

10-2011 Watts Bar SRO NRC License Exam
12/29/2011

1. 007 EK1.02 201

Given the following:

- A reactor trip occurs on Unit 1.
- ES-0.1, "Reactor Trip Response," has been implemented.
- Shutdown Bank 'B' rod G3 remains at 228 steps.
- Control Bank 'D' rod M8 sticks at 16 steps while inserting.
- Tavg dropped to 549°F before stabilizing.

Which ONE of the following completes the statement below?

Conditions indicate Immediate Boration is _____ to satisfy Shutdown Margin.

- A. **NOT** required
- B. required due to the RCS temperature ONLY
- ☒ C. required due to the stuck control rods ONLY
- D. required due to the RCS temperature and the stuck control rods

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because if only one rod had failed to completely insert Immediate Boration would not be required with the remaining conditions.*
- B. *Incorrect, Plausible because Immediate Boration would be required due to the RCS temperature if Tavg had been lower than 547°F.*
- C. *Correct, Immediate Boration is required because there are two rods that failed to insert. but it is not required due RCS temperature because the temperature is above 547°F*
- D. *Incorrect, Plausible because Immediate Boration would be required for both the temperature and the stuck rods if the RCS temperature if Tavg had been lower than 547°F.*

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Question Number: 1

Tier: 1 Group: 1

K/A: 007 EK1.02
Reactor Trip
Knowledge of the operational implications of the following concepts as they
apply to the reactor trip:
Shutdown Margin

Importance Rating: 3.4 / 3.8

10 CFR Part 55: 41.8 / 41.10

10CFR55.43.b: Not applicable

K/A Match: This question matches the K/A by having the candidate recall the
operational effect of a stuck rod following a reactor trip on shutdown
margin.

Technical Reference: ES-0.1, Reactor Trip Response, Revision 0023

Proposed references
to be provided: None

Learning Objective: 3-OT-EOP0000
26. Given a set of plant conditions, use E-0, ES-0.0,
ES-0.1, ES-0.2, ES-0.3, ES0.4 and the Critical
Safety Function Status Trees to correctly diagnose
and implement: Action Steps, RNOs, Foldout Pages,
Notes and Cautions.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: SQN bank question E-0-B.3.A 010 modified

Comments:

2. 008 AG2.4.47 102

Given the following:

- Unit 1 is operating at 100% power with Pressurizer Heater Group C energized.
- Pressurizer PORV 68-340A leakage exceeds spray flow.

Which ONE of the following completes the statement below?

Assuming **NO** operator action, 1-TI-68-318, PZR SURGE LINE TEMP, indication will (1) and the Tech Spec Operational Leakage limit would be exceeded when the leakage reached (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | Rise | >1.0 gpm |
| B. | Rise | >10 gpm |
| C. | Lower | >1.0 gpm |
| D✓ | Lower | >10 gpm |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because another pressurizer parameter (the PORV tailpipe temperature indication) will rise as the valve begins leaking through and the RCS Operational Unidentified Leakage limit in accordance with Tech Specs is 1.0 gpm.*
- B. *Incorrect, Plausible because another pressurizer parameter (the PORV tailpipe temperature indication) will rise as the valve begins leaking through and the RCS Operational Identified Leakage limit in accordance with Tech Specs being 10 gpm is correct.*
- C. *Incorrect, Plausible because the Surge Line temperature dropping due to the PORV leaking is correct and the RCS Operational Unidentified Leakage limit in accordance with Tech Specs is 1.0 gpm.*
- D. *Correct, with the PORV leaking, inventory will be lost in the pressurizer resulting in a flow from the RCS hot leg into the pressurizer. This replaces the outflow from the pressurizer. The Hot Leg temperature is lower than the temperature in the pressurizer which results in the Surge Line temperature dropping and the RCS Operational Identified Leakage limit in accordance with Tech Specs is 10 gpm.*

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Question Number: 2

Tier: 1 **Group:** 1

K/A: 008 AG2.4.47
Vapor Space LOCA
Emergency Procedures / Plan
Ability to diagnose and recognize trends in an accurate and timely manner
utilizing the appropriate control room reference material.

Importance Rating: 4.2 / 4.2

10 CFR Part 55: 41.10 / 43.5 / 45.12

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to understand how the Pressurizer Surge Line Temperature indicator will trend during a vapor space leak and also know that this type of leakage is classified as Identified leakage; then be able to recognize the leakage rate when the Tech Spec Operational Leakage would be exceeded.

Technical Reference: SOI-68.03, Pressurizer Pressure and Spray Control System, Revision 0021

Proposed references to be provided: None

Learning Objective: 3-OT-SYS068C
11. Describe the indication an operator has that a PORV is open or leaking through.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: SQN bank question

Comments:

3. 015 AK3.03 003

Given the following:

- Unit 1 is operating at 18% power.
- RCP #2 motor winding temperatures have increased to 304°F.

Which ONE of the following identifies the action required and the reason for the sequence?

- A✓ Trip the reactor and then stop RCP #2 because the unit will not be operated on 3 loop operation in Modes 1 or 2 due to conservative industry operating principles.
- B. Trip the reactor and then stop RCP #2 because Tech Spec LCO 3.4.4 does not allow 3 loop operation with the Unit in Mode 1.
- C. Stop RCP #2 and then trip the reactor because the challenge is to the pump and there is no challenge to DNB during 3-loop operation at the current reactor power level.
- D. Stop RCP #2 and then trip the reactor because the challenge is to the pump and stopping the pump does not challenge the reactor trip system at the current reactor power level.

