion of the EOP-FRP-C.2.
- b. Plausible since the red path for integrity has a higher priority than the orange path that caused entry into EOP-FRP-C.2, but under these particular conditions a transition should not occur until completion of the EOP-FRP-C.2.
- ✓ c. During the depressurization, a red path may occur due to injecting the accumulators. A transition should not be made until the entire procedure has been completed.
- d. Plausible since the red path for integrity has a higher priority than the orange path that caused entry into EOP-FRP-C.2, but under these particular conditions a transition should not occur until completion of the EOP-FRP-C.2.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPIANATION: Must analyze plant conditions to determine that the cause of the red path is the depressurization and that, under these specific conditions, an immediate transition is not warranted

QUESTION: 17

Given the following conditions:

- The unit is in Mode 3.
- Instrument Buses 1DP-1B-SII and 1DP-1B-SIV are both de-energized.
- Maintenance reports that Instrument Bus 1DP-1B-SII is ready to be re-energized.

In order to prevent an inadvertent Safeguards Actuation, which **of** the following must be verified prior to re-energizing the bus and why?

- a. Train 'A' Logic Input Error inhibit must be verified to be in INHIBIT due to the proper coincidence for an actuation being available
- b. Train 'A' Logic Train Output must be verified to be in TEST to prevent an inadvertent Safeguard Actuation due to the loss of the SI BLOCK Signals
- c. Train 'R' Logic Input Error Inhibit must be verified to be in INHIBIT due to the proper coincidence for an actuation being available
- d. Train 'B' Logic Train Output must be verified to be *in* TEST to prevent an inadvertent Safeguard Actuation due to the loss of the SI BLOCK Signals

ANSWER:

- d. Train 'B' Logic Train Output must be verified to be in TEST to prevent an inadvertent Safeguard Actuation due to the loss of the SI BLOCK Signals

QUESTION NUMBER: 17 TIER/GROUP: 2/I
KA IMPORTANCE: RO SRO 3.4
10CFR55 CONTENT: 41(b) 43(b) 2

KA: 062G2.2.22

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

OBJECTIVE: ESFAS-3.0-4

Given applicable logic diagrams and a set of plant conditions, predict how loss of any of the four instrument buses will affect the ESFAS output functions of each SSPS train.

DEVELOPMENT REFERENCES: OP-156.02

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED/ DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since the loss of both trains of power will provide the proper coincidence, but power must be available to the output relays to actuate. Placing the input error inhibit in INHIBIT at this time will not prevent an actuation since the logic is already made up. Also the incorrect Train.
- b. Plausible since the loss of both trains of power causes the SI Block signals to be lost and when either of the supplies is restored, power will be available to the output relays to cause an actuation, however this occurs on Train 'B' for this event.
- c. Plausible since the loss of both trains of power will provide the proper coincidence, but power must be available to the output relays to actuate. Placing the input error inhibit in INHIBIT at this time will not prevent an actuation since the logic is already made up.
- d. The loss of both trains of power causes the SI Block signals to be lost. When either of the supplies is restored, power will be available to the output relays to cause an actuation.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must determine train of SSPS affected by the loss of power and then analyze the effect of partially restoring power

QUESTION: 18

The Unit-SCO and Superintendent-Shift Operations are discussing invoking 10CFR50.54(x) during the implementation of the Emergency Operating Procedures due to a condition arising which is **NOT** addressed by the procedures or Technical Specifications.

Which of the following conditions must be met when invoking 10CFR50.54(x)?

- a. The action must be approved by an additional licensed Senior Reactor Operator when the action is necessary to prevent equipment damage.
- b. The action must be approved by the Superintendent-Shift Operations prior to taking the action.
- c. The NRC must concur with the action to be taken prior to the action actually being taken.
- d. The action must be approved by the Manager-Operations when the action is necessary to protect plant personnel.

ANSWER:

- b. The action must be approved by the Superintendent-Shift Operations prior to taking the action.

QUESTION NUMBER: 18 **TIER/GROUP:** 3
KA IMPORTANCE: RO **SRO** 3.3
10CFR55 CONTENT: 41(b) **43(b)** 3

KA: 2.2.10

Knowledge of the process for determining if the margin of safety, as defined in the basis of any technical specification is reduced by a proposed change, test or experiment

OBJECTIVE: PP-2.0-S2

LIST the actions required by the individual who authorizes a deviation from the Technical Specifications or license conditions

DEVELOPMENT REFERENCES: PRO-NGGC-0200

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: INPO 23318

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since 10CFR50.54(x) requires that a licensed SRO approve any actions which deviate from license conditions prior to performance. but the actions must be to protect the health and safety of the public.
- \checkmark b. The minimum level of approval per PRO-NGGC-0200 is the Superintendent-Shift Operations, but it can be approved by any personnel holding an SRO license above this position also.
- c. Plausible since the NRC must be notified, but the notification requirements are within 1 hour per AP-617.
- d. Plausible since the Manager-Operations can approve a deviation if he holds an SRO license, but the actions must be to protect the health and safety of the public.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 2

EXPLANATION: Requires knowledge of requirements for process of performing actions not described in any licensing basis documents.

QUESTION: 19

Given the following conditions:

- e Following a Loss of All Power, EDG 1A-SA has been restarted and partially loaded.
- A transition has been made to EOP-EPP-003, "Loss of All AC Power Recovery with SI Required."
- EDG 1A-SA is currently loaded to 4.5 MWe and 3.5 MVAR.

Which of the following would result in an UNACCEPTABLE loading condition for EDG 1A-SA?

- a. • Pick up an additional 0.5 MWe
e Pick up an additional 0.1 MVAR
- b. • Pick up an additional 1.0 MWe
e Pick up an additional 0.5 MVAR
- c. • Pick up an additional 1.5 MWe
• Pick up an additional 1.0 MVAR
- d. • Pick up an additional 2.0 MWe
• Pick up an additional 1.2 MVAR

ANSWER:

- c. • Pick up an additional 1.5 MWe
• Pick up an additional 1.0 MVAR

QUESTION NUMBER: 10 **TIER/GROUP:** 1/1
KA IMPORTANCE: RO **SRO** 4.6
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 000056AA2.14

Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Operational status of ED/Gs (A and B)

OBJECTIVE: EOP-3.7-6

Given a step, caution, or note from EOP-001, EOP-002, or EOP-003, state its purpose

DEVELOPMENT REFERENCES: OP-155, Attachment 9
EOP-003

REFERENCES SUPPLIED TO APPLICANT: OP-155, Attachment 9

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT
BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since new loading will be 5.0 MWe and 3.6 MVAR, which is just within acceptable limits.
- b. Plausible since new loading will be 5.5 MWe and 4.0 MVAR, which is just within acceptable limits.
- \checkmark c. New loading will be 6.0 MWe and 4.5 MVAR, which is outside acceptable limits
- d. Plausible since new loading will be 6.5 MWe and 4.7 MVAR, which is just within acceptable limits.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must analyze EDG operability curve to determine whether additional MWe and MVAR loading is within acceptable limits

QUESTION: 20

A reactor trip occurred due to a loss of offsite power. The plant is being cooled down on RIIK per EPF-006. Natural Circulation Cooldown with Steam Void in Vessel with RVLIS.

- RCS cold leg temperatures are 190°F.
- Steam generator pressures are 50 psig.
- RVLIS upper range indicates greater than 100%.
- Three CRDM fans have been running during the entire cooldown.

Steam should be dumped from all SGs to ensure ..

- a. boron concentration is equalized throughout the RCS prior to taking a sample to verify cold shutdown boron conditions.
- b. all inactive portions of the RCS are below 200°F prior to complete RCS depressurization.
- c. RCS and SG temperatures are equalized prior to any subsequent RCP restart.
- d. RCS temperatures do not increase during the required 29 hour vessel soak period.

ANSWER:

- b. all inactive portions of the RCS are below 200°F prior to complete RCS depressurization.

QUESTION NUMBER: 20 **TIEWGROUP** I/2
KA IMPORTANCE: **RO** **SRO** 3.8
10CFR55 CONTEXT: **41(b)** **43(b)** **2**

KA: WE09G2.1.32

Ability to explain and apply all system limits and precautions. (Natural Circulation Operations)

OBJECTIVE: EOP-3.8-2

Demonstrate the below-assumed operator knowledge from the SHNPP Step Deviation Document and the WOG ERGs that support performance of EOP actions: Determining that upper head and SG U-tube temperatures are below 200 °F

DEVELOPMENT REFERENCES: EOP-EPP-006

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EOP-3.8 006

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since this action would have been performed in this procedure, but must be completed prior to depressurizing the RCS below 1900 psig.
- \checkmark b. SG pressure above 0 psig indicates that the SGs are above 200°F. Depressurizing the RCS under this condition will result in additional void formation in the SG u-tubes.
- c. Plausible since KCP operation throughout NC Cooldown is desirable, but will not be performed at this point in the procedure.
- d. Plausible since a soak period is addressed, but only if continued operation of CRDM fans had not been maintained.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must analyze the conditions and determine that the entire RCS is not below 200°F and the effect of depressurizing under these conditions.

QUESTION: 21

During an emergency, a worker has been directed to enter a high radiation area and perform a repair necessary for the protection of valuable property.

In accordance with PEP-330, "Radiological Consequences," the worker's exposure should be limited to . . .

- a. 10 Rem TEDE and the entry does **NOT** require specific Site Emergency Coordinator authorization.
- b. 10 Rem TEDE and the entry requires specific Site Emergency Coordinator authorization.
- c. 25 Rem TEDE and the entry does **NOT** require specific Site Emergency Coordinator authorization.
- d. 25 Rem TEDE and the entry requires specific Site Emergency Coordinator authorization,

ANSWER:

- b. 10 Rem TEDE and the entry requires specific Site Emergency Coordinator authorization.

QUESTION NUMBER: 21 **TIEWGROUP:** 3
KA IMPORTANCE: RO **SRO** 3.3
10CFR55 CONTENT: 41(b) **43(b)** 4

KA: 2.3.7

Knowledge of the process for preparing a radiation work permit

OBJECTIVE: EP20-2A

Identify the types of protective actions for HNP persotmrl (both on and off-site) and who is responsible for directing them.

DEVELOPMENT REFERENCES: PEP-330

ROFEMENCESUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since 10 rem TEDE for protecting valuable company property, hut *S-SO* approval is required.
- \checkmark b. Exposure is limited to 10 rem TEDE is the limit required for this activity and S-SO approval is required.
- c. Plausible since 25 rem TEDE is the limit required for lifesaving efforts, but the limit to protect equipment and property is 10rem TEDE.
- d. Plausible since 25 rem TEDE is the limit required for lifesaving efforts, but the Limit to protect equipment and property is 10 rem TEDE.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Requires knowledge of the emergency exposure limits and approval requirements

QUESTION: 22

Given the following conditions:

- Power is currently at 32% during a plant startup.
- Instrument Bus IDP-1B-SIV deenergized as a result of a fault in PIC CAB-4.
- PIC CAB-4 has been isolated from Instrument Bus SIV and will be deenergized for approximately eight (8) hours while repairs are being made.

Which of the following actions must be taken?

- a. Place all PIC CAB-4 Reactor Trip instruments in the tripped condition
- b. Place all PIC CAB-4 ESF instruments in the tripped condition
- c. Place all MFW Regulating Valves in MANUAL
- d. Perform a plant shutdown

ANSWER:

- d. Perform a plant shutdown

QUESTION NUMBER: 22 **TIEWGROUP:** 1/1
KA IMPORTANCE: RO **SRO** 4.1
10CFR55 CONTENT: 41(b) **43(b)** 2

KA: 000057G2.2.22

Knowledge of limiting conditions for operations and safety limits. (Loss of Vital AC Instrument Bus)

OBJECTIVE: AOP-3.24-4

Determine the following: a. Consequences of the loss of all power to PIC CAR-4

DEVELOPMENT REFERENCES: AOP-024
TS Table 3.3-3, pg 3-18 and 3-27
TS 3.0.3, pg 0-1

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

RANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: AOP-3.24-R4 001

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since instrument failures require bistables tripped, but they are deenergized to actuate and are already tripped since no power is available.
- b. Plausible since instrument failures require bistables tripped, but they are deenergized to actuate and are already tripped since no **power** is available.
- c. Plausible since this is the immediate operator action for a loss of Instrument Bus SIII, not SIV.
- \checkmark d. Loss of all power to PIC CAB-4 will result in 3 bistable channels of Steam Line Pressure becoming inoperable. The TS action is to trip the bistables within one hour, but the bistables are energized to actuate. Without power available, this action cannot be performed and TS 3.0.3 becomes applicable

DIFFICULTY ANALYSIS:

COMPREHENSIVE/ ANALYSIS KNOWLEDGE/ RECALL

DIFFICULTY RATING: 4

EXPLANATION: Must recognize that energized to actuate bistables cannot be placed in tripped condition without power, thus an entry into TS 3.0.3 is required, and must determine the required TS 3.0.3 actions

QUESTION: 23

During the performance of FOP-PATH-2, the SIA reports that the following two (2) YELLOW path Critical Safety Function Status Trees (CSFST) exist:

- Integrity
- Heat Sink

Which of the following describes how these YELLOW paths are to be addressed and / or implemented?