DISTRACTOR ANALYSIS:

- A. *Correct, the required sequence when an RCP is required to be stopped during Mode 1 or 2 operation is to trip the reactor first then stop the RCP. The reason as identified in AOI-24 is to conform to conservative industry operating principles.*
- B. *Incorrect, Plausible because tripping the reactor prior to stopping the RCP is correct and there is a Tech Spec limitation on 3-loop operation and a violation would occur if the allowed time limit of 6 hours was not met.*
- C. *Incorrect, Plausible because 'Immediate Trip' criteria is met for RCP #2 and there is no DNB concern during 3-loop operation at the current low power level if the RCP was stopped before the reactor was tripped.*
- D. *Incorrect, Plausible because 'Immediate Trip' criteria is met for RCP #2 and with the reactor level below P8 (48%) there would be no challenge to the reactor protection system if the RCP was stopped before the reactor was tripped.*

Question Number: 3

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Tier: 1 Group: 1

K/A: 015 AK3.03
Reactor Coolant Pump (RCP) Malfunctions
Knowledge of the reasons for the following responses as they apply to the
Reactor Coolant Pump Malfunctions:
Sequence of events for manually tripping reactor and RCP as a result of
an RCP malfunction

Importance Rating: 3.7 / 4.0

10 CFR Part 55: 41.5, 41.10 / 45.6 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the
reason for the sequence of tripping the reactor prior to stopping the
RCP when the RCP is required to be stopped due to a malfunction.

Technical Reference: AOI-24, RCP Malfunctions During Pump Operation,
Revision 0029

**Proposed references
to be provided:** None

Learning Objective: 3-OT-AOI2400
10. Given a set of plant conditions, use AOI-24 to
correctly:
a. Recognize Entry Conditions.
b. Identify Required Actions.
c. Respond to Contingencies (RNO).
d. Observe and Interpret Cautions and Notes.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question AOI0500.01020 modified

Comments:

4. 026 AA2.03 104

Given the following:

- Unit 1 is operating at 100% power.
- The C-S CCS Pump trips while supplying the B Train CCS.
- Operators have not taken any action.

Which ONE of the following completes the statements below?

To restore flow, the 2B-B CCS pump (1).

If the 1B-B CCS pump is used to supply B Train CCS, its suction valve must be re-aligned to (2).

- A✓ (1) must be manually started
(2) protect train separation within the CCS surge tank
- B. (1) must be manually started
(2) ensure a suction path to the 1B-B CCS pump
- C. (1) will automatically start
(2) protect train separation within the CCS surge tank
- D. (1) will automatically start
(2) ensure a suction path to the 1B-B CCS pump

DISTRACTOR ANALYSIS:

- A. *Correct, The 2B-B CCS Pump does not automatically start on low header pressure and will need to be manually started, and the reason for re-aligning the 1B-B Pump's suction is to protect train separation (see SOI-70.01, "Component Cooling Water (CCS) System").*
- B. *Incorrect, Plausible because the 2B-B CCS Pump does not automatically start on low header pressure and will need to be manually started. Also plausible, because there are pumps that must have their suction valves re-aligned to protect their suction source. In this case, the 1B-B pump has its suction lined up to the 1A side of the surge tank and would have a suction source, however it would connect the 1A and 1B CCS headers if it was not re-aligned.*
- C. *Incorrect, Plausible because, although the 2B-B pump does not automatically start, the 1B-B CCS pump would auto start if the 1A-A pump failed to provide pressure. Also, the reason for re-aligning the 1B-B Pump's suction to protect train separation is correct (see SOI-70.01, "Component Cooling Water (CCS) System").*
- D. *Incorrect, Plausible because, although the 2B-B pump does not automatically start, the 1B-B CCS pump would auto start if the 1A-A pump failed to provide pressure. Also plausible, because there are pumps that must have their suction valves re-aligned to protect their suction source. In this case, the 1B-B pump has its suction lined up to the 1A side of the surge tank and would have a suction source, however it would connect the 1A and 1B CCS headers if it was not re-aligned.*

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Question Number: 4

Tier: 1 Group: 1

K/A: 026 AA2.03
Loss of Component Cooling Water (CCW)
Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water:
The valve lineups necessary to restart the CCWs while bypassing the portion of the system causing the abnormal condition.

Importance Rating: 2.6 / 2.9

10 CFR Part 55: 43.5 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the valve lineup for the 1B-B CCS Pump suction required for that pump to be used to bypass a failed C-S CCS pump.

Technical Reference: SOI-70.01, Component Cooling Water (CCS) System,
Revision 0068
1-45W760-70-1 R25
2-45W760-70-1 R2 (as designed)

Proposed references
to be provided: None

Learning Objective: 3-OT-SYS070A
03. Describe the CCS pumps, include power supply,
pump type, capacity, lubrication, and logic.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN Bank Question SYS070A.15 004 modified for use
on the WBN 10/22011 NRC exam.

Comments:

5. 027 AK3.02 005

Given the following:

- Unit 1 is operating at 100% power.
- 1-XS-68-340D, PZR PRESS CONTROL CHANNEL SELECT, is selected to PT-68-340 & 334.
- 1-XS-68-340B, PZR PRESS RECORDER CHANNEL SELECT, is selected to PT-68-334.
- 1-PI-68-334, PRESSURIZER PRESSURE, fails to the bottom of the scale due to transmitter failure.
- The other three pressurizer pressure instruments indicate:
 - 1-PI-68-340A - 2235 psig
 - 1-PI-68-323 - 2220 psig
 - 1-PI-68-322 - 2230 psig
- Operators are performing AOI-18, "Malfunction of Pressurizer pressure Control System," and have placed 1-XS-68-340D, PZR PRESS CONTROL CHANNEL SELECT, to PT-68-340 B322.

Which ONE of the following identifies how 1-XS-68-340B, PZR PRESS RECORDER CHANNEL SELECT, will be positioned and the reason why?

- A. PT-68-323 because it is the channel with the lowest reading.
- B. PT-68-322 because it is the channel replacing the control function of 1-PT-68-334.
- C. PT-68-323 or PT-68-322 because neither is the channel selected for control.
- D✓ Any position other than PT-68-334 because each is an operable channel.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because selecting the channel with the lowest reading would provide trend for the margin to DNB pressure limit.*
- B. *Incorrect, Plausible because PT-68-322 is the pressure channel replacing the failed channel PT-68-334.*
- C. *Incorrect, Plausible because PT-68-334 was not the controlling channel prior to its failure and these two positions are the only choices for selection of a non-controlling channel.*
- D. *Correct, 1-XS-68-340B can be selected to any channel other than PT-334 because each of the other three are operable channels.*

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Question Number: 5

Tier: 1 **Group:** 1

K/A: 027 AK3.02
Pressurizer Pressure Control System (PZR PCS) Malfunction
Knowledge of the reasons for the following responses as they apply to the
Pressurizer Pressure Control Malfunctions:
Verification of alternate transmitter and/or plant computer prior to shifting
flow chart transmitters

Importance Rating: 2.9* / 3.0

10 CFR Part 55: 41.5,41.10 / 45.6 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the
reason for verifying the status of alternate transmitters prior to
positioning the input to the chart recorder following the failure of the
transmitter previously selected.

Technical Reference: AOI-18, Malfunction of Pressurizer Pressure Control
System, Revision 0023

**Proposed references
to be provided:** None

Learning Objective: 3-OT-AOI1800
7. Demonstrate ability/knowledge of AOI, to correctly:
b. Respond to Action steps.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question for the WBN 10/2011 NRC exam

Comments:

6. 029 EK2.06 306

Given the following:

- Unit 1 is at 45% power when the reactor fails to trip from a valid trip signal and cannot be tripped from the MCR handswitches.
- FR-S.1, "Nuclear Power Generation/ATWS," is entered and the immediate actions are in progress.
- RCS Tavg is 548°F and dropping.

Which ONE of the following completes the statement below?

Both MFPTs will be tripped by a Feedwater Isolation Signal ____ is/are opened.

- A✓ after the first reactor trip breaker
- B. after the first MG set output breaker
- C. only after both reactor trip breakers
- D. only after both MG set output breakers

DISTRACTOR ANALYSIS:

- A. *Correct, FR-S.1 will direct an operator be sent to trip the reactor by opening the Reactor Trip Breakers and the MG Set output breakers. With Tavg less than 554°F, a trained FWI signal is generated by auxiliary contacts (P4) on the respective train Reactor Trip Breakers. Each MFPT has a trip solenoid from both Train A and Train B FWI signals. This provides for the trip of both MFPTs when the first of the reactor trip breakers is opened*
- B. *Incorrect, Plausible because the MG set output breakers are directed to be tripped in the same step of the procedure as the reactor trip breakers are and the MFPTs will be tripped as a result of the actions completed in the step.*
- C. *Incorrect, Plausible because the each of the reactor trip breaker do have the P4 contact for its respective train creating the conclusion that both breakers must be opened to trip both MFPTs.*
- D. *Incorrect, Plausible because the MG set output breakers are directed to be tripped in the same step of the procedure as the reactor trip breakers are and because the each of the reactor trip breaker do have the P4 contact for its respective train creating the conclusion that both breakers must be opened to trip both MFPTs.*

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Question Number: 6

Tier: 1 Group 1

K/A: 029 EK2.06
Anticipated Transient Without Scram (ATWS)
Knowledge of the interrelations between the and the following an ATWS:
Breakers, relays, and disconnects

Importance Rating: 2.9* / 3.1*

10 CFR Part 55: 41.7 / 45.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the applicant is required to demonstrate the knowledge of how the local actions directed to be performed on the reactor trip breakers during an ATWS result tripping the MFPTs due to the generation of a feedwater isolation signal.

Technical Reference: 1-47W611-99-1, R7
FR-S.1, Nuclear Power Generation/ATWS Rev. 0020
N3-99-4003, Reactor Protection System, Revision 0021

Proposed references
to be provided: None

Learning Objective: 3-OT-FRS0001
03. List from memory and in order the two Immediate
Operator Actions for procedure FR-S.1, Nuclear
Power Generation / ATWS, and discuss the basis for
each action.
3-OT-SYS099A
10. Describe two ways by which the SSPS opens the
Reactor Trip Breakers.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: Combination of 029EK2.06 1 from Vogtle 2009 exam
(28) and a SQN Bank question 029 EK2.06 008 used on
the SQN 2/2010 exam.

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Comments:

7. 038 EA2.15 007

The following conditions exist on Unit 1:

- A S/G tube rupture is in progress.
- The crew is backfilling at 125 gpm per ES-3.1, "Post-SGTR Cooldown Using Backfill."
- A 75 gpm and the 45 gpm orifices are in service.
- The TSC has requested the crew to reduce the backfill rate from 125 gpm to 75 gpm.

Which ONE of the following actions would the crew take to reduce the backfill rate?

- A. Lower RCS pressure
- ☒ B. Raise RCS pressure
- C. Lower ruptured SG pressure
- D. Raise ruptured SG pressure

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because changing the RCS pressure would change the backfill flow rate but lowering the RCS pressure is the opposite of the direction needed to lower the backfill flow rate.*
- B. *Correct, To reduce the backfill flow rate, the S/G to RCS ΔP must be reduced. This can be done either by reducing the ruptured S/G pressure or increasing RCS pressure. Lowering ruptured S/G pressure is not a viable option since it would require dumping steam through the S/G PORVs resulting in a release.*
- C. *Incorrect, Plausible because lowering ruptured S/G pressure would reduce the backfill flow rate but would also require dumping steam through the S/G PORVs creating a release.*
- D. *Incorrect, Plausible because changing the ruptured S/G pressure would change the backfill rate but raising the steam generator pressure is the opposite of the direction needed to lower the backfill flow rate.*

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Question Number: 7

Tier: 1 Group: 1

K/A: 038 EA2.15
Steam Generator Tube Rupture (SGTR)
Ability to determine or interpret the following as they apply to a SGTR:
Pressure at which to maintain RCS during S/G cooldown

Importance Rating: 4.2 / 4.4

10 CFR Part 55: 43.5 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires ability to determine the requirements for establishing and maintaining RCS pressure during a post-SGTR event when using the preferred cooldown method

Technical Reference: ES-3.1, Post-SGTR Cooldown Using Backfill,
Revision 0014
WOG E-3 Background Documents, Rev 2

Proposed references
to be provided: None

Learning Objective: 3-OT-EOP0300
5. Given a set of plant conditions, use E-3, ES-3.1,
ES-3.2, and ES-3.3 to correctly diagnose and
implement: Action Steps, RNOs, Foldout Pages,
Notes and Cautions.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: SQN bank question ES-3.1-B.5.H 001 for use on the
WBN 10/2011 NRC exam

Comments:

8. 040 AK1.05 108

Given the following:

- Unit 1 is operating at 75% power steady-state conditions.
- A steam line leak occurs on a steam header outside the north valve room.