- a. Both must be addressed and implemented, with Heat Sink having a higher priority than Integrity, as soon as EOP-PATH-2 actions are completed provided no other higher priority CSFST conditions exist
- b. Both must be addressed, but implemented at the discretion of the Superintendent-Shift Operations, prior to exiting from the EOP network
- c. Both must be addressed and implemented, with Heat Sink having a higher priority than Integrity, prior to exiting from the EOP network
- d. Both must be addressed, but implemented at the discretion of the Superintendent-Shift Operations, as soon as EOP-PATH-2 actions are completed provided no other higher priority CSFST conditions exist

ANSWER:

- b. Both must be addressed, but implemented at the discretion of the Superintendent-Shift Operations, prior to exiting from the EOP network

QUESTION NUMBER: 23 **VIEWGROUP:** 3
KA IMPORTANCE: RO **SRO** 4.0
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 2.4.22

Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations

OBJECTIVE: EOP-3.19-2

Describe Control Room usage of status trees as it relates to the following

- a. Priority of status trees
- b. Rules of usage

DEVELOPMENT REFERENCES: EOP User's Guide

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark 'd):

- a. Plausible since they are to be addressed, but only prior to leaving the EOP network and are not required to be implemented.
- \checkmark b. All YELLOW-condition CSFSTs should be addressed prior to exiting the EOP network. However, the operator is allowed to decide if and when to implement, and whether to complete any YELLOW-condition FRP.
- c. Plausible since they are to be addressed, but only prior to leaving the EOP network and are not required to be implemented.
- d. Plausible since they are to be addressed, but only prior to leaving the HOP network and are not required to be implemented.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of the implementation criteria for yellow CSFSTs as directed by plant procedures

QUESTION: 24

Following a loss of all AC power, how long are the safety-related 125 VDC batteries **DESIGNED** to allow equipment operation'!

- a. 2 hours, assuming DC load shedding occurs within 30 minutes of the loss of all AC power
- b. 2 hours, assuming DC load shedding occurs within 60 minutes of the loss of all AC power
- c. 4 hours, assuming DC load shedding occurs within 30 minutes of the loss of all AC power
- d. 4 hours, assuming DC load shedding occurs within 60 minutes of the loss of all AC power

ANSWER:

- d. 4 hours, assuming DC load shedding occurs within 60 minutes of the loss of all AC power

QUESTION NUMBER: 24 **TIER/GROUP:** 1/1
KA IMPORTANCE: RO **SRO** 3.7
10CFR55 CONTENT: 41(b) **43(b)** 2

KA: 000058G2.2.25

Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.
(Loss of DC Power)

OBJECTIVE: EOP-3.7-6

Given a step, caution, or note from EOP-001, EOP-002, or EOP-003, state its purpose

DEVELOPMENT REFERENCES: Tech Spec Bases 3.8.2, pg 8-2
EOP-EPP-001
ADEL-LP-2.6

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: ADEL2-6-S1 001

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since this is the time limit which requires actions being taken in accordance with Technical Specifications, but the design of the batteries is 4 hours.
- b. Plausible since this is the time limit which requires actions being taken in accordance with Technical Specifications: but the design of the batteries is 4 hours.
- c. Plausible since the design of the batteries is 4 hours, but the design assumes that DC Load shedding occurs within 60 minutes, not 30.
- \checkmark d. Batteries are designed to carry required safety related loads for up to 4 hours without AC input to carry bus or charge battery, assuming that required load shedding occurs within 1 hour.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE: / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of tech spec basis and design of safety-related batteries

QUESTION: 25

Which of the following actions would be **INAPPROPRIATE** to perform prior to direction in an EOP?

- a. Isolating AFW flow to a single faulted SG
- b. Throttling AFW flow to control a ruptured SG level within the required level band
- c. Securing a CSIP to prevent overfilling the pressurizer following an inadvertent SI
- d. Shutting the MSIVs to isolate a steamline break which has not resulted in an SI

ANSWER:

- c. Securing a CSIP to prevent overfilling the pressurizer following an inadvertent SI

QUESTION NUMBER: 25 **TIER/GROUP:** 3
KA IMPORTANCE: RO **SRO** 3.9
10CFR55 CONTENT: 41(b) **43(b)** 5

KA: 2.4.14

Knowledge of general guidelines for EOP flowchart use

OBJECTIVE: EOP-LP-3.19-1

Describe Control Room usage of the EOP network as it relates to the following: a) Performing steps out of sequence

DEVELOPMENT REFERENCES: EOP User's Guide

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

RANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EOP-3.19-R1 018

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since this is a numbered step in PATH-1 which are normally required to be performed in sequence, but the EOP User's Guide addresses this as being acceptable.
- b. Plausible since this is a numbered step in PATH-I which are normally required to be performed in sequence, but the EOP User's Guide addresses this as being acceptable.
- c. Performing steps out of sequence is allowed, but must be done with caution to prevent masking symptoms or defeating the intent of the EOP being used. Although terminating SI early might be beneficial to prevent filling the pressurizer if the only event is a spurious SI, this may result in further degradation of the plant if another undiagnosed event is in progress.
- d. Plausible since this is a numbered step in PATH-1 which are normally required to be performed in sequence, but the EOP User's Guide addresses this as being acceptable.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Must differentiate between those actions which could potentially result in degradation of the plant if taken out of sequence and those actions which would likely have little impact on the operators' abilities to diagnose other events.

INITIAL SUBMITTAL

**HARRIS EXAM
50-400/2004-301**

**FEBRUARY 23 - 27, 2004
& MARCH 4, 2004 (WRITTEN)**

**RO. INITIAL SUBMITTAL
WRITTEN EXAMINATION**

QUESTION: 1

Following a Reactor Trip, the RCS temperature is being controlled by the Steam Dump Control System at 540°F. EOP-EPP-004, "Reactor Trip," directs that the RCS be maintained at 557°F.

Given the following range of instruments, if the Steam Dump Control System is placed in the Steam Pressure mode, what approximate setpoint is required to maintain RCS temperature at 557°F?

- Steam header pressure full range: 0-1300 psig
- Steam generator pressure full range: 0-1300 psig
- Turbine main steam pressure full range: 0-1500 psig

- a. 16%
- b. 24%
- c. 73%
- d. 84%

ANSWER:

- d. 84%

QUESTION: 2

With the plant at 100 percent steady-state condition, the following occurs:

- ALB-06-7-3, TOTAL MAKEUP WATER FLOW DEVIATION, alarms.
- ALB-06-8-4, BORIC ACID FLOW DEVIATION, alarms.
- VCT level is at 19.5% and decreasing at the same rate it has been for the last few days.

Which of the following procedures should be addressed?

- a. AOP-002, Emergency Roration
- b. AOP-003, Malfunction of Keactor Makeup Control
- c. AOP-016, Excessive Primary Plant Leakage
- d. AOP-017, Loss of Instrument Air

ANSWER:

- b. AOP-003, Malfunction of Reactor Makeup Control

QUESTION NUMBER 2 **TIER/GROUP:** 1/1
KA IMPORTANCE: RO 4.0 **SRO**
10CFR55 CONTENT: 41(b) 10 **43(b)**

KA: 00002262.4.4

Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (Loss of Reactor Coolant Makeup)

OBJECTIVE: AOP-3.3-R1

IDENTIFY symptoms that require entry into AOP-003, Malfunction of Reactor Makeup Control

DEVELOPMENT REFERENCES: AOP-003

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED/ DIRECT: AOP-3.3-R1 002

NRC EXAM HISTORY: Hams NRC 2000

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since Emergency Roration entry conditions include any condition which is a result of an unexplained reactivity addition, which candidate may consider this to be.
- \checkmark b. These are entry conditions for Reactor Makeup Control malfunction
- c. Plausible since CVCS leakage, if suspected, would cause entry into AOP-016.
- d. Plausible since normal horation flowpaths are not available during a loss of instrument air event.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of entry requirements for loss of reactor makeup

QUESTION: 3

Given the following conditions:

- The plant is operating at 50% power.
- PT-457, Channel III Pressurizer Pressure, has failed and all associated bistables are in the tripped condition.
- Power is subsequently lost to UPS Bus IDP-1A-S1.

Which of the following describes the effect of this loss **of power** on the Phase A Containment Isolation valves?

- a. **NO** Phase A Containment Isolation valves will **close**
- h. **ONLY** Train **A** Phase A Containment Isolation valves will close
- c. **ONLY** Train **B** Phase A Containment Isolation valves will close
- d. All Phase A Containment Isolation valves will close

ANSWER:

- c. **ONLY** Train **B** Phase **A** Containment Isolation valves will close

QUESTION NUMBER: 3 TIER/GROUP: 2/1
KA IMPORTANCE: NO 4.3 SRO
10CFR55 CONTENT: 41(b) 5 43(b)

KA: 013K3.03

Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Containment

OBJECTIVE: ESFAS- 3.0-4

PREDICT how loss of any of the four instrument buses will affect the ESFAS output functions of each SSPS train

DEVELOPMENT REFERENCES: AOP-024
SD-103

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: ESFAS-3.0-R4 001

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since Train SA slave relays will not actuate, but Train SB relays will still actuate.
- b. Plausible since one train of Phase A will not actuate, but the train that will not actuate is Train SA.
- c. A loss of Bus IDP-1A-S1 under these conditions will result in a 2/3 signal to both trains of ESFAS, resulting in an SI and Phase A signal. Train SA slave relays; however, are powered from IDP-1A-S1 and are energized to actuate, so Train SA slaves will not perform their function.
- d. Plausible since SI and Phase A signals will be generated on both trains of ESFAS, but Train SA slave relays will not actuate due to not having power.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analyze the effect of a loss of power on the actuation signals and determine which power supplies power which output relays

QUESTION: 4

Given the following conditions:

- e The unit is operating at 30% power.
- A dropped Control **Rank** 'C' rod *has* just been re-aligned.
- While attempting to operate the ROD CONTROL ALARM RESET, the operator inadvertently operates the ROD CONTROL START-UP RESET.

Which of the following describes the effect *of* operating the incorrect reset?

- a. All Control Bank 'C' rods drop into the core, causing an automatic reactor trip
- b. All **rods**, including Control **Bank** and Shutdown Bank rods, drop into the core, causing an automatic reactor trip
- c. All rods remain in their current position and there is **NO** effect on the Rod Control System circuitry
- d. All rods remain in their current position, but the Rod Control System circuitry senses **all rods are** fully inserted

ANSWER:

- d. All rods remain in their current position, but the Rod Control System circuitry senses all rods **are** fully inserted

QUESTION NUMBER: 4 **TIENGROUP:** 1/2
MA IMPORTANCE: **RO** **3.6** **SRO**
10CFR55 CONTENT: **41(b)** **6** **43(b)**

KA: 000003AA1.02

Ability to operate and / or monitor the following as they apply to the Dropped Control Kod: Controls and components necessary to recover rod

OBJECTIVE: RODCS-3.0-R7

DISCUSS the effects of manipulating each of the following rod control-related switches

- ROD CONTROL START-UP RESET switch
- ROD CONTROL ALARM RESET switch

DEVELOPMENT REFERENCES: AOP-001
RODCS-3.0

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: RODCS-3.0-R7 001

KRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since improper operation of correct switch could result in rods dropping into core, but operated switch only resets starting points for rod control circuitry.
- b. Plausible since improper operation of correct switch could result in rods dropping into core, but operated switch only resets starting points for rod control circuitry.
- c. Plausible if misconception that effect is nothing if performed at power since switch is normally only operated prior to withdrawing any rods: but operated switch resets starting points for rod control circuitry.
- \checkmark d. Operating switch at power does not affect actual rod position, but resets rod control such that circuitry senses rods are at "full inserted" position.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the function of rod control system controls

QUESTION: 5

FRP-J.1, "Response to High Containment Pressure," monitors the status of the ESW Booster Pumps.

Which of the following *is* the concern if ESW Booster pumps fail to start while high containment pressure conditions exist'?

- a. ESW Pump runout
- b. Flooding of safety equipment **in** containment
- c. Loss of containment cooling capability
- d. Radioactivity release to the environment

ANSWER:

- d. Radioactivity release to the **environment**

QUESTION: 6

Given the following conditions:

- EOP-FRP-H.1, “Response to a Loss of Secondary Heat **Sink**,” is being implemented.
- **RCS** bleed and feed has been initiated when Auxiliary Feedwater (AFW) capability **is** restored.
- **All** SGs are completely **dry** and depressurized.

Which of the following describes which SGs are to be fed under these conditions?

- a. Feed **ONLY** one (1) SG to ensure RCS cooldown rates are established within Technical Specification limits
- b. Feed **ONLY** one (1) SG to limit the possibility of a SG tube rupture to a single **SG**
- c. Feed **ALL** SGs **to** establish subcooling conditions in the RCS as soon as possible
- d. Feed **ALL** SGs to allow termination of RCS bleed and feed as soon as possible

ANSWER:

- b. Feed **ONLY** one (1) SG to limit the possibility of a SG tube rupture to a single **SG**

QUESTION NUMBER: 6 **TIER/GROUP:** 1/1
KA IMPORTANCE: RO 3.6 **SRO**
10CFR55 CONTENT: 41(b) 4/10 **43(b)**

KA: 000054AK1.02

Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): Effects of feedwater introduction on dry S/G

OBJECTIVE: EOP-3.11-4

Given the following EOP steps, notes, and cautions, DESCRIBE the associated basis

- Feed restoration

DEVELOPMENT REFERENCES: EOP-FRP-H.1
EOP-LP-3.11

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since feed is established to only one dry SG, but the reason is to ensure any subsequent failures due to thermal shock are limited to a single SG.
- \checkmark b. Flow should only be established to one dry SG so that if excess thermal shock causes failure, the failure is limited to one SG.
- c. Plausible since RCS subcooling is a desirable condition to achieve, but only one SG at a time is fed.
- d. Plausible since terminating RCS bleed and feed is a desirable condition to achieve, but only one SG at a time is fed.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the requirements for feeding a dry SG and the reasons for these actions

QUESTION: 7

Given the following conditions:

- PZR level is 53% and stable.
- a VCT level is 23" and stable.
- a Letdown flow is 45 gpm (FI-150.1).
- a RCP seal injection flows are:
 - RCP 'A' at 8.3 gpm
 - RCP 'B' at 7.9 gpm
 - RCP 'C' at 7.8 gpm
- RCP seal return flows are:
 - RCP 'A' at 2.8 gpm
 - RCP 'B' at 3.1 gpm
 - RCP 'C' at 2.9 gpm

Which of the following would be the expected flow indication on FI-122A.1, Charging Flow, assuming **NO** RCS leakage?