Which ONE of the following completes the statement below?

_____ (1) _____ is the time in core life that results in the largest addition of positive reactivity and a manual reactor trip is required in accordance with AOI-38, "Main Steam or Feedwater Leak," if _____ (2) _____.

(1)

(2)

- | | | |
|----|-----|---|
| A. | BOL | final reactor power rises to 79% |
| B. | BOL | Tavg/Tref cannot be maintained within 4°F |
| C✓ | EOL | final reactor power rises to 79% |
| D. | EOL | Tavg/Tref cannot be maintained within 4°F |

DISTRACTOR ANALYSIS:

- A. *Incorrect, the largest reactivity change would occur at EOL (not at BOL) due to the moderator temperature coefficient (MTC) change but unable to maintain Tavg/Tref mismatch within 5°F would require a reactor trip. Plausible because the reactivity effect does change over core life and steam leak greater than 3% requiring a reactor trip is correct.*
- B. *Incorrect, the largest reactivity change would occur at EOL (not at BOL) due to the moderator temperature coefficient (MTC) change but steam leak greater than 3% power would require a reactor trip. Plausible because the reactivity effect does change over core life and a higher Tavg/Tref mismatch would require a reactor trip.*
- C. *Correct, the largest reactivity change would occur at EOL due to the moderator temperature coefficient (MTC) being much larger than at BOL, and the condition requiring a reactor trip is a steam leak greater than 3% power.*
- D. *Incorrect, the largest reactivity change would occur at EOL due to the moderator temperature coefficient (MTC) change but unable to maintain the Tavg/Tref mismatch within 5°F would require a reactor trip. Plausible because the reactivity effect does change over core life with EOL being correct and a higher Tavg/Tref mismatch would require a reactor trip.*

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Question Number: 8

Tier: 1 Group 1

K/A: 040 AK1.05
Steam Line Rupture
Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture:
Reactivity effects of cooldown

Importance Rating: 4.1 / 4.4

10 CFR Part 55: 41.8 / 41.10 / 45.3

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of how time in core life affects the reactivity change due to a steam leak and the operational limits on the change in unit conditions due to the steam leak and corresponding reactivity change.

Technical Reference: AOI-38, Main Steam or Feedwater Line Break,
Revision 0010

Proposed references
to be provided: None

Learning Objective: 3-OT-AOI3800
4. Given a set of plant conditions, use the AOI to correctly:
a. Recognize Entry Conditions.
b. Identify Required Actions.
c. Respond to Contingencies (RNO).
d. Observe and Interpret Cautions and Notes.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: WBN bank question AOI-3800 006 with the choices repositioned to relocate the correct answer and minor wording changes is stem and values in choices, but not sufficiently to call it a modified question.

Comments:

9. 054 AA1.02 109

Given the following:

- Unit 1 is operating at 100% power when an ATWS occurs.

Which ONE of the following completes the statement below?

To ensure long term reactor protection, the AFW pumps are assumed to be started within a maximum of (1) and the limiting ATWS accident which determines this maximum AFW start time is (2) .

 (1)

 (2)

- | | | |
|----|------------|------------------------|
| A. | 30 seconds | turbine trip |
| B. | 30 seconds | loss of main feedwater |
| C. | 60 seconds | turbine trip |
| D✓ | 60 seconds | loss of main feedwater |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because 30 seconds is the amount of time that the operators have to trip the turbine during an ATWS and a turbine trip is an analyzed ATWS initiation event.*
- B. *Incorrect, Plausible because 30 seconds is the amount of time that the operators have to trip the turbine during an ATWS and Loss of Main Feedwater is the correct event for the limiting time of 60 seconds.*
- C. *Incorrect, Plausible because 60 seconds is the correct amount of time that the operators have to start AFW pumps during an ATWS and a turbine trip is an analyzed ATWS initiation event.*
- D. *Correct, 60 seconds is the correct amount of time that the operators have to start AFW pumps during an ATWS and Loss of Main Feedwater is the correct event for the limiting time of 60 seconds.*

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Question Number: 9

Tier: 1 Group 1

K/A: 054 AA1.02
Loss of Main Feedwater (MFW)
Ability to operate and / or monitor the following as they apply to the Loss of
Main Feedwater (MFW):
Manual startup of electric and steam-driven AFW pumps.

Importance Rating: 4.4 / 4.4

10 CFR Part 55: 41.7 / 45.5 / 45.6

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the knowledge that the
AFW pumps must be started when Main Feedwater is lost during an
ATWS.

Technical Reference: WOG Emergency Procedure FR-S.1 Background
Document, Revision 2
Watts Bar Nuclear Plant Updated Final Safety Analysis
Report, Amendment 8

Proposed references
to be provided: None

Learning Objective: 3-OT-FRS0001
10. Explain the purpose for and basis of each step in
FR-S.1 and FR-S.2.

Cognitive Level:

Higher
Lower X

Question Source:

New X
Modified Bank
Bank

Question History: New question written for the 10/2011 NRC exam.

Comments:

10. 055 EA1.01 210

Given the following:

- Unit 1 is in Mode 3 following a loss of offsite power 20 minutes ago.
- Both of the Unit 1 diesel generators failed to start.
- A fire on the lower level of the Control Building results in the loss of both 250v DC Station Batteries.

Which ONE of the following completes the statement below?

The MCR will be able to monitor Core Exit Thermocouples on _____ (1) _____ and to prevent entry into a REQUIRED ACTION in Tech Spec LCO 3.3.3, Post Accident Monitoring, a minimum of _____ (2) _____ operable thermocouples per train are required.