- a. 21 gpm
- b. 30 gpm
- c. 36 gpm
- d. 54 gpm

ANSWER:

- b. 30 gpm

QUESTION NUMBER: 7 TIER/GROUP: 211
 KA IMPORTANCE: RO 3.3 SRO
 10CFR55 CONTENT: 41(b) 3 43(b)

KA: 003A4.01

Ability to manually operate and/or monitor in the control room: Seal injection

OBJECTIVE: CVCS-3.0-RI

Given appropriate CVCS information, PERFORM a CVCS flow balance without reference to procedures

DEVELOPMENT REFERENCES: SD-107
 CPL-2165-S1305

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT
 BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT CVCS-RI 001
 NRC EXAM HISTORY: None

DISTRACTOR SUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible if misconception is that seal leakoff flow is ignored, but leakoff flow is not required to be made up ($45 - 24 = 21$). However, seal leakoff flow ~~is~~ required to be included.
- \checkmark b. Charging flow should equal letdown flow (45 gpm) less seal injection flow (24 gpm) plus seal return flow (9 gpm) ($45 - 24 + 9 = 30$).
- c. Plausible if misconception that seal injection flow is measured as part of charging flow and seal leakoff must be subtracted, but seal injection is required to be included ($45 - 9 = 36$).
- d. Plausible if misconception that seal injection flow is measured as part of charging flow, but seal injection is required to be included ($45 + 9 = 54$).

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Calculation of expected charging flow indication based on given CVCS parameters

QUESTION: 8

EOP-EPP-008, "SI Termination," directs resetting SI.

Which of the following describes the effect of operating only **ONE** (1) of the two (2) SI RESET switches at this step instead of both?

- a.
 - e Bypass – Permissive Light Panel light 4-1, SI ACTUATE, would blink due to only one train of SSPS having an SI signal
 - e Bypass – Permissive Light Panel light 5-1, SI RESET – AUTO SI BLOCKED, would blink due to only one train of SSPS having **SI** reset
- b.
 - e Bypass – Permissive Light Panel light 4-1, SI ACTUATE, would extinguish due to neither train of SSPS having an SI signal
 - Bypass – Permissive Light Panel light 5-1, **SI RESET – AUTO SI BLOCKED**, would light due to both trains of SSPS having SI reset
- c.
 - Bypass – Permissive Light Panel light 4-1, SI ACTUATE, would blink due to only one train of SSPS having an SI signal
 - Bypass – Permissive Light Panel light 5-1, **SI RESET – AUTO SI BLOCKED**, would light due to both **trains** of SSPS having auto SI blocked
- d.
 - e Bypass – Permissive Light Panel light 4-1, SI ACTUATE, would extinguish due to neither train **of** SSPS having an SI signal
 - e Bypass – Permissive Light Panel light 5-1, **SI RESET -- AUTO SI BLOCKED**, would light due to both trains of SSPS having auto SI blocked

ANSWER:

- a.
 - e Bypass – Permissive Light Panel light 4-1, SI ACTUATE, would blink due to only one train of SSPS having **an SI** signal
 - Bypass – Permissive Light Panel light 5-1, **SI RESET -- AUTO SI BLOCKED**, would blink due to only one train **of** SSPS having SI reset

QUESTION: 9

Given the following conditions:

- e Containment Pressure Channel I, PT-950A, *is* in TEST for surveillance testing purposes.
- e Containment Pressure Channel III, PT-952A, is failed low.
- e A large break LOCA occurs and actual Containment Pressure reaches 21 **psig**.

Which of the following describes the response of the Containment Spray system?

- a. **NEITHER** train of Containment Spray will automatically actuate
- b. **ONLY** Train 'A' of Containment Spray will automatically actuate
- c. **ONLY** Train 'B' of Containment Spray will automatically actuate
- d. **BOTH** trains of Containment Spray will automatically actuate

ANSWER

- d. **BOTH** trains of Containment Spray will automatically actuate

QUESTION: io

Given the following conditions”

- The plant *is* operating at **43%** power.
- 120VAC Vital Bus IDP-1B-SII deenergizes.

Outward rod motion **is** inhibited **by** ...

- a. C-1, Intermediate Range rod stop.
- b. C-2, Power Range rod stop.
- c. C-3, OTΔT rod stop.
- d. C-4, OPΔT rod stop.

ANSWER:

- b. C-2, Power Range rod stop.

QUESTION NUMBER: 10 **TIER/GROUP:** 212
KA IMPORTANCE: RO 3.4 **SRO**
10CFR55 CONTENT: 41(b) 6 **43(b)**

KA: 001K4.07

Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: Rod stops

OBJECTIVE: NIS-3.0-9

DISCUSS the operation of the following NIS trip-related functions:

b. SR, IR and PR (low) trip blocks

DEVELOPMENT REFERENCES: OF-105
AOP-024

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: NIS-R6 003

NHC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

a. Plausible since this causes a rod stop, and coincidence is 1/2, but IR rod **stop** is blocked above P-10 by manual operator action. Must have 2/4 PR below P-10 to reset.

\checkmark b. PR rod stop is 1/4 coincidence. With S2-SB deenergized, PR N-42 is tripped.

c. Plausible since causes rod stop, but coincidence is 2/4 instead of 1/4

d. Plausible since causes rod stop, but coincidence is 2/4 instead of 1/4.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analyze effect of **loss** of power on NIS and rod control and determine effect of single channel tripped

QUESTION: 11

The basis for the operation of the Electric Hydrogen Recombiners is to minimize hydrogen concentration build **up** in Containment following a **LOCA** due to the ...

- a. zirc-water reaction and release of hydrogen from the PRT.
- b. corrosion of metals in Containment and release of hydrogen from the RCDT.
- c. release of hydrogen from the PRT and the radiolytic decomposition of water.
- d. radiolytic decomposition of water and the corrosion of metals in Containment.

ANSWER:

- d. radiolytic decomposition of water **and the** corrosion of metals in Containment.

QUESTION: 12

EOP-EPP-001, "Loss of AC Power to 1.4-SA and 1B-SB Buses," is being performed. Concurrent to the loss of power, a small break LOCA occurred.

The crew has completed the following actions when off-site power is restored to 6.9 KV Bus **1.4-SA**:

- Sequencers have been de-energized
- Safeguards pumps autostarts have been disabled
- RCP seals have been isolated
- MSIVs and FWIVs have been closed
- e Depressurization of SGs to 180 psig has commenced

Which of the following actions is the **FIRST** to be taken following the restoration of off-site power?

- a. Start **an** ESW pump
- b. Start **a** CSIP
- c. Stabilize SG pressures
- d. Initiate SI

ANSWER:

- c. Stabilize SG pressures

QUESTION: 13

While performing an Operating Procedure, the Reactor Operator comes to a step which states:

“Request Chemistry to sample the RHT for boron concentration.”

The Reactor Operator believes the step is **NOT** essential to achieving the purpose for which the procedure is being used and that the omission of the step does **NOT** violate the precautions and limitations of the Operating Procedure.

Which of the following is the **MINIMUM** requirement(s) that must be **met** to allow marking the step “N/A”?

- a. ● Step must be initialed by the Reactor Operator prior to performance
- b. ● Step must be initialed by the Reactor Operator prior to performance
e. A written explanation of why **the** step is **NA** must be provided in the Comments section of the procedure
- c. ● Step must be initialed **by** the SCO prior to performance
- d. ● Step must be initialed by the SCO prior to performance
● A written explanation of why the step is **NA** must be provided in the Comments section of the procedure

ANSWER:

- d. ● Step must be initialed by the SCO prior to performance
● A written explanation of why the step is **N/A** must be provided in the Comments section of the procedure

QUESTION NUMBER: 13 **TIER/GROUP** 3
KA IMPORTANCE: RO 3.9 **SRO**
10CFR55 CONTENT: 41(b) 10 **43(b)**

KA: 2.1.23

Ability to perform specific system and integrated plant procedures during all modes of plant operation

OBJECTIVE: PP-2.0-2

DISCUSS the requirements in PRO-NGGC-0200 concerning the following:

- e Procedure user's responsibilities

DEVELOPMENT REFERENCES: PRO-NGGC-0200

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED/ DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since the RO discovered the cause for marking the step N/A, but a supervisor must initial the step prior to performance and a written explanation must be provided in the Comments section.
- b. Plausible since a written explanation must be provided in the Comments section, but a supervisor must initial the step prior to performance.
- c. Plausible since a supervisor must initial the step prior to performance, but a written explanation must be provided in the Comments section.
- \checkmark d. The step is initialed by the responsible supervisor prior to performance and a written explanation is provided in the Comments section.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of use of N/A during procedure usage

QUESTION: 14

Given the following conditions:

- e Spent resin is being sluiced from the Cation Demineralizer to a Spent Resin Storage Tank.
- The operator reports that it appears that a pipe **in** the overhead of a hallway is plugged with resin.
- HP reports the results of a radiation survey as follows:
 - e 2500 mr/hr on contact with pipe
 - e 1200mr/hr @ 18 inches from the pipe
 - 5 mr/hr at floor level below the pipe

Which one of the following describes the required radiological postings?

- a. **NO** postings are required because a ladder **is** required to access the **pipe** area
- b. Very High Radiation Area with red flashing light
- c. High Radiation Area with a red flashing light
- d. High Radiation Area, but **NO** red flashing light required

ANSWER:

- c. High Radiation **Area** with a red flashing light

QUESTION: 15

The Containment Fan Coil Units (AH-37 / 38 / 39) provide area cooling to ...

- a. the reactor vessel supports and reactor coolant leg nozzles.
- b. the clearance between the reactor vessel and primary shield wall.
- c. the reactor coolant pumps.
- d. containment for normal operation and accident conditions.

ANSWER:

- c. the reactor coolant **pumps**.

QUESTION: 16

Given the following conditions:

- e Following a Reactor Trip and Safety Injection due to a *leak* in the PRZ steam space, the Critical Safety Function Status Trees (CSFST) **are** being monitored.
- e The CSFST for RCS Inventory first checks PRZ level and then checks the Reactor Vessel Level Indicating System (RVLIS).

If PRZ level is indicating greater than 92%, why is a check of RVLIS then perform'?

- a. Determine if the cause of the high PRZ level is excessive RCS inventory or voiding in the Reactor Vessel head
- b. Determine **if** SI termination criteria *is* met to allow reducing the excessive RCS inventory
- c. Determine **if** Adverse Containment conditions have caused erroneous indications of the PRZ level instruments
- d. Determine if the cause of the high PRZ level is excessive RCS inventory **or** expansion due to **an** RCS heatup

ANSWER:

- a. Determine if the cause **of** the high PRZ level is excessive RCS inventory **or** voiding in the Reactor Vessel head

QUESTION NUMBER: 16 TIER/GROUP: 1/1
KAIMPORTANCE: RO 3.2 SRO
10CFR55 CONTENT: 41(b) 7 4 3 m

KA: 000008G2.1.28

Knowledge of the **purpose** and function of major system components and controls. (Pressurizer Vapor Space Accident)

OBJECTIVE: ICCM-3.0-1

LIST the two major functions of the Inadequate Core Cooling Monitor (ICCM)

DEVELOPMENT REFERENCES: EOP Background for Inventory Status Tree
LPEOP-3.12

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EOP-3.12 001

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- \checkmark a. Once a determination has been made that PRZ level is full, RVLIS is then used to confirm whether the cause of the full PRZ is excessive inventory or voiding in the head region.
- b. Plausible since RVLIS is used throughout the EOP network to determine if SI termination criteria has been met, but in this instance it is used to determine the cause of the high PRZ level.
- c. Plausible since a steam space break in the PRZ will affect the level indications, but RVLIS is used to determine the cause of the PRZ high level condition.
- d. Plausible since RVEIS is part of the Inadequate Core Cooling Monitoring System and a heat up of the RCS will cause expansion of the RCS, but RVLIS is used to determine the cause of the PRZ high level condition.

DIFFICULTY ANALYSIS:

COMPREHENSIVE/ ANALYSIS KNOWLEDGE /RECALL

DIFFICULTY RATING: Knowledge of the purpose of monitoring RVLIS during accident conditions

EXPLANATION:

QUESTION: 17

Given the following conditions:

- e The plant is shutdown for work on Reactor Coolant Pump seals.
- The Reactor **Vessel** Head is still installed.
- e The running Residual Heat Removal (RIIR) pump trips and the crew *is* unable to start the standby RIIR pump.
- e Time to reach core boiling is determined *to* be **26** minutes.
- e Time to reach core boil-off is determined to be 53 minutes.

Of the following two (2) methods of RCS makeup, which of the following is the **PREFERRED** method of makeup and why is it preferred over the other method?

- a. Gravity feed from the RWST to the RCS is *preferred* over starting a CSIP since starting a CSIP under these conditions would violate Technical Specifications
- b. Gravity feed from the RWST to the RCS is preferred over starting a CSIP since Reactor Makeup to the CSIP may be insufficient to makeup for core boil-off
- c. Starting a CSIP is *preferred* over gravity feed from the RWST since gravity feed flow may be insufficient to makeup for core boil-off **even** if the RCS is depressurized
- d. Starting a CSIP is preferred over gravity feed from the RWST since the RCS may be pressurized and prohibit gravity flow

ANSWER:

- d. Starting a CSIP is preferred over gravity feed from the RWST since the RCS may be pressurized and prohibit gravity flow

QUESTION NUMBER: 17 **TIER/GROUP:** 1/1
KA IMPORTANCE: RO 3.1 **SRO**
10CFR55 CONTENT: 41(b) 8/10 43(b)

KA: 000025AK3.01

Knowledge of the reasons for the following responses as they apply to the Loss of Residual Heat Removal System: Shift to alternate flowpath

OBJECTIVE: AOP-3.20-3

Given a set of entry conditions and a copy of AOP-020, DETERMINE the appropriate response

DEVELOPMENT REFERENCES: AOP-020
AOP-020-BD

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER ✓ d):

- a. Plausible since TS requires that a CSIP be made inoperable before these plant conditions are established, but GP-008 requires that at least one CSIP be functional under these conditions.
- b. Plausible since the CSIP can provide more flow than Reactor Makeup is capable of providing, but the suction source for the CSIP would be the RWST.
- c. Plausible since starting a CSIP is preferred to gravity feed, but only because the RCS may be pressurized. If the RCS is depressurized, gravity feed will provide adequate flow.
- ✓ d. If the RCS is pressurized, gravity flow may be insufficient to provide adequate makeup to the RCS.