- A. (1) Plasma displays on the control board or Integrated Computer System (ICS)
(2) 2 quadrants with at least 4
- B. (1) Plasma displays on the control board or Integrated Computer System (ICS)
(2) 4 quadrants with at least 2
- C. (1) Plasma Displays ONLY
(2) 2 quadrants with at least 4
- D. ✓ (1) Plasma Displays ONLY
(2) 4 quadrants with at least 2

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the Plasma displays and the ICS computer both receive power from inverters which are powered from batteries during a loss of all AC power. The batteries are design to supply the loads for longer than the 20 minutes provided in the question stem. However the ICS is powered from the DC that is lost in the stem. Also, the requirement is to have a minimum of 8 thermocouples in each train but it is '4 quadrants with 2', not '2 quadrants with 4'. The statement from TS basis (see below) that states "There are two isolated systems, with each system monitoring at least four thermocouples per quadrant" could be incorrectly interpreted by the applicant.*
- B. *Incorrect, Plausible because the Plasma displays and the ICS computer both receive power from inverters which are powered from batteries during a loss of all AC power. The batteries are design to supply the loads for longer than the 20 minutes provided in the question stem. However the ICS is powered from the DC that is lost in the stem. Also, Tech Spec LOC 3.3.3, Post Accident Monitoring, does require each of the 4 quadrants to have two trains with a minimum of 2 thermocouples each.*
- C. *Incorrect, Plausible because only the Plasma display power supply would be available during a blackout and the statement from TS basis (see below) that states "There are two isolated systems, with each system monitoring at least four thermocouples per quadrant" could be incorrectly interpreted by the applicant.*
- D. *Correct, The ICS would not have a power supply available during the blackout after the 250v batteries were lost but the Plasma displays power supplies form the 125v Vital DC would be available and the requirement to have 2 trains in each quadrant with each train having a minimum of 2 thermocouples is stated correctly in the second part of the choice.*

Wording from 3.3.3 Bases

17, 18, 19, 20. Core Exit Temperature

Core Exit Temperature is provided for verification and long term surveillance of core cooling. Core exit thermocouples, in conjunction with RCS wide range temperatures, are sufficient to provide indication of radial distribution of the coolant enthalpy rise across representative sections of the core.

Core Exit Temperature is used to support determination of whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Core Exit Temperature is also used for unit stabilization and cooldown control.

The Inadequate Core Cooling Monitor (ICCM) is used to monitor the core exit thermocouples. There are two isolated systems, with each system monitoring at least four thermocouples per quadrant. The plasma display gives the average quadrant value, the high quadrant value, and the low quadrant value for each quadrant.

Two OPERABLE channels are required in each quadrant to provide adequate indication of coolant temperature rise in representative regions of the core. Two isolated channels of two thermocouples each ensure a single failure will not disable the ability to identify significant temperature gradients.

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Question Number: 10

Tier: 1 Group 2

K/A: 055 EA1.01
Loss of Offsite and Onsite Power (Station Blackout)
Ability to operate and monitor the following as they apply to a Station
Blackout:
In-core thermocouple temperatures.

Importance Rating: 3.7 / 3.9

10 CFR Part 55: 41.7 / 45.5 / 45.6

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the operability and availability of the In-core thermocouple temperature outputs during a station blackout.

Technical Reference: 1-45W700-1 R31
1-45W706-5 R18
Tech Spec 3.3.3, PAM instrumentation, Amendment 72
Control Board Photo

Proposed references
to be provided: None

Learning Objective: 3-OT-T/S0303
03. Given plant parameters/conditions, correctly determine applicable Limiting Conditions for Operation or Technical Requirement limits for the various instrumentation systems covered by T/S or T/R.
04. Given plant parameters/conditions, correctly determine the OPERABILITY of the various instrumentation systems covered by T/S or T/R.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> </u>
Modified Bank	<u> </u>
Bank	<u> X </u>

Question History: WBN bank question 055 EA1.01 010 used on 5/2008 exam

Comments:

11. 056 AK3.01 011

Which ONE of the following identifies the pump that will be sequenced on first following a blackout signal on a 6900v Shutdown board and a reason?

<u>First Pump</u>	<u>Reason</u>
A. CCP	Largest blackout load on the board.
B. CCP	To restore Reactor Coolant Pump seal cooling.
C. ERCW pump	Largest blackout load on the board.
D. ERCW pump	To restore Diesel Generator engine cooling.

DISTRACTOR ANALYSIS:

- A. *Incorrect, The CCP does sequence on first (5 seconds after SD board voltage is restored), however the ERCW pump is the largest load.*
- B. *Correct, The CCP does sequence on first (5 seconds after SD board voltage is restored), and does supply RCP seal cooling and inventory makeup to the RCS.*
- C. *Incorrect, ERCW pump is not be first pump to sequence on (20 seconds after SD board voltage is restored) but plausible because the ERCW pump is the largest load on the board and is used to cool the DG supplying power to the board.*
- D. *Incorrect, ERCW pump is not be first pump to sequence on (20 seconds after SD board voltage is restored) but plausible because the ERCW pump is the largest load on the board and is used to cool the DG supplying power to the board.*

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Question Number: 11

Tier: 1 Group 1

K/A: 056 AK3.01
Loss of Offsite Power
Knowledge of the reasons for the following as they apply to the loss of Offsite Power:
Order and time to initiation of power for the load sequencer.

Importance Rating: 3.5 / 3.9

10 CFR Part 55: 41.5/41.10 / 45.6 / 45.13

10CFR55.43.b: Not applicable

K/A Match: This question matches K/A by having candidate determine the Status of CCPs and ERCW pumps following a loss of offsite power and a subsequent SI and the expected timed sequence for restart of the equipment.

Technical Reference: 1-45W760-62-1, R16
1-45W760-67-1, R25
WBN Final Safety Analysis Report, Amendment 8

Proposed references to be provided: None

Learning Objective: 3-OT-SYS201B
16. Identify the equipment and associated (sequence timer) ST setpoint that will start with the following:
a. A blackout with a return of voltage.

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank
Bank X

Question History: SQN Bank question 056 AK3.01 012 used on the SQN 2/2010 exam.

Comments:

12. 058 G2.1.30 112

Given the following:

- Unit 1 is operating at 100% power.
- A loss of 125V DC Vital Battery Board III occurs.
- Operators are performing AOI-21.03, "Loss of 125V DC Vital Battery Board III," Appendix A, "Transfer of 125v DC Buses."