DIFFICULTY ANALYSIS:

COMPREHENSIVE/ ANALYSIS

KNOWLEDGE/ RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analysis of plant conditions to determine appropriate response and reason for response

QUESTION: 18

Given the following conditions:

- e Containment temperature is **96** °F.
- e Containment Fan Coolers (AH-1 / 2 / 3 / 4) are operating in the Normal Cooling **Mode**.
- e A loss of offsite power occurs and the plant responds **as** expected.

The Containment Fan Coolers should be aligned with one (1) fan associated with each fan cooler operating in ...

- a. high speed and discharging to the concrete airshaft
- b. high speed and discharging to the post-accident discharge duct
- c. **low** speed and discharging to the concrete airshaft
- d. low speed and discharging to the post-accident discharge duct

ANSWER:

- a. high speed and discharging to the concrete airshaft

QUESTION: 19

Which of the following can all be used to confirm that an inoperable/ stuck rod is to be considered misaligned?

- a.
 - Delta-H indication
 - Power range channels
 - Reactor vessel level indication
 - Core AT

- b.
 - Delta-I indication
 - a Power range channels
 - a QPTR calculation
 - Core outlet thermocouples

- c.
 - e Core AT
 - e Power range channels
 - QPTR calculation
 - Core outlet thermocouples

- d.
 - a Delta-I indication
 - a Power range channels
 - Reactor vessel level indication
 - Core outlet thermocouples

ANSWER:

- b.
 - a Delta-I indication
 - Power range channels
 - QPTR calculation
 - a Core outlet thermocouples

QUESTION NUMBER: 19 **TIER/GROUP:** 1/2
KAIMPORTANCE: RO 2.5 **SRO**
10CFR55 CONTENT: 41(b) 6/10 **43(b)**

KA: 000005AK2.02

Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following: Breakers, relays, disconnects, and control room switches

OBJECTIVE: AOP-3.1-3

LIST the indications of a misaligned rod specified in AOP-001, Attachment 1, Indications of Misaligned Rod

DEVELOPMENT REFERENCES: AOP-001

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: AOP-3.1-R3 002
AOP-3.1-R3 003

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since delta-I and QPTR are used to determine a misaligned rod, hut RVLIS and core ΔT are not used.
- \checkmark b. Delta-I, QPTR, power range channels, and core outlet thermocouples are all used to determine a misaligned rod.
- c. Plausible since QPTR, power range channels, and core outlet thermocouples are all **used to** determine a misaligned rod, hut core AT is not used.
- d. Plausible since delta-I, power range channels, arid core outlet thermocouples are all used to determine a misaligned rod, hut RVLIS is not used.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPIANATION: Knowledge of the indications of a misaligned rod per procedure

QUESTION: 20

Given the following conditions:

- Following an accident, EOP-FRP-C.1, "Response to Inadequate Core Cooling," is being performed.
- ERFIS is inoperable.
- Plant parameters are as follows:
 - ICCM highest TC = 672° F
 - RCS WR temperature (highest) = 688° F
 - RCS pressure PT-440 = 1535 psig
 - RCS pressure PT-402 = 1635 psig
 - CNMT pressure PT-951 = 4.5 psig

What value of superheat should be reported?

- a. 63 °F
- b. 71 °F
- c. 79 °F
- d. 87 °F

ANSWER:

- a. 63 °F

QUESTION: 21

A failure of Containment Cooling causes equilibrium Containment temperature to increase from 105°F to 130°F.

Assuming no change in Tave, PRZ pressure, or Letdown flow rate, how will this effect 1CS-231, FK-122.1 CHARGING FLOW?

- a. It will throttle open slightly during the course of the temperature change and then return to its original position
- b. It will throttle closed slightly during the course of the temperature change and then return to its original position
- c. It will throttle **open** slightly during the course of the temperature change and remain in that position
- d. It will throttle closed slightly during the course of the temperature change and remain in that position

ANSWER:

- b. It will throttle closed slightly during the course of the temperature change and then return to its original position

QUESTION NUMBER: 21 **TIER/GROUP:** 2i1
KAIIMPORTANCE: **RO** **3.0** **SRO**
10CFR55 CONTENT: **41(b)** 7/9 **43(b)**

KA: 022K3.02

Knowledge of the effect that a loss or malfunction of the CCS will have on the following: Containment instrumentation readings

OBJECTIVE: CVCS-3.0-R3

DESCRIBE the controls and interlocks of remotely operated CVCS valves, including the following:

- e **CVCS** controllers, including transfers between automatic and manual control, setpoint determination and adjustment, and output control

DEVELOPMENT REFERENCES: SD-I00.3

REFERENCES SUPPLIED TO APPLICANT: None

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

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since a containment temperature increase will affect indicated pressurizer level, but indicated level will increase so charging flow would decrease.
- \checkmark b. As containment temperature increases, indicated pressurizer level increases due to heating of the reference leg. This would result in a smaller ΔP which would indicate that pressurizer level is high. Charging flow will decrease to lower actual level and then return to its original value to match letdown flow.
- c. Plausible since a containment temperature increase will affect indicated pressurizer level, but indicated level will increase so charging flow would decrease.
- d. Plausible since a containment temperature increase will affect indicated pressurizer level and charging flow will decrease, but the flow will return to its original value to match letdown flow.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS **KNOWLEDGE / RECALL**

DIFFICULTY RATING: 4

EXPLANATION: Analyze the effect of the temperature change on pressurizer level and then determine how this change affects the operation of FK-122.1

QUESTION: 22

Given the following conditions:

- e The unit is operating at **12%** power.
- e The following RCP vibrations are observed:

<u>INDICATION</u>	<u>WCP 'A'</u>	<u>RCP 'B'</u>	<u>RCP 'C'</u>
Frame Vibration	3.6 mil and ↑ at 0.3 mil per hr	2.8 mil and stable	4 mil and ↑ at 0.1 mil per hr
Shaft Vibration	12 mil and ↑ at 0.3 mil per hr	7 mils and stable	14 mils and ↑ at 0.6 mils per hour

Which of the following describes the actions required for this condition?

- a. Stop RCP 'A' and initiate a plant shutdown
- b. Trip the reactor, stop RCP 'A', and go to PATH-1
- c. Stop RCP 'C' and initiate a plant shutdown
- d. Trip the reactor, **stop** RCP 'C', and go to PATH-1

ANSWER:

- a. Stop RCP 'A' and initiate a plant shutdown

QUESTION NUMBER 22 **TIER/GROUP:** 2/1
KA IMPORTANCE: RO 2.9 SRO
10CFR55 CONTENT: 41(b) 3/10 43(b)

KA: 003A1.01

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCPS controls including: RCP vibration

OBJECTIVE: AOP-3.18-3

Given a set of plant conditions and a copy of AOP-018, DETERMINE the appropriate response

DEVELOPMENT REFERENCES: AOP-018

REFERENCES SUPPLIED TO APPLICANT: AOP-018, Attachment 1

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: AOP-3.18 019

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER ✓d):

- ✓ a. 'A' RCP vibration has exceeded limits and the pump must be stopped. With the plant in Mode 2, a reactor trip is not required, but the plant must be shutdown.
- b. Plausible since these would be the correct actions if the plant was in Mode 1, but the plant is in Mode 2
- c. Plausible since these are the correct actions, but 'C' RCP has not reached any trip limits while 'A' RCP has.
- d. Plausible since these would be the correct actions if the plant was in Mode 1, but 'C' RCP has not reached any trip limits while 'A' RCP has and the plant is in Mode 2.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analysis to determine which RCP must be stopped and comparison to power level to determine proper action

QUESTION: 23

Given the following conditions:

- The Pressurizer Relief Tank (PRT) is being cooled by recirculation through the Reactor Coolant Drain Tank Heat Exchanger **per** OP-100, "Reactor Coolant System," and OP-120.08, "Radioactive Equipment Drain System."
- 1ED-143, RCDT RECIRC ISOLATION, loses its air supply.

1ED-143 will fail **open**, ...

- a. but **NOT** effect the PRT cooldown because it is already open during this evolution.
- b. slowing down the cooling of the PRT due to starting a recirculation **of** the RCDT.
- c. but **NOT** affect the PRT cooldown because 1ED- 139 is shut.
- d. causing a lowering level in the PRT as coolant is diverted to the RCDT.

ANSWER

- d. causing a lowering level in the PRT as coolant is diverted **to** the RCDT

QUESTION NUMBER: 23 TIER/GROUP: 2/1
K4 IMPORTANCE: RO 2.6 SRO
10CFR55 CONTENT: 41(b) 3 43(b)

KA: 007K4.01

Knowledge of PRTS design feature(s) and/or interlock(s) which provide for the following: Quench tank cooling

OBJECTIVE: PZR-3.0-3

Given a flow diagram of the PRT or associated subsystems and the appropriate procedure, correctly ALIGN the PRT for filling, draining, recirculation, or cooldown

DEVELOPMENT REFERENCES: CAR 2165-S-1313
OP-120.08

REFERENCES SUPPLIED TO APPLICANT: CAR 2165-S-1313

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

RANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: PZR-R3 002

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER **√d**):

- a. Plausible since 1ED-143 does fail open, but it is not open during the cooldown evolution
- b. Plausible since 1ED-143 does fail open and will cause the KCDT to recirc, but it is not open during the cooldown evolution.
- c. Plausible since 1ED-143 does fail open, but 1ED-139 is not closed during the cooldown evolution.
- √ d.** 1ED-143 failing open will result in the PRT level decreasing and the KCDT level increasing as water is transferred from the PRT to the RCDT.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the effect of a valve failure on PRT cooldown, having knowledge of valve alignment required

QUESTION: 24

While operating at 100% power, 125 VDC bus DP-1B-SB is isolated due to a fault.

Which of the following identifies two (2) Technical Specification Action Statements that must be entered as result of the bus fault?

- a. ● 3.7.1.2, "AFW Modes 1, 2, and 3," due to the TDAFW pump being inoperable as a result of a loss of power to **one (1)** of **the** steam supply valves
- 3.4.I.1, "Reactor Coolant Loops and Coolant Circulation," due to the RCPs being inoperable as a result of a loss of tripping power to the motor breakers
- b. ● 3.4.1.1, "Reactor Coolant Loops and Coolant Circulation," due to the RCPs being inoperable as a result of a loss of tripping **power** to the motor breakers
- 3.6.5, "RCS Leak Detection," due to RM-3502A being inoperable as a result of the sample isolation valves automatically closing
- c. ● 3.7.1.2, "AFW Modes 1, 2, and 3," due to the TDAFW pump being inoperable as a result of a loss of power to one (1) of the steam **supply** valves
- 3.8.1.1, "AC Sources Operating," due to the EDG being inoperable as a result of a **loss** of power to the EDG governor control circuit
- d. ● 3.8.1.1, "AC Sources Operating," due to the EDG being inoperable as a result of a loss of power to the EDG governor control circuit
- 3.6.5, "RCS Leak Detection," due to RM-3502A being inoperable as a result of the sample isolation valves automatically closing

ANSWER

- c. ● 3.7.1.2, "AFW Modes 1, 2, and 3," due to the TDAFW pump being inoperable as a result of a loss of power to one (1) of the steam supply valves
- 3.8.1.1, "AC Sources Operating," due to the EDG being inoperable as a result of a loss of power to the EDG governor control circuit

QUESTION NUMBER: 24 **TIER/GROUP:** 1/1
KAIMPORTANCE: RQ 3.4 **SRO**
10CFR55 CONTENT: 41(b) 8 **43(b)**

KA: 064K2.03

Knowledge of EDG bus power supplies to the following: Control power

OBJECTIVE: AOP-3.25-3

Given plant conditions, **DISCUSS** the following notes, cautions, and procedural steps as they apply

- The effects of a loss of a DC bus on equipment operability (i.e., DG, sequencer, and TD AFW)

DEVELOPMENT REFERENCES: AOP-025

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

RANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: AOP-3.25-R3 004

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- Plausible since the TDAFW pump is inoperable and the KCPs use DC power for the tripping coils, but tripping the RCPs is not part of the operability requirement.
- Plausible since the RCPs use DC power for the tripping coils and the RCS leak detection sample valves will isolate on a loss of power, but tripping the RCPs is not part of the operability requirement and the sample isolation valves close on a CVIS due to a loss of AC power.
- \checkmark e. The TDAFW pump is inoperable due to a loss of power to a steam supply valve and the EDG is inoperable due to a loss of power to the governor, as well as to the generator excitation control circuit and sequencer.
- d. Plausible since the EDG is inoperable and the RCS leak detection sample valves will isolate on a loss of power, but the sample isolation valves close on a CVIS due to a loss of AC power.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the effect of a loss of DC power on equipment operability and knowledge of the TS LCOs affected

QUESTION: 25

Given the following indications during a plant startup:

- Power Range Channel N-41 26.0%
- e Power Range Channel N-42 24.5%
- e Power Range Channel N-43 24.5%
- e Power Range Channel N-44 25.0%
- Loop 'A' AT 25.5%
- e Loop 'B' AT 25.5%
- e Loop 'C' AT 25.5%
- Turbine Load 24.5%

Which of the following power levels should he reported as being actual reactor power?

- a. 24.5%
- b. 25.0%
- c. 25.5%
- d. 26.0%

ANSWER:

- c. 25.5%

QUESTION: 26

AH-82A, NORMAL PURGE SUPPLY FAN AH-82A, fails to start when the control switch is placed in START.

Which **of** the following interlocks **would** prevent the fan from starting?

- a. Normal Purge Inlet and Discharge Valves are open
- b. AH-82A fan inlet damper is closed
- c. Fan inlet air temperature is **low**
- d. Containment differential pressure is zero

ANSWER

- d. Containment differential pressure is zero

QUESTION: 27

Given the following conditions:

- The plant is at the Point of Adding Heat (POAH) when a SG PORV fails open.
- RCS temperature decreases and stabilizes at 548 °F.

Which of the following predicts the plant response and the operator actions required?

- a. Reactor power increases; withdraw control rods and dilute, in a controlled manner, to restore RCS temperature to program within 15 minutes
- b. Reactor power increases; trip the reactor if RCS temperature **CANNOT** be restored above 551 °F in a controlled manner within 15 minutes
- c. The reactor becomes subcritical; trip the reactor if criticality **CANNOT** be restored in a controlled manner within 15 minutes
- d. The reactor becomes subcritical; immediately trip the reactor

ANSWER:

- b. Reactor power increases; trip the reactor if RCS temperature **CANNOT** be restored above 551 °F in a controlled manner within 15 minutes

QUESTION: 28

The plant is operating at 100% **power** with the following conditions:

<u>Time</u>	<u>Ambient Temp</u>	<u>CT Basin Temp</u>
1500	35 °F	64 °F
1900	20 °F	60 °F
2300	10 °F	58 °F

Which of the following describes the correct CT Deicing **Gate Valve** alignment for **these** conditions?

- | | <u>1900</u> | <u>2300</u> |
|----|-------------|-------------|
| a. | Full Open | Full Open |
| b. | Full Open | Half Open |
| c. | Half Open | Full Open |
| d. | Half Open | Half Open |

ANSWER:

- | | | |
|----|-----------|-----------|
| b. | Full Open | Half Open |
|----|-----------|-----------|

QUESTIONNUMBER: 28 TIEWGROUP: 3
 KA IMPORTANCE: RO 2.8 SRO
 10CFR55 CONTENT: 41(b) 10 43(b)

KA: 2.1.25

Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data

OBJECTIVE: CT-R3

Given OP-141, Attachment 5, ANALYZE a set of adverse weather conditions and DESCRIBE the operation of the Cooling Tower System to prevent ice damage to the fill material

DEVELOPMENT REFERENCES: OP-141

REFERENCES SUPPLIED TO APPLICANT: OP-141, Attachment 5

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED/DIRECT: CT-R3 001

NRC EXAM HISTORY: Harris NRC 2000

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since valves should be open at 1900, but are required to be changed to half open at 2300,
- \checkmark b. At 1500 conditions call for valves to be full open, at 1900 conditions call for no change in position, and at 2300 conditions call for change to half open.
- c. Plausible since valves should be changed between 1900 and 2300, but should go from full open to half open.
- d. Plausible since valves should be half open at 2300, but should be full open at 1900 due to no change from 1500.

DIFFICULTY ANALYSIS:

COMPREHENSIVE/ ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Application of given data to curve to determine required operation of deicing valves

QUESTION: 29

Which of the following conditions requires processing a Radioactive Gaseous Release **BATCH** permit?

- a. Manual operation of the Containment Vacuum Relief System
- b. Resetting **and** starting the Containment Pre-Entry Purge following **an** automatic isolation
- c. Startup of the standby Airborne Radioactive Removal fan (S-I) following **a trip of** the running fan
- d. Swapping the operating Normal Containment Purge Makeup (AH-82) fans from Train **A** to Train B

ANSWER:

- b. Resetting **and** starting the Containment Pre-Entry Purge following **an** automatic **isolation**

QUESTION: 30

Which of the following two (2) conditions are both identified by EOP-EPP-Oi3, "LOCA Outside Containment," as being **used** to identify that the LOCA has been isolated?

- a. RCS pressure increasing
 RAB local room temperatures
- b. RAB local room temperatures
 RAB radiation levels decreasing
- e. RAB radiation levels decreasing
 Local observation of the isolation
- d. RCS pressure increasing
 Local observation of the isolation

ANSWER:

- d. RCS pressure increasing
 Local observation of **the** isolation

QUESTIONNUMBER: 30 **TIER/GROUP:** 1/1
KAIMPORTANCE: RO 3.5 **SRQ**
10CFR55 CONTENT: 41(b) 10 **43(b)**

KA: WE04EK1.2

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: EOP-2.3-R4

Using appropriate plant procedures and prints, determine the following:

- Transitions to other EOPs

DEVELOPMENT REFERENCES: EOP-EPP-013

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: EOP-3.3 024

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- Plausible since RCS pressure increasing is one of the indications used, but pressurizer level may not be indicative of actual RCS inventory or the leak being isolated and is not used in EPP-013.
- Plausible since these may both be indications that might support that the leak is isolated, but pressurizer level may not be indicative of actual RCS inventory or the leak being isolated and is not used in EPP-013.
- Plausible since local observation is one of the indications used, but KAB radiation levels may be elevated for some time after isolation and is not used in EPP-013.
- \checkmark EPP-013 determines that the LOCA outside containment is isolated if RCS pressure is increasing and if local observation confirms the isolation.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the conditions required by EPP-013 to determine that a LOCA outside containment is isolated

QUESTION: 31

Which of the following **is** the reason for purposely tripping the Reactor Coolant **Pumps** (RCPs) under accident conditions'!

- a. **Ensure** RCPs are available later in the event if they should be needed in response **to** an inadequate core cooling condition
- b. Prevent RCP runout in the event of **a** large break LOCA
- c. Prevent excessive depletion of RCS inventory through **a** small break in the RCS
- d. Prevent damage to RCPs due **to pumping** a two-phase mixture event

ANSWER:

- c. prevent excessive depletion of RCS inventory through a small break in the *RCS*

QUESTION: 32

While operating at 100% **power**, a failure of the Pressurizer Pressure AUTO controller (PK-444A) occurs and the Reactor Operator takes manual control of the controller.

While restoring from the failure, in order to maintain PRZ pressure at 2235 psig, the Reactor Operator should adjust PK-444A to setpoint of approximately ...

- a. 31%.
- b. 50%.
- c. 67%.
- d. 89%.

ANSWER:

- c. 67%.

QUESTION: 33

Which one of the following correctly describes how and why the speed of the Condensate Booster Pumps (CBPs) **is** varied?

- a. Changing the coupling impeller vane pitch to maintain a constant **430** psig feed pump suction pressure
- b. Changing the coupling impeller vane pitch to maintain desired flow from the CBPs to the feed **pumps**
- c. Varying the amount of oil to the coupling between the pump and motor to **maintain a constant 430** psig at the *feed* pump suction
- d. Varying the amount **of** oil to the coupling between **the** pump and motor to maintain a desired flow from the CBPs to the feed pumps

ANSWER:

- c. Varying the amount of oil **to the** coupling between the pump **and** motor to maintain a constant **430** psig at the feed pump suction

QUESTION NUMBER 33 **TIER/GROUP:** 211
KA IMPORTANCE: RO 3.2 **SRO**
10CFR55 CONTENT: 41(b) 4 **43(b)**

KA: 056G2.1.28

Knowledge of the purpose and function of major system components and controls. (Condensate)

OBJECTIVE: CFW-3.0-4

DESCRIBE the basic construction and operation of the following CFW System components / subsystems

- CBP Variable Speed Fluid Coupling (VSFC)

DEVELOPMENT REFERENCES: SD-134

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: CFW-R3 001

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER ✓d):

- a. Plausible since the variable speed coupling maintains 430 psig at the feed pump suction, but it is maintained by using oil between the motor and pump coupling.
- b. Plausible since this is a means of providing a variable flow rate, but the CBPs used a variable speed oil coupling.
- ✓ c. An oil bath between the motor and pump coupling causes the pump to operate at a variable speed to maintain a constant 430 psig suction at the feed pump.
- d. Plausible since an oil bath between the motor and pump coupling causes the pump to operate at a variable speed, but it is designed to maintain a constant 430 psig suction at the feed pump rather than a constant flow rate.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the operation of the CBPs

QUESTION: 34

Given the following conditions:

- The plant is operating at 100% power.
- A tube leak has been detected on 'B' SG.
- The Condenser Vacuum Pump Rad Monitor, REM-1TV-3534, and H-X-15 curves **are** being monitored every 15 minutes to estimate the leak rate.
- CVPE is operating with **NO** motivating air.

Which of the following readings noted on REM-1TV-3534 is the **MINIMUM** reading that would require a plant shutdown **per** Technical Specifications?

- a. $5.40 \text{ E } -7$
- b. $6.00 \text{ E } -7$
- c. $1.08 \text{ E } -6$
- d. $1.80 \text{ E } -6$

ANSWER:

- c. $1.08 \text{ E } -6$

QUESTION: 35

FRP-J.2, 'Response to Containment Flooding,' directs that the containment sump be sampled for activity, and then to notify the operations staff of sump level and the sample results.

What action will the operations staff be considering based on this information?

- a. Isolation of the Cold Leg Accumulators
- b. Isolation **of** the CNMT spray additive tank
- c. Shift **to** Hot Leg Recirculation
- d. Transfer of sump water to tanks outside containment

ANSWER

- d. Transfer of sump water to tanks outside containment

QUESTION: 36

Given the following conditions:

- KHR Pump A-SA is tagged **out**.
- Following a large break LOCA, the crew was performing EOP-EPP-010, "Transfer to Cold Leg Recirculation."
- ISI-301, CONTAINMENT SUMP TO **RHR PUMP B-SB**, failed to open and the crew transitioned to EOP-EPP-012, "Loss of Emergency Coolant Recirculation."
- Both Containment Spray Pumps automatically transferred to the Containment Sump.
- Two (2) Containment Fan Coolers are operating.
- Containment pressure is 12 psig and decreasing slowly.
- While performing EPP-012 the Reactor Operator notes that RWST level is 2% with both CSIPs, both Containment Spray Pumps, and **RHR Pump B-SB** operating.

Which of the following actions are to be taken?

- a. **Stop the RHR pump ONLY**
- b. Stop both CSIPs and the RHR pump ONLY
- c. Stop both CSIPs, the **RHR** pump, and one Containment Spray pump ONLY
- d. Stop both CSIPs, the **RHR** pump, and both Containment Spray pumps

ANSWER:

- b. Stop both CSIPs and the **RHR** pump ONLY

QUESTION: 37

Given the following plant conditions:

- e The plant is operating at 100% power.
- e 1CS-7, 45 GPM Letdown Orifice **A**, and 1CS-8, 60 GPM Letdown Orifice **B**, are closed.
- e 1CS-9, 60 GPM Letdown Orifice **C**, is open.
- e The Reactor Makeup System **is** setup properly and is in **AUTO**.
- e VGT **level** transmitter, LT-112, fails high.

Assuming **NO** operator action, which of the following describes the plant response?

- a. Charging Pump suction is eventually lost as VCT level decreases
- b. 1CS-120 (LCV-115A), Letdown VCT/Hold Up Tank, aligns to the VCT and **NO** automatic makeup will occur
- c. 1CS-120 (LCV-115A), Letdown VCT/Hold Up Tank, aligns to the HUT and a **CONTINUOUS** makeup to the VCT will occur
- d. 1CS-120 (LCV-115A), Letdown VCT/Hold Up Tank, aligns to the HUT and **INTERMITTENT** makeups at normal setpoints will occur

ANSWER:

- d. 1CS-120 (LCV-115A), Letdown VCT/Hold Up Tank, aligns to the HUT and **INTERMITTENT** makeups at normal setpoints will occur

QUESTION: 38

The plant is operating at 100% power with all **equipment** operable and properly aligned.

Which of the following describes changes to the Component Cooling Water System alignment following a Safety Injection signal?

- a. CCW to the Gross Failed Fuel Detector and **Primary** Sample Panel isolates
- b. Both CCW pumps start and the Non-Essential header isolates
- c. CCW to and from the RCP Motor Coolers isolates
- d. Both CCW pumps start and the Thermal Barrier Hx Return isolates

ANSWER:

- a. CCW to the Gross Failed Fuel Detector and Primary Sample Panel isolates

QUESTION NUMBER: 38 TIEWGROUP: 2/1
KA IMPORTANCE: RO 3.6 SRO
10CFR55 CONTENT: 41(b) 4 43(b)

KA: 008A3.08

Ability to monitor automatic operation of the CCWS, including: Automatic actions associated with the CCWS that occur as a result of a safety injection signal

OBJECTIVE: CCWS-3.0-R2

STATE how the CCWS responds during each of the following conditions:

- Safety Injection signal

DEVELOPMENT REFERENCES: SD-145

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: CCWS-R2 002

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- \checkmark a. On an SI signal, both the GFFD and sample panel receive isolation signals.
- b. Plausible since the pumps will get a start signal, but only the GFFD and sample panel in the non-essential header are isolated.
- c. Plausible since the CCW to RCP isolations close on a Phase B signal, but Phase B is not generated by an SI signal.
- d. Plausible since the pumps will get a start signal, but the thermal barrier heat exchangers are only isolated on a Phase B signal.

DIFFICULTY ANALYSIS:

COMPREHENSIVE/ ANALYSIS KNOWLEDGE/ RECALL

DIFFICULTY RATING: 3

EXPLANATION: Knowledge of the response of CCWS to an SI signal

QUESTION: 39

Given the following conditions:

- The *plant is* operating at 23% power.
- Steam pressure channel PT-475 is selected for control of SG 'A'
- Steam pressure transmitter PT-475 fails high.

Assuming **NO** operator action, which of the following statements describes the response of the Steam Generator Water Level Control System (SGWLCS)?