Which ONE of the following completes the statements below?

The operator is directed to 'DEPRESS and HOLD' the 6.9kV SD Bd 2A-A BO-RESET switch in logic Panel 2A-A when control power is being restored to Shutdown Board 2A-A to ____ (1) ____.

The switch to transfer the 6.9kV SD Bd 2A-A 125V DC NORMAL BUS power supply is located ____ (2) ____.

- A. (1) prevent inadvertent equipment tripping
(2) inside the 125V DC Vital Battery Board III room
- B. (1) prevent inadvertent equipment tripping
(2) inside a compartment on 6.9kV Shutdown Board 2A-A
- C. (1) prevent unwanted starts of equipment
(2) inside the 125V DC Vital Battery Board III room
- D✓ (1) prevent unwanted starts of equipment
(2) inside a compartment on 6.9kV Shutdown Board 2A-A

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because it is held to prevent unwanted operation of equipment but the operation is equipment starting not tripping that is being prevented and there are switches associated with 125v DC vital power inside the 125V DC Vital Battery Board III room.*
- B. *Incorrect, Plausible because it is held to prevent unwanted operation of equipment but the operation is equipment starting not tripping that is being prevented and the transfer switch being located inside a compartment of the 6.9kV Shutdown Board is correct.*
- C. *Incorrect, Plausible because preventing unwanted start of equipment is correct and there are switches associated with 125v DC vital power inside the 125V DC Vital Battery Board III room.*
- D. *Correct, As identified in AOI-21.03, the reason for depressing and holding the BO-RESET switch is to prevent unwanted start of Train A equipment (See below) and the transfer switch is located inside a compartment on the 6.9Kv shutdown Board.*

Appendix A

(Page 1 of 1)

Transfer of 125V DC Buses

NOTE

Holding the BO-RESET Switch prevents unwanted start of Train A equipment, such as CCPs, AFW pumps, ERCW pumps, CCS pumps, and PZR Htrs when BO relays energize, and requires two operators to perform.

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Question Number: 12

Tier: 1 **Group:** 1

K/A: 058 G2.1.30
Loss of DC Power
Conduct of Operations
Ability to locate and operate components, including local controls.

Importance Rating: 4.4 / 4.0

10 CFR Part 55: 41.7 / 45.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to locate a local control associated with a loss of DC power and the ability to understand why a separate local control pushbutton is being 'held' in a pushed in position.

Technical Reference: AOI-21.03, Loss of 125V DC Vital Battery Bd III,
Revision 0020
1-45W724-3 R24

Proposed references to be provided: None

Learning Objective: 3-OT-AOI2100
9. Discuss transfer of 125V DC buses using AOI-21.01 or AOI-21.02, Appendix B for 125V DC Battery Board I or II respectively.

Cognitive Level:

Higher	
Lower	<u>X</u>

Question Source:

New	<u>X</u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question for the WBN 10/2011 NRC Exam

Comments:

13. 062 AA1.06 113

Given the following:

- Unit 1 is operating at 100% power.
- All available Train A ERCW pumps are in service.
- ERCW pump B-A trips.

Which ONE of the following completes the statements below?

If needed to maintain CCS temperature on the Unit 1 Miscellaneous Equipment Header, the CCS heat exchanger (1) outlet flow control bypass valve will be adjusted. As the valve is adjusted, the ERCW flow rate on CCS Heat Exchanger B will (2) .

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|-----------------|
| A. | C | drop |
| B✓ | A | drop |
| C. | C | remain constant |
| D. | A | remain constant |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the CCS heat exchanger C outlet bypass valve being the valve to be throttled more open to reduce the temperature could have been correct if a Train B pump had tripped and because the ERCW flow rate on CCS heat exchanger B is reduced is correct.*
- B. *Correct, the B-A pump trip will lower the 2A ERCW header pressure which will drop flow through Component Cooling Water System (CCS) heat exchangers A and B. This will cause CCS temperature on the U-1 Miscellaneous Equipment Header to increase requiring 1-FCV-67-143, CCS HX A OUTLET ERCW FLOW CNTL BYP, to be manually throttled more open to restore the temperature. Placing more flow on CCS heat exchanger A cause a further reduction on the ERCW header pressure, thus lowering ERCW flow on CCS heat exchanger B.*
- C. *Incorrect, Plausible because the CCS heat exchanger C outlet bypass valve being the valve to be throttled more open to reduce the temperature could have been correct if a Train B pump had tripped and because the ERCW flow rate on the CCS heat exchanger C does remain constant, but the ERCW flow rate on CCS heat exchanger B is reduced. Train B flow is not affected and if the B heat exchanger was mistakenly thought to be on Train B (instead of being on the 2A Train), the flow would not be affected*
- D. *Incorrect, Plausible because the CCS heat exchanger A outlet bypass valve is the valve that will be throttled more open to reduce the temperature and because the applicant could mistake the Train alignment of the heat exchangers. While the ERCW flow rate on the CCS heat exchanger B would be affected, the flow on heat exchanger C would remain constant because it is on Train B.*

Question Number: 13

Tier: 2 **Group:** 1

K/A: 062 AA1.06
Loss of Nuclear Service Water
Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water (SWS):
Control of flow rates to components cooled by the SWS

Importance Rating: 2.9 / 2.9

10 CFR Part 55: 41.7 / 45.5 / 45.6

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires service water system (ERCW) flow rate changes that are made following a loss of a

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K/A Match: K/A is matched because the question requires service water system (ERCW) flow rate changes that are made following a loss of a service water system pump in order to maintain temperature on a system (CCS) cooled by the service water system.

Technical Reference: SOI-70.01, Component Cooling Water System,
Revision 0068
1-47W845-1 R57
1-47W845-2 R80
1-47W859-1 R49

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS067A
3. Describe the ERCW System flow path from the river
to the cooling tower basin and discharge holding
pond including:
b. Major components
3-OT-SYS070A
19. Given a set of plant conditions, determine the correct
response of the CCS system.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

14. 065 G2.2.44 114

Given the following:

- Unit 1 is currently in Mode 3, with the reactor trip breakers open.
- A control air leak develops inside containment.
- 1-FCV-62-86, Alt Charging to Loop 4, is in service and 1-FCV-62-85, Norm Charging to Loop 1, begins drifting open.
- AOI-10, "Loss of Control Air," is entered.
- The operating crew stops RCPs #1, #3, and #4 in accordance with AOI-10 guidance.