- a. An increase in steam flow from **SG 'A'** is sensed and responds **by** increasing 1FW-140, MN FW A REG BYP FK-449.1, position to increase **feed** flow to **SG 'A'** and level increases
- b. An increase in steam flow from SG 'A' is sensed and responds by increasing 1FW-133, **MAIN** FW A REGULATOR FK-478, position to increase feed flow to **SG 'A'** and level increases
- c. A decrease in steam flow from SG 'A' is sensed **and** responds by decreasing 1FW-140, MN FW A REG BYP FK-479.1, position to decrease feed flow to SG 'A' and level decreases
- d. A decrease in steam flow from SG 'A' is sensed and responds by decreasing 1FW-133, MAIN FW A REGULATOR FK-478, position to decrease feed flow to **SG 'A'** and level decreases

ANSWER:

- b. **An** increase in steam **flow** from SG 'A' is sensed and responds by increasing 1FW-133, MAIN FW A REGULATOR FK-448, position to increase feed flow to SG 'A' and level increases

QUESTION NUMBER: 39 **TIEWGROUP** 2/6
KAIMPBRTANCE: **RO** 3.0 **SRO**
10CFR55 CONTENT: **41(b)** 4 **43(b)**

KA: 059A4.08

Ability to manually operate and monitor in the control room: Feed regulating valve controller

OBJECTIVE: SGWLC-3.0-2

Given the status of the various SGWLC related control switch positions and controllers, PREDICT how a malfunction of the following will effect the SGWLC System:

- SG pressure channels

DEVELOPMENT REFERENCES: SD-126.02

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: SGWLC-R2 002

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since steam pressure failing high causes the steam flow to increase, resulting in SF > FF, but the feed reg valve is in operation at this power level.
- b. Steam pressure failing high causes the steam flow to increase, resulting in SF > FF. The feed reg valve. in operation at 15% power, opens to cause FF and level to increase.
- c. Plausible since steam pressure failing causes the steam flow to change, resulting in a SF – FF mismatch, but the feed reg valve will open to increase FF.
- d. Plausible since steam pressure failing causes the steam flow to change, resulting in a SF – FF mismatch, but the feed reg valve will open to increase FF.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analyze the effect of the failure on the control system and recognize which valve will be controlling at the power level given

QUESTION: 40

The plant is operating at 80% power with rod control in automatic and pressurizer pressure at 2240 psig.

After a rapid power reduction the plant is stabilized at 40% power, when the Reactor Operator notes the following conditions:

- Pressurizer pressure is 2275 psig and slowly decreasing.
- Pressurizer level is 45% **and** slowly decreasing.
- Both pressurizer spray valves indicate mid-position.
- All pressurizer backup heaters are de-energized.

These conditions are indicative of . . .

- a. a normal plant response following **an** outsurge from the pressurizer.
- h. a failure in the Pressurizer Pressure control circuitry, which opened the spray valves.
- c. a failure in the Pressurizer Level control circuitry?which failed to energize the backup heaters.
- d. a normal **plant** response following **an** insurge into the pressurizer.

ANSWER:

- c. a failure in the Pressurizer Level control circuitry, which failed to energize the backup heaters.

QUESTION NUMBER: 40 **TIEWGROUP:** 22
KA IMPORTANCE: RQ 3.1 **SRO**
10CFR55 CONTENT: 41(b) 37 **43(b)**

KA: 011K6.04

Knowledge of the effect of a loss or malfunction on the following will have on the **PZR I.CS:** Operation of PZR level controllers

OBJECTIVE: PZRLC-3.0-5

EXPLAIN how the system controls pressurizer level, including the input parameters and the components that receive output signals

DEVELOPMENT REFERENCES: SD-I00.3

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: PZRLC-R7 001

NAC EXAM HISTORY None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER d):

- a. Plausible since the response is correct, with the exception of the pressurizer heaters not being energized, for an ~~outsurge~~ from the pressurizer.
- b. Plausible since a downpower should result in an insurge which would cause the spray valves to open, but the heaters should also be energized.
- c. A rapid downpower transient will result in an insurge to the pressurizer. This should result **in** the conditions noted, including a high pressurizer level causing the heaters to be energized even during a high pressure condition causing the spray valves to **be** open. The heaters not being energized with level more than 5% high is indicative of a level control system failure.
- d. Plausible since the response **is** correct, with the **exception of** the pressurizer heaters not **being** energized, for an insurge to the pressurizer.

DIFFICULTY ANALYSIS:

COMPREHENSIVE/ ANALYSIS

KNOWLEDGE/RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analysis of the expected plant response and the actual plant response to an insurge into the pressurizer

QUESTION: 41

Given the following conditions:

- e Feed flow to the steam generators is being transferred from the Auxiliary Feedwater (AFW) System to the Main Feedwater (MFW) System in accordance with OP-134-1, "Feedwater System."
- The Motor-Driven AFW Pumps are operating with **all** Flow Control Valves throttled in mid-position.
- e The Turbine Driven AFW Pump **is** in standby with all Flow Control Valves full open.
- e **MFW Pump 'A'** is operating with the Feed **Reg** Bypass Valves throttled slightly open.
- All AFW and MFW Isolation Valves are open.

If a condition occurs which results **in** a valid AFW Isolation Signal, how **will** the following AFW and MFW valves on SG 'B' respond?

	<u>TDAFW FLOW CONTROL VALVE</u>	<u>MFW ISOLATION VALVE</u>	<u>MFW FEED REG BYPASS VALVE</u>
a.	Remain Open	Remain Open	Remain Open
b.	Remain Open	Close	Close
c.	Close	Remain Open	Remain Open
d.	Close	Close	Close

ANSWER:

d.	Close	Close	Close
----	-------	-------	-------

QUESTION: 42

Given the following conditions:

- Ⓔ A reactor trip with SI has occurred.
- Ⓔ The immediate action steps, **ECCS** flow verifications, and AFW **flow** verifications are performed.
- Ⓔ SG levels are < 10% and the required AFW flow **CANNOT** be established.
- Ⓔ FRP-H. 1, Response to Loss of Secondary Heat Sink, is entered.
- RCS pressure is checked and determined to be less than intact SG pressure.

Which of **the** following describes the plant conditions?

- a. A large break LOCA **is** in progress **AND** a secondary heat sink **is** required
- b. A large break LOCA **is** in progress **AND** a secondary heat sink is **NOT** required
- c. A small break LOCA is in progress **AND** a secondary heat sink is required
- d. A small break LOCA is in progress **AND** a secondary heat sink is **NOT** required

ANSWER:

- b. A large break LOCA is in progress **AND** a secondary heat sink **is NOT** required

QUESTION: 43

Given the following conditions:

- The plant had been operating at 100% for three (3) weeks when a Reactor Trip occurred.
- Six (8) hours following the trip, a reactor startup is planned.

Which one of the following is **PROHIBITED** at SHNPP as a result of industry wide premature criticality events?

- a. A startup rate in excess of + 0.3 dpm
- b. Delaying the startup until xenon begins to decay
- c. Operators performing the EXSPACK estimated critical conditions (**ECC**)
- d. A difference of 400 pcm between the POWERTRAX and **EXSPACK** ECCs

ANSWER:

- d. A difference of 400 pcm between the POWERTRAX and EXSPACK ECCs

QUESTION: 44

While reviewing the MCB annunciators prior to relieving the off-going shift, you note that an annunciator has a **RED** bar attached to it.

This indicates that the annunciator is in alarm due to ...

- a. the alarm being defeated.
- b. the associated system being tested.
- c. the alarm window itself being inoperable with a Work Request to repair it written.
- d. the associated system being under clearance.

ANSWER:

- d. the associated system being under clearance.

QUESTION: 4.5

Given the following conditions:

- e A Reactor Trip occurred from 100% power.
- e The plant stabilized at **5.57°F** for several minutes.
- Shortly thereafter, a Safety Injection signal actuated.

Which of the following describes the effect of this sequence on the Main Feedwater System?

- a. ● After the Reactor **Trip** occurred, the SGs could be fed using the Feedwater Reg Bypass Valves
 - e After the SI occurred, the SGs could be fed using **the** Feedwater Reg **Bypass** Valves
- b. ● After the Reactor Trip occurred, the SGs could be fed using the Main Feedwater Reg Valves or the Feedwater Reg Bypass Valves
 - After the SI occurred, Main Feedwater could **NOT** be used to feed the SGs
- c. e After the Reactor Trip occurred, the SGs could be fed using the Feedwater Reg Bypass Valves
 - e After the **SI** occurred, Main Feedwater could **NOT** be used to feed the SGs
- d. e After the Reactor **Trip** occurred, the SGs could be fed using the Main Feedwater Reg Valves or the Feedwater Reg Bypass Valves
 - After the SI occurred, the SGs could be fed using the Feedwater Reg Bypass Valves

ANSWER:

- c. e After the Reactor Trip occurred, the SGs could be fed using the Feedwater Reg Bypass Valves
 - e After the SI occurred, Main Feedwater could **NOT** be used to feed the SGs

QUESTION: 46

Which of the following describes the design of Phase A and a Phase B Containment Isolation signals?

- a.
 - a Phase A ONLY limits radioactive releases following a LOCA
 - a Phase B ONLY limits radioactive releases following a LOCA or secondary system break inside Containment

- h.
 - Phase A limits radioactive releases AND minimizes Containment overpressurization following a LOCA
 - a Phase B limits radioactive releases AND minimizes Containment overpressurization following a LOCA **or** secondary system break inside Containment

- c.
 - a Phase A ONLY limits radioactive releases following a LOCA
 - a Phase B limits radioactive releases following a LOCA AND prevents an excessive RCS cooldown following a secondary system break inside Containment

- d.
 - Phase A limits radioactive releases AND minimizes Containment overpressurization following a LOCA
 - a Phase B limits radioactive releases following a LOCA AND prevents an excessive RCS cooldown following a secondary system break inside Containment

ANSWER:

- a.
 - Phase A ONLY limits radioactive releases following a LOCA
 - a Phase B ONLY limits radioactive releases following a LOCA or secondary system break inside Containment

QUESTION: 47

An entry into FRP-S.1, "Response to Nuclear Power Generation/ATWS," has been made from PATH-1. The following conditions currently exist:

- e The reactor **trip** breakers are closed.
- e Rods are being inserted manually.
- e Control Bank **D** is at 12 **steps**.
- e Power Range Instruments are all indicating 8%.
- Intermediate Range SUR is NEGATIVE

Which of the following conditions must be met in FRP-S.1 allow a return to **PATH-I**?

- a. One of the reactor **trip** breakers must be opened
- b. Both of the reactor trip breakers must be opened
- c. Power Range indication **must** be reduced below 5%
- d. Control Bank A must be inserted fully

ANSWER:

- c. Power Range indication must be reduced below 5%

QUESTION: 48

Given the following conditions:

- A plant cooldown **is** being performed.
- e All Steam Generators (SGs) are currently at approximately 50 psig.
- Auxiliary Feed Water (AFW) Pump A-SA is being used to feed **the** SGs.
- e **The** supply breaker on 120 VAC 1DP-1A-S1 for 1AF-19, AUX FW MOTOR PMP A-SA DISCHARGE VLV, trips open.

Which of the following describes the effect of this **loss of power** on the operation of AFW Pump **A-SA**?

- 3. Operates at shutoff head
- b. Operates on minimum recirculation flow
- c. Operates on maximum recirculation **flow**
- d. Operates at runout conditions

ANSWER:

- d. Operates at runout conditions

QUESTION: 49

Given the following conditions:

- The **plant is** in Mode 5.
- **ALB-008-1-4, RWMU STORAGE TANK MINIMUM/HIGH LEVEL, a l m s .**
- RWMU tank level is decreasing with **NO** VCT makeup in progress.

Which one of the following **procedures** would **be** the most appropriate to implement?

- a. **AOP-003, Malfunction of** Reactor Makeup Control
- b. AOP-008, Accidental Release of Liquid Waste
- c. AOP-016, Excessive Primary Plant Leakage
- d. **AOP-020, Loss of** Reactor **Coolant** Inventory / RHR While Shutdown

ANSWER:

- b. AOP-008, Accidental Release **of** Liquid Waste

QUESTION NUMBER: 49 **TIEWGROUP:** 1/2
KAIMPBRTANCE: RO 4.0 **SRO**
10CFR55 CONTENT: 41(b) 10/13 **43(b)**

KA: 000059G2.4.4

Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures. (Accidental Liquid Radwaste Release)

OBJECTWE: AOP-3.8

IDENTIFY symptoms that require entry into AOP-008, Accidental Release of Liquid Waste

DEVELOPMENT REFERENCES: AOP-008 (unknown)

REFERENCES SUPPLIED TO APPLICANT None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED/ DIRECT: AOP-3.8 001

NRC EXAM HISTORY: Hams NRC 2000

DISTRACTOR SUSTIFICATION (CORRECT ANSWER ✓d):

- a. Plausible since RMUW tank supplies makeup to VCT, but AOP-003 addresses conditions regarding valve / transmitter failures, not loss of tank source.
- ✓ b. Entry conditions have been met for AOP-008.
- c. Plausible since RMUW tank supplies makeup to RCS and candidate may imply that loss of supply results in a loss of primary inventory, but conditions are met for entry into AOP-008.
- d. Plausible since RMUW tank supplies makeup to RCS and candidate may imply that loss of supply results in a loss of primary inventory with plant shutdown, but conditions are met for entry into AOP-008.

DIFFICULTY ANALYSIS:

COMPREHENSIVE/ ANALYSIS

KNOWLEDGE/RECALL

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of entry requirements for accidental liquid release

QUESTION: 50

Which of the following actions would be most effective in responding to a Pressurized Thermal Shock condition in accordance with EOP-FRP-P.1, "Response to Pressurized Thermal Shock?"

- a. Close the block valve for any open PRZ PORV
- b. Start a RCP once SI has been terminated
- c. Direct **an** operator to locally isolate any stuck open SG PORV
- d. Direct an operator to locally open any failed closed BIT outlet valve

ANSWER:

- c. Direct an operator to locally isolate any stuck open SG PQRV

QUESTION: 51

Given the following conditions:

- An operator has been sent to rack out a 480 VAC breaker by the SCO.
- Inadvertently, the incorrect cubicle is opened and the control power **fuses** are removed **from** the wrong breaker.

Which of the following describes how the breaker is affected **by** the removal of the control power fuses?

- a. All Main Control Board indications will be lost for the breaker and if the breaker is closed, it will **trip** and CANNOT be closed until control power is restored
- b. All Main Control Board indications will be lost for the breaker and if the breaker is open, it can only be closed mechanically locally
- c. Main Control Board indication will still be available for the breaker, but if the breaker is closed, it will trip and CANNOT be closed until control power is restored
- d. Main Control Board indication will still be available for the breaker, but if the breaker is open, it can only be closed mechanically locally

ANSWER:

- b. All Main Control Board indications will be lost for the breaker and if the breaker is open, it can only be closed mechanically locally

QUESTION: 52

Which of the following situations would likely result in **an** inadvertent dilution event during Mode I operation and, after the crew has adjusted core reactivity to compensate for the change in boron concentration, which procedure would be used **to** address the cause of the event?

- a.
 - RCP thermal barrier heat exchanger leak
 - AOP-016, "Excessive Primary Plant Leakage"
- b.
 - The boric acid pump trips during an automatic makeup
 - AOP-004, "Malfunction of Reactor Makeup"
- c.
 - A mixed bed demineralizer that was last in service three weeks ago is mistakenly placed in service at the end-of-cycle
 - AOP-033, "Chemistry Out of Tolerance"
- d.
 - A tube leak in the Seal Water heat exchanger
 - AOP-014, "Loss of Component Cooling Water"

ANSWER:

- d.
 - A tube leak in the Seal Water heat exchanger
 - AOP-014, "Loss of Component Cooling Water"

QUESTION NUMBER: 52 TIEWGROUP 2/1
 KA IMPORTANCE: RO 4.2 SRO
 10CFR55 CONTENT: 41(b) 6/10 43(b)

KA: 004A2.06

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

OBJECTIVE: IE-3.12-3

Identify systems whose operation may alter RCS boron concentration and discuss how operation of these systems may affect boron concentration

DEVELOPMENT REFERENCES: SOER 94-2
 AOP-014
 AOP-14-BD

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: IE-3.12-R3 001

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since the thermal barrier interfaces with a non-borated system (CCW), but leakage would be out of the RCS to CCW and would not affect RCS boron concentration.
- b. Plausible since boric acid is required for the proper blended flow, but an automatic makeup **would** be terminated automatically in the event of a boric acid pump trip.
- c. Plausible since boron concentration will change in CVCS, but this would result in an inadvertent boration rather than a dilution.
- \checkmark d. A seal water HX leak will result in CVCS being diluted by CCW. This failure is to be addressed by AOP-014.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analyze the effect of each failure on RCS boron concentration and determine the required procedure to address the failure

QUESTION: 53

While establishing a bubble in the PRZ per GP-002, “Normal Plant Heatup From Cold Solid to Hot Subcritical MODE 5 to MODE 3,” letdown pressure control valve 1CS-38 (PK-145.1), Low Pressure Letdown Pressure Controller, opens.

Which of the following describes why PK-145.1 opens?

- a. Thermal expansion of liquid in the pressurizer
- b. Change in CCW heat load
- c. Spray valves are shut while drawing a bubble
- d. Switchover of letdown to orifices from RHR-CVCS cross-connect

ANSWER:

- a. Thermal expansion of liquid in the pressurizer

QUESTION NUMBER: 53 **TIER/GROUP:** 2/1
KAIMPORTANCE: RO 2.9 **SRO**
10CFR55 CONTENT: 41(b) 7 **43(b)**

KA: 010K1.06

Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems: CVCS

OBJECTIVE: GP-3.2-2

DISCUSS "drawing a bubble in the pressurizer," including
b. The parameters used to determine when the bubble has been drawn

DEVELOPMENT REFERENCES: GP-002
LP-GP-3.2

REFERENCES SUPPLIED TO APPLICANT None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: INPO 10811

NRC EXAM HISTORY: Hams NRC 2002

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- \checkmark a. Thermal expansion of the liquid due to the heaters being energized results in a pressure increase in the RCS. PK-145.1 opens to maintain letdown pressure, resulting in increased letdown flow.
- b. Plausible since the letdown heat exchanger is cooled by CCW, but temperature has little effect on the response of PK-145.1.
- c. Plausible since the spray valves are shut while a bubble is being drawn, but PK-145.1 opens to maintain letdown pressure, not RCS pressure.
- d. Plausible since KHR letdown may be placed in service at low temperature and pressure conditions, but is not in service while drawing a bubble.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY MATING: 3

EXPLANAFION: Comprehension of the effects of drawing a bubble on CVCS components

QUESTION: 54

125 VDC battery 1A-SA is rated for 1170 amp-hours at a 4-hour discharge rate.

If DC load shedding is performed such **that** the loading on the battery is reduced from 292 amps to 146 **amps**, how long should the battery be available to supply the remaining loads?

- a. 4 hours
- b. More than 4 hours, hut less **than** 8 hours
- c. 8 hours
- d. More than 8 hours

ANSWER:

- d. More than 8 hours

QUESTION: 55

Given the following conditions:

- o The plant has experienced a Large Break Loss of Coolant Accident during a reactor startup.
- All equipment functioned as designed and the crew has reached the point in PATH-1 where monitoring Critical Safety Function Status Trees is required.

Which one of the following statements describes the **IMMEDIATE** result that voiding in the downcomer region would have on the Source Range instrumentation and procedure used to mitigate these plant conditions?

- a. ● The displacement of downcomer water would increase the neutron leakage and result in a higher source range count rate.
 - The crew should continue in PATH-1 rather than transition to EOP-FRP-S.2, "Response to Loss of Core Shutdown."
- b. ● A decrease in downcomer water density would reduce fission and result in a lower source range count rate.
 - The crew should transition to EOP-FRP-S.2, "Response to Loss of Core Shutdown," rather than continue in PATH-1.
- c. ● The displacement of boron from the downcomer region would increase fission and result in a higher source range count rate.
 - o The crew should continue in PATH-1 rather than transition to EOP-FRP-S.2, "Response to Loss of Core Shutdown."
- d. ● A decrease in downcomer water density would reduce fission and result in a lower source range count rate.
 - o The crew should continue in PATH-1 rather than transition to EOP-FRP-S.2, "Response to Loss of Core Shutdown."

ANSWER:

- a. ● The displacement of water would increase the neutron leakage and result in a higher source range count rate.
 - The crew should continue in PATH-1 rather than transition to EOP-FRP-S.2, "Response to Loss of Core Shutdown."

QUESTION NUMBER: 55 **TIEWGROUP** 2/2
KA IMPORTANCE: **RO** 3.3 **SRO**
10CFR55 CONTENT: 41(b) 2 43(b)

KA: 015A2.05

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

OBJECTIVE: BD-3.10-7

Explain the NIS response to different void fractions in the core and downcomer region

DEVELOPMENT REFERENCES: IIO-BD-3.10

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: INPO 20608

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \sqrt{d}):

- \sqrt{a} . Downcomer voiding results in higher source range indication due to increased leakage. The crew should continue in PATH-I rather than transfer to FRP-S.2 since entry conditions to FRP-S.2 are a Yellow path condition.
- b. Plausible since a severe decrease in core water density would result in less moderation and a lower power level, but downcomer density has little effect on core reactivity.
- c. Plausible since displacing core boron would result in a higher power level, but downcomer density has little effect on core reactivity.
- d. Plausible since a severe decrease in core water density would result in less moderation and a lower power level, but downcomer density has little effect on core reactivity.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY MATING: 3

EXPLANATION: Analysis of the effects of core voiding on SR indication and knowledge of the procedure hierarchy during the performance of the EOPs

QUESTION: 56

Given the following conditions:

- e A transition has **just** been made to **FRP-S.1**, “Response to Nuclear Power Generation / ATWS,” from **PATH-I**.
- The Reactor Operator is manually inserting control rods.
- e All Turbine Throttle Valve (TV) and Turbine Governor Valve (GV) indications show the RED light OFF and the GREEK light ON, with the exception of TV-3 and GV-2 which have both the RED light and GREEN light ON.
- Turbine speed is decreasing, and ~~is~~ currently 1680rpm.
- e The Main Steam Isolation Valve (MSIV) Bypass valves are closed.

Which of the following actions should be taken next?

- a. Verify all AFW pumps running
- b. Manually **trip** the Turbine from the MCB
- c. Place both Turbine DEH pumps in PULL-TO-LOCK
- d. Shut all MSIVs

ANSWER

- b. Manually **trip** the Turbine from the MCB

QUESTION: 57

Given the following conditions:

- The Main Control Room has been evacuated and control transferred to the Auxiliary Control Panel (ACP).
- AOP-004, "Remote Shutdown," is being performed when a loss of offsite power coincident with a Safety Injection signal occur.

Which of the following describes the response of the plant?

- a. The Emergency Diesel Generators automatically start and the sequencers load the EDGs due to the undervoltage signal
- b. The Emergency Diesel Generators automatically start and the sequencers load the EDGs due to the safety injection signal
- e. The Emergency Diesel Generators automatically start, **but** must be manually loaded with the required loads
- d. The Emergency Diesel Generators must **be** manually **started** and manually loaded with the required loads

ANSWER:

- a. The Emergency Diesel Generators automatically start and the sequencers load the EDGs due **to** the **undervoltage** signal

QUESTION: 58

Given the following conditions:

- An I&C technician reports that both of the Control Room Normal Outside Air Intake Isolation radiation monitors have failed detectors.
- It will take somewhere between four (4) and eight (8) hours to replace the detectors.

Which of the following states the action which must be taken within one (1) hour, in accordance with Technical Specification 3.3.3.1?

- a. Establish operation **of** the Control Room Emergency Filtration System in the Recirculation Mode of Operation
- b. Initiate the preplanned alternate method of radiation monitoring
- c. Return the monitors to service, **or** be in Hot Standby within the next six (6) hours
- d. Perform a surveillance test on the Control Room Emergency Filtration System, or be in Hot Standby within the next six (6) hours

ANSWER

- a. Establish operation of the Control Room Emergency Filtration System in the Recirculation Mode of Operation

QUESTION: 59

Given the following conditions:

- 8 A LOCA has occurred inside Containment.
- 8 Containment pressure is 5.5 psig.
- 8 RCS Wide Range Pressure indications are:

(BLACK BEZELED INSTRUMENTS)

PI-440 = 1060 psig

PI-441 = 1040 psig

(YELLOW BEZELED INSTRUMENTS)

PI-402 = 980 psig

PI-403 = 980 psig

PI-402A = 700 psig

RCS pressure should be reported as ...

- a. 700 psig.
- b. 980 psig.
- c. 1040 psig.
- d. 1060 psig.

ANSWER:

- b. 980 psig.

QUESTION: 60

Which **of** the following is the **MINIMUM** required operable components to meet Technical Specification 3.8.2.1, "DC Sources – Operating," Limiting Condition for Operation?

- a.
 - o IA-SA 125-V emergency batterybank
 - o 1B-SB 125-V emergency battery bank

- b.
 - o 1A-SA 125-V emergency battery bank
 - 1B-SB 125-V emergency batterybank
 - 1A-SA 125-V full capacity charger

- c.
 - IA-SA 125-V emergency batterybank
 - 1B-SB 125-V emergency battery bank
 - 1A-SB 125-V full capacity charger
 - e 1B-SA 125-V full capacity charger

- d.
 - IA-SA 125-V emergency battery bank
 - 1B-SB 125-V emergency battery bank
 - IA-SA 125-V full capacity charger
 - 1A-SB 125-V full capacity charger
 - IB-SA 125-V full capacity charger
 - IB-SB 125-V full capacity charger

ANSWER:

- c.
 - 1A-SA 125-V emergency battery bank
 - 1B-SB 125-V emergency battery bank
 - 1A-SB 125-V full capacity charger
 - 1B-SA 125-V full capacity charger

QUESTION: 61

Given the following conditions:

- The plant **is** operating at 100% power when ALB-010-1-1B, RCP A UPPER OIL RSVR LOW-LEVEL, alarm is received.
- The operator checks the computer points for GD AOP-018 and finds RCP 'A' motor thrust-bearing temperature at 195°F and RCP 'A' upper radial bearing **at** 185°F with both slowly increasing.

Which **of** the following actions are required?

- a. Stop RCP 'A' and initiate a rapid **plant** shutdown in accordance with AOP-038, "Rapid Downpower"
- b. Manually trip the reactor and go to PATH-I, stopping RCP 'A' as time permits
- c. Continue monitoring RCP 'A' temperatures, tripping the reactor and entering **PATH-I** if RCP 'A' temperatures exceed 300°F
- d. Stop RCP 'A', manually trip the reactor and go **to** PATH-I

ANSWER:

- b. Manually trip the reactor and **go to** PATH-1, stopping RCP 'A' as time permits

QUESTION: 62

Given the following conditions:

- e Path-2 is being performed due to an SGTR.
- e The Main Steam Isolation Valves (MSIVs) on the intact SGs are open.
- e The MSIV on the ruptured SG is closed.
- The Condenser is available for Steam Dump operation.
- A cooldown to **485 °F** from **557 °F** at the maximum rate is required.

Which one of the following describes the method to accomplish this cooldown?

- a Fully open the Steam Dumps as fast as possible
- b Fully open the Steam Dumps as fast as possible without causing main steam line isolation
- c Fully open the intact SG PORVs as fast as possible
- d Fully open the intact SG PORVs as fast as possible without causing a main steam line isolation

ANSWER:

- b Fully open the Steam Dumps as fast as possible without causing main steam line isolation

QUESTION: 63

Given the following conditions:

- e While transferring resin, it is noted that RM-1WR-3644A, SPENT RESIN PUMP 1-4A, radiation monitor is indicating 10mRem/hr.
- The monitor is physically located 20 feet away from a suspected clog **in** the pipe which is the source of the monitor indication.

What is the radiation level **5** feet from the pipe? (**ASSUME THE CLOG **IN** THE PIPE IS A POINT SOURCE**)

- a. 20 mRem/hr
- b. 40 mRem/hr
- c. 80 mRem/hr
- d. 160 mRem/hr

ANSWER.

- d. 160 mRem/hr

QUESTION NUMBER: 63 TIER/GROUP: 2/1
KAIMPORTANCE: RO 2.5 SRO
10CFR55 CONTENT: 41(b) 11/12 43(b)

KA: 073K5.02

Knowledge of the operational implications as they apply to concepts as they apply to the PRM system:
Radiation intensity changes with source distance

OBJECTIVE: RP-3.5-21

Calculate dose rates at different distances from point sources and line sources

DEVELOPMENT REFERENCES: Rk-LP-3.5

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \sqrt{d}):

- a. Plausible if the square root of the distances is taken, instead of squared as they should be ($10\text{mR/hr} \times 20^{1/2}\text{ ft} = 20\text{ mR/hr} \times 5^{1/2}\text{ ft}$).
- b. Plausible if the distances are not squared as they should be ($10\text{mR/hr} \times 20\text{ ft} = 40\text{ mR/hr} \times 5\text{ ft}$).
- c. Plausible if a mathematical error is made (value selected as a distractor due to the progression of other numbers in distractors).
- \sqrt{d} . Using the formula $I_1d_1^2 = I_2d_2^2$, the intensity of the source at 5 feet is calculated to be 160mRem/hr .