Which ONE of the following completes the statement below?

The leak is on the (1) header and stopping the RCPs will (2) .

(1)

(2)

- | | |
|------------------------------|--|
| A. Auxiliary Air Train B | reduce the increase in the pressurizer level |
| B. Auxiliary Air Train B | stop uncontrolled pressurizer spray flow |
| C✓ Non-essential Control Air | reduce the increase in the pressurizer level |
| D. Non-essential Control Air | stop uncontrolled pressurizer spray flow |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because 1-FCV-62-85 is a B Train valve and it would be reasonable that it be supplied with B Train Auxiliary Air. Also, all but one of the RCPs being evaluated and stopped during a loss of control air in Mode 3 in order to minimize heat input to the RCS to limit pressurizer level increase is correct.*
- B. *Incorrect, Plausible because 1-FCV-62-85 is a B Train valve and it would be reasonable that it be supplied with B Train Auxiliary Air. The step in the AOI-10 that results in the RCPs being stopped directs an evaluation of the pressurizer sprays, which are air operated valves that could have been affected by the loss of air.*
- C. *Correct, While 1-FCV-62-85 is a Train B valves for isolation purposes, the valve receives non-essential control air. All but one RCP being stopped, after an evaluation during a loss of control air in Mode 3, would be in order to minimize heat input to the RCS to limit the pressurizer level increase.*
- D. *Incorrect, Plausible because 1-FCV-62-85 being supplied by non-essential control air is correct. The step in the AOI-10 that results in the RCPs being stopped directs an evaluation of the pressurizer sprays, which are air operated valves that could have been affected by the loss of air.*

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Question Number: 14

Tier: 1 **Group:** 1

K/A: 065 G2.2.44
Loss of Instrument Air
Equipment Control
Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.

Importance Rating: 4.2 / 4.4

10 CFR Part 55: 41.5 / 43.5 / 45.12

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the interpretation of control room indications (valve positions) to determine the failure mode of the instrument air system and it also requires the operator to recall why the RCP operation would affect the plant (pressurizer level).

Technical Reference: AOI-10, Loss of Control Air, Rev. 0040

Proposed references to be provided: None

Learning Objective: 3-OT-AOI1000
05. Explain the actions to control PZR level if Non-Essential Air is lost in Mode 3.

Cognitive Level:

Higher X
Lower

Question Source:

New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

15. 077 AA2.10 115

Given the following:

- Unit 1 is operating at 100% power with the following conditions:

Megawatts 1210 MWe
Megavars +20 Mvars
Gen Voltage 23.6 Kv

- A disturbance occurs on the Transmission Grid resulting in the following:

Megawatts 1210 MWe
Megavars -180 Mvars
Gen Voltage 23.6 Kv

- Annunciator 1-C, STATOR TEMP HI, alarms.
- The Stator Coil Outlet temperature is determined to be 177°F and rising at 2°F/minute.

Which ONE of the following completes the statements below?

Under the conditions, the timer to trip the turbine (1) been initiated.

The stator temperature can be reduced by (2) generator excitation current.

- | | <u>(1)</u> | <u>(2)</u> |
|----|----------------|------------|
| A. | has | lowering |
| B. | has | raising |
| C. | has NOT | lowering |
| D. | has NOT | raising |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the temperature to start the turbine trip timer also brings in an alarm which could be mistaken for the alarm that is LIT and lowering the generator excitation current would be correct if the MVAR load had been a positive value.*
- B. *Incorrect, Plausible because the temperature to start the turbine trip timer also brings in an alarm which could be mistaken for the alarm that is LIT and raising the generator excitation current is correct with the MVAR loading being a negative value.*
- C. *Incorrect, Plausible because the turbine trip timer being not started is correct and lowering the generator excitation current would be correct if the MVAR load had been a positive value.*
- D. *Correct, the alarm setpoint is 176°F for the lit annunciator but the turbine trip 45 second timer does not start timing until the temperature reaches 194°F, so the timer has not started and raising exciter current will reduce the MVAR load on the generator allowing the stator to cool.*

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Question Number: 15

Tier: 1 **Group** 1

K/A: 077 AA2.10
Generator Voltage and Electric Grid Disturbances
Ability to determine and interpret the following as they apply to Generator
Voltage and Electric Grid Disturbances:
Generator overheating and the required actions.

Importance Rating: 3.6 / 3.8

10 CFR Part 55: 41.5 and 43.5 / 45.5, 45.7, and 45.8

10CFR55.43.b: Not applicable

K/A Match: The K/A is matched because the question requires knowledge of the correct operator actions for a condition where a grid disturbance causes generator overheating due to a change in reactive loading on the generator.

Technical Reference: ARI 1-7, Electrical Control, Revision 0030

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS035C
5. Describe the Generator Trips associated with SCW system.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam.

Comments:

16. W/E04 EK1.1 116

Given the following:

- Unit 1 was operating at 100% power when a small break LOCA occurred.
- The crew has implemented ECA-1.2, "LOCA Outside Containment," due to alarm "AUX BLDG HIGH ENERGY LINE BREAK" being LIT.
- When the crew closes RHR Train A cold leg injection valve, 1-FCV-63-93, the RCS pressure begins to rise.
- RCS pressure is now 1520 psig and slowly rising.

Which ONE of the following completes the statement below?

The (1) are currently contributing the most ECCS flow to the core and ECA-1.2 will require (2) to be stopped.