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Calculation of distance using inverse square for radiation

QUESTION: 64

Given the following conditions:

- o The Control Room has been evacuated due to a fire.
- o **AOP-004**, "Remote Shutdown," is being performed.
- The crew is determining the amount of boric acid required to be added to the RCS.

Which **of** the following describes the reason for adding boric acid during the performance of Section **3.1**, "Remote Shutdown Due to Fire," of **AOP-004**?

- a. Ensure adequate shutdown margin is maintained **for** the first 12 hours following the plant trip
- b. Ensure adequate shutdown margin is maintained in the event that access to the Control Room is prevented until the core has reached xenon-free conditions
- c. Ensure adequate shutdown margin is maintained in the event that **a cooldown to Cold Shutdown** conditions is required
- d. Ensure adequate shutdown margin **is** maintained in the event that pressurizer is required to be raised to **90%** level

ANSWER:

- c. Ensure adequate shutdown margin is maintained in the event that a **cooldown to Cold Shutdown** conditions **is** required

QUESTION: 65

Given the following conditions:

- **The** unit is operating at 50% power.
- **LT-460**, Channel 111 Pressurizer Level, has failed and all associated bistables are in the tripped condition.
- Power is subsequently lost to UPS **Bus** IDP-1A-S1.

Which train(s) of Reactor Protection **will** actuate, if any?

- Neither train
- Train **SA ONLY**
- Train **SB ONLY**
- Both trains

ANSWER:

- Bothtrains

QUESTION: 66

Given the following conditions:

- **An** earthquake has caused damage to the Main Reservoir dam.
- Main and Auxiliary Reservoir levels are both currently 240 feet and stable.
- **AOP-022**, “Loss of Service Water,” is being performed for a Loss of Ultimate Heat Sink.
- Emergency Service Water (ESW) pumps have **been** aligned to the Main Reservoir.
- One (I) Normal Service Water (NSW) pump is operating.

Which of the following pumps are required to be operating to provide water to the SSE Fire Protection Header once the ESW header is aligned to the fire protection header?

- a. **ONLY** an ESW pump
- b. An ESW pump **AND an** ESW Booster pump
- c. **ONLY** a second NSW pump
- d. A second NSW pump **AND an** ESW Booster pump

ANSWER:

- b. **An** ESW pump **AND an** ESW Booster pump

QUESTION: 67

Given the following conditions:

- The plant is being cooled down to 140°F for maintenance which will **NOT** require the RCS be opened.
- e The crew is in the process of placing the **first** Residual Heat Removal (RHR) train in service for RCS cooling.
- Current boron concentrations are **as** follows:
 - RHR (train to be placed in service) boron 1021 ppm
 - Required Shutdown Margin boron 1200pprn
 - RCS boron 1341 ppm
 - Cold Shutdown boron 1750ppm
 - Refueling boron 2261 ppm

Before the RHR train can be placed in service for RCS cooling, WHR boron concentration must be increased by a **MINIMUM of...**

- a. 179 ppm.
- b. 320 ppm.
- c. 729 ppm.
- d. 1240 ppm.

ANSWER:

- a. 179 ppm.

QUESTION NUMBER 67 TIER/GROUP: 2/1
KAIIMPORTANCE: RO 3.2 SRO
10CFR55 CONTENT: 41(b) 8 43(b)

KA: 005K5.09

Knowledge of the operational implications of the following concepts as they apply the RHRS: Dilution and boration considerations

OBJECTIVE: RHRS-2.0-12

APPLY precautions and limitations of OP-111, RHRS to Hypothetical System Configurations

DEVELOPMENT REFERENCES: OP-111

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- \checkmark a. RHR boron must be greater than or equal to the required SDM or the required refueling concentration. The boron concentration requirements will be dependent on the intended use of the KHR System. Using the RHR system for cooldown purposes requires that the boron concentration be greater than or equal to the required shutdown margin.
- b. Plausible since this is **the** difference between RHR and RCS boron concentration, but only **the** required SDM boron is needed.
- c. Plausible since this is the difference between RHR and Cold Shutdown boron concentration, but only the required SDM boron is needed.
- d. Plausible since **this** is the difference between **RHR** and refueling boron concentration, and refueling conditions occur at **140°F**. but only the required SDM boron **is** needed.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS

KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Application of actual versus required boron concentration – must determine minimum limiting requirement

QUESTION: 68

Given the following conditions:

- A liquid waste discharge from a Treated Laundry and **Hot** Shower (TL&HS) Tank is in progress.
- REM-1 WL-3540, Treated Laundry and Hot Shower **Tank** Pump Discharge Monitor, goes into high alarm.

Which **of** the following terminates the discharge'?

- a. The running TL&HS Tank Pump will automatically **trip**.
- b. An operator must take manual action to shut the TL&HS Tank Pump Discharge Isolation Valve.
- c. The running TL&HS Tank **Pump** Recirc Valve will automatically open.
- d. The TL&HS Tank Pump Discharge Isolation Valve **will** automatically close.

ANSWER:

- d. The TL&HS Tank Pump Discharge Isolation Valve will automatically close.

QUESTION NUMBER: 68 **TIER/GROUP:** 2/2
KA IMPORTANCE: RO 3.6 **SRO**
10CFR55 CONTENT: 41(b) 7/13 **43(b)**

KA: 068A3.02

Ability to monitor automatic operation of the Liquid Radwaste System including: Automatic isolation

OBJECTIVE: LWPS-LP-3.0-7

DESCRIBE the automatic protection features associated with discharges to the environment from the LWPS

DEVELOPMENT REFERENCES: AOP-005

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

HANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT: RMS-A6 005

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER √d):

- a. Plausible since the pump will stop the discharge, but there is no auto trip due to high rad.
- b. Plausible since manual isolation will **stop** the discharge, but an auto isolation will not require operator action.
- c. Plausible since placing the tank in recirc will stop discharge, but only because of the isolation valve, as the recirc valve does not have an auto function.
- √ d. On a high rad **level** as sensed by REM 3540, the discharge isolation valve will automatically close, terminating any release in progress.

DIFFICULTY ANALYSIS:

COMPREHENSIVE/ ANALYSIS

KNOWLEDGE/ RECALL

DIFFICULTY RATING: 2

EXPLANATION: Knowledge of liquid radwaste design and operation

QUESTION: 69

Assuming **NO** operator actions, which of the following describes the effect of a loss of instrument air on Volume Control Tank (VCT) level?

- a. VCT level decreases due to maximum charging and letdown isolation valves closing
- b. VCT level decreases due to maximum charging and letdown being diverted to the Hold Up Tank
- c. VCT level increases due to minimum charging and the letdown pressure control valve failing open
- d. VCT level increases due to minimum charging and the letdown orifice isolation valves failing open

ANSWER:

- a. VCT level decreases due to maximum charging and letdown isolation valves closing

QUESTION: 70

Given the following conditions:

- Following a plant trip, EOP-EPP-004, “Reactor **Trip** Response,” is being performed.
- The crew is verifying Natural Circulation conditions as a result of a loss **of** power to all RCPs.
- Five (5) core exit thermocouples are failed.

How do the failed core exit thermocouples affect indications used to verify Natural Circulation‘?

- a. ● The Core Exit Temperature indications will be **HIGHER** than actual
 - RCS Subcooling will indicate **MORE** subcooling than actual
- b. ● The Core Exit Temperature indications will be **HIGHER** than actual
 - RCS Subcooling will indicate **LESS** subcooling than actual
- c. ● Core Exit Temperature indications will indicate **LOWER** than actual
 - **RCS** Subcooling will indicate **MORE** subcooling than actual
- d. ● Core Exit Temperature indications will indicate the **SAME** as actual
 - RCS Subcooling will indicate the **SAME** subcooling as actual

ANSWER:

- d. ● Core Exit Temperature indications will indicate the **SAME** as actual
 - RCS Subcooling will indicate the **SAME** subcooling as actual

QUESTION NUMBER: 70 TIER/GROUP: 2/2
KAIIMPORTANCE: RO 3.5 SRO
10CFR55 CONTENT: 41(b) 5 43(b)

KA: 017K3.01

Knowledge of the effect that a loss or malfunction of the ITM system will have on the following: Natural circulation indications

OBJECTIVE: ICCM-3.0-R6

DESCRIBE how the plant's subcooling monitor information is processed

DEVELOPMENT REFERENCES: SD-106
ICCM-LP-3.0

REFERENCES SUPPLIED TO APPLICANT: None

QUESTION SOURCE: NEW SIGNIFICANTLY MODIFIED DIRECT

BANK NUMBER FOR SIGNIFICANTLY MODIFIED / DIRECT New

NRC EXAM HISTORY: None

DISTRACTOR JUSTIFICATION (CORRECT ANSWER \checkmark d):

- a. Plausible since the thermocouples are failed, but a failed thermocouple indicates 507: (low) and not high.
- b. Plausible since the thermocouples are failed, but a failed thermocouple indicates 50°F (low) and not high.
- c. Plausible since the failed thermocouples indicate 50°F (low), but the ICCM indication uses the highest thermocouples and not the lowest.
- \checkmark d. The failed thermocouples will not be used to process the indication by the ICCM, so there will be no change on core exit temperatures and subcooling margin.

DIFFICULTY ANALYSIS:

COMPREHENSIVE / ANALYSIS KNOWLEDGE / RECALL

DIFFICULTY RATING: 3

EXPLANATION: Analyze the effect of failed thermocouples on temperatures and subcooling margin

QUESTION: 71

Which of the following EOP network procedures, containing **NO** Immediate Operator Actions, may be directly entered and the conditions under which it may be entered?

- a. EOP-FRP-1.1, "Response to Pressurizer High Level," when it **is** desirable to restore pressurizer level following a malfunction **of** the Pressurizer Level Control System and **NO** accident is in progress
- b. EOP-FRP-I.1, "Response to Pressurizer High Level," when it is desirable to restore pressurizer level following an inadvertent Safety Injection actuation with the plant in Mode 3
- c. EPP-005, "Natural Circulation Cooldown," when it **is** desirable to cooldown with RCPs unavailable and **NO** accident is in progress
- d. EPP-005, "Natural Circulation Cooldown," when it is desirable to cooldown with RCPs unavailable due to a **loss** of offsite power with the plant in Mode 3

ANSWER:

- c. EPP-005, "Natural Circulation Cooldown," when it is desirable to cooldown with RCPs unavailable and **NO** accident is in progress

QUESTION: 72

Which **of** the following is a reason that containment pressure greater than 45 psig is considered an extreme challenge to the containment critical safety function?

- a. Containment structural failure is imminent
- b. Containment leakage could be in excess **of** design basis leakage
- c. Hydrogen recombiner efficiency is significantly reduced at the pressure
- d. Containment temperature is high enough to prevent adequate core cooling

ANSWER

- b. Containment leakage could be in excess of design basis leakage

QUESTION: 73

Which **of** the following would require that Independent Verification be performed in accordance with OPS-NGGC-1303, "Independent Verification?"

- a. During Mode **5**, a valve in the Containment Spray system is being repositioned for testing and the OP lineup will be completed prior to Mode **4** entry
- b. During Mode 1, a valve in the Main Steam system is being placed under clearance and the valve is only accessible with a manlift
- c. During Mode **4**, a valve in CVCS inside containment is being positioned **for** draining **and** the valve is located in an area where the temperature **is** 134°F
- d. During Mode 3, a valve in CVCS is being placed under clearance and the valve is located in a radiation field of 175 mRem/hr with an estimated verification time **of** 6 minutes

ANSWER:

- h. During Mode 1, a valve in **the** Main Steam system is being placed under clearance and the valve is only accessible with a manlift

QUESTION: 74

Given the following conditions:

- Following an accident, EOP-EPP-015, “Uncontrolled Depressurization of All Steam Generators,” is being performed.
- Due to the excessive cooldown rate, the operators have reduced AFW flow to all steam generators (SG) to minimum as they continue attempts to isolate the SGs.

Which of the following describes the expected plant response to the AFW flow reduction and what actions are to be taken as SG pressures decrease?

- a. RCS hot leg temperatures will eventually begin **to** increase and the crew will then transition to EOP-EPP-008, “Safety Injection Termination”
- b. RCS hot leg temperatures **will** eventually begin to increase and the crew will then be required to increase **AFW** flow to maintain **RCS** hot leg temperatures stable or decreasing
- c. The SGs will eventually approach dry conditions and no longer be required and the crew will then transition to EOP-EPP-008, “Safety Injection Termination”
- d. The SGs will eventually approach dry conditions and the crew will then be required to isolate AFW flow to all SGs

ANSWER:

- b. RCS hot leg temperatures will eventually begin to increase and the crew will then be required to increase **AFW** flow to maintain **RCS** hot leg temperatures stable or decreasing

QUESTION: 75

Which of the following conditions **would** permit securing Containment Spray per EOP-PATH-1 Guide?

- a.
 - Actuation caused by a LOCA
 - 4 Time since LOCA occurred is **6** hours
 - Containment pressure is **9 psig**

- b.
 - a Actuation caused by **a** LOCA
 - **Time** since LOCA occurred is **3 hours**
 - Containment pressure is **5 psig**

- c.
 - Actuation caused by a Steam Line Break
 - Time since Steam Line Break **occurred** is **3** hours
 - Containment pressure is **5 psig**

- d.
 - 4 Actuation caused by a Steam Line Break
 - **Time** since Steam Line Break occurred is 6 hours
 - Containment pressure is 9 psig

ANSWER

- c.
 - 4 Actuation caused by a Steam Line Break
 - 4 Time since Steam Line Break occurred is **3** hours
 - Containment pressure is **5 psig**