(1)

(2)

- | | |
|-------------------------------|--------------------|
| A. Safety Injection Pumps | only RHR pump 1A-A |
| B. Safety Injection Pumps | both RHR pumps |
| C✓ Centrifugal Charging Pumps | only RHR pump 1A-A |
| D. Centrifugal Charging Pumps | both RHR pumps |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible since the SIPs are running during the LOCA event and can provide a higher flow rate than the CCP at lower pressures. However the RCS pressure is near the SIP shut-off head. Stopping only RHR pump 1A-A is correct because while the pumps are normally cross-tied, performance of ECA-1.2 isolates the cross-tie.*
- B. *Incorrect, Plausible since the SIPs are running during the LOCA event and can provide a higher flow rate than the CCP at lower pressures. However the RCS pressure is near the SIP shut-off head. Stopping both RHRs pumps is plausible because the RHR pumps are normally cross-tied so that all 4 Cold Legs receive injection flow.*
- C. *Correct, Since the CCPs re-align through the CCPIT during a LOCA event, and with RCS pressure at 1520 psig the CCPs are designed to deliver ~340 gpm (170 gpm/each) to the RCS. ECA-1.2 will direct removing and isolating RHR pump 1A-A only. The cross-tie between the RHR pumps will be isolated during performance of the procedure.*
- D. *Incorrect, Plausible because the CCPs providing the highest flow rate is correct with the RCS pressure at 1535 psig and stopping both RHR pumps is plausible because the RHRs pumps are normally cross-tied so that all 4 Cold Legs receive injection flow.*

Simulator - RCS pressure 1520 psig

CCP flow 340 gpm/total (170 gpm each)
SIP flow A-50 gpm B 40 gpm

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Question Number: 16

Tier: 1 **Group** 1

K/A: W/E04 EK1.1
LOCA Outside Containment
Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment):
Components, capacity, and function of emergency systems.

Importance Rating: 3.5 / 3.9

10 CFR Part 55: 41.8 / 41.10

10CFR55.43.b: Not applicable

K/A Match: This question matches the K/A by having the candidate recall the capacity of several ECCS pumps and relating that information to the ECCS system response during a LOCA.

Technical Reference: N3-63-4001, Safety Injection System, Rev. 0027

Proposed references to be provided: None

Learning Objective: 3-OT-SYS063A
27. List each subsystem of the ECCS with its design injection pressure and flow.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: SQN bank question W/E04 EK1.01 written for SQN SEPT 2010 NRC exam.

Comments:

17. W/E05 EK2.2 017

Given the following:

- The crew has entered FR-H.1, "Loss of Secondary Heat Sink," due to a loss of inventory in the S/Gs and failure of the AFW pumps to start.

<u>Time</u>	<u>SG Wide Range Levels (%)</u>				<u>AFW</u>	<u>Cnmt</u>
	<u>SG#1</u>	<u>SG#2</u>	<u>SG#3</u>	<u>SG#4</u>	<u>Flow</u>	<u>Press</u>
0800	41	39	38	37	0 gpm	1.70 psid
0810	37	32	34	33	0 gpm	2.40 psid
0820	30	28	27	26	0 gpm	2.70 psid
0830	27	25	22	24	0 gpm	2.50 psid

Which ONE of the following is the earliest time, if any, that the initiation of Bleed and Feed is required?

- A. Bleed and Feed **NOT** required.
- B. 0810
- C. 0820
- D✓ 0830

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible if any the criteria are not known – setpoint, number of levels below the setpoint, or when adverse containment numbers are to be applied (and would have been correct for the previous level setpoints.) 0800 would be a correct answer if containment pressure had been above 2.8 psid because 3 of the levels are less than 39%.*
- B. *Incorrect, Plausible if any the criteria are not known – setpoint, number of levels below the setpoint, or adverse containment numbers. 0810 would be a correct answer if the containment pressure had been above 2.8 psid because all of the levels are less than 39%.*
- C. *Incorrect, Plausible if any the criteria are not known – setpoint, number of levels below the setpoint, or adverse containment numbers. 0820 is plausible because three of the four levels are below the minimum heat sink required level of 29% which could be misapplied instead of the WR level of 26%. Also, one of the levels is below the required setpoint and the time would be correct if 2 additional levels, which are near the minimum setpoint, were below the minimum required 26%.*
- D. *Correct, Bleed and Feed criteria is met when 3 of the 4 S/G wide range levels are at or below 26% when Adverse Containment values are not required. Adverse containment values are not used until containment pressure is above 2.8 psid.*

Question Number: 17

Tier: 1 **Group** 1

K/A: W/E05 EK2.2
Loss of Secondary Heat Sink
Knowledge of the interrelations between the (Loss of Secondary Heat Sink) and the following:
Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Importance Rating: 3.9 / 4.2

10 CFR Part 55: 41.7 / 45.7

10CFR55.43.b: Not applicable

K/A Match: KA is matched because the applicant must apply the plant conditions to the required actions in the applicable procedure being used in response to a loss of all feed water to identify when the emergency

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K/A Match: KA is matched because the applicant must apply the plant conditions to the required actions in the applicable procedure being used in response to a loss of all feed water to identify when the emergency coolant system would be initiated to provide core cooling.

Technical Reference: FR-H.1, Loss of Secondary Heat Sink, Rev 18

Proposed references to be provided: None

Learning Objective: 3-OT-FRH0001
07. Given a set of plant conditions, evaluate and determine when RCS bleed and feed should be initiated.

Cognitive Level:

Higher	<u> X </u>
Lower	<u> </u>

Question Source:

New	<u> </u>
Modified Bank	<u> </u>
Bank	<u> X </u>

Question History: WBN bank question W/E05 EK2.2 016 used an AUDIT exam in 2010 with one level value changed in the 0830 time line.

Comments:

18. W/E11 EK2.2 118

Given the following:

- 0900 - A reactor trip occurs.
- 0910 - A small break LOCA occurs.
- 0930 - The crew transitions to ECA-1.1, "Loss of RHR Sump Recirculation," due to the failure of both RHR pumps.
- 0940 - Crew reduces ECCS flow to 1 SIP and 1 CCP per ECA-1.1.
- 0950 - Crew determines SI flow cannot be terminated due to lack of subcooling.
- 1000 - The crew is performing ECA-1.1 Step 19 RNO to establish the minimum required ECCS flow to remove decay heat.

Which ONE of the following identifies the minimum flow rate that meets the intent of ECA-1.1, Step 19 RNO, and the flow adjustment methodology for meeting this flow rate?

REFERENCE PROVIDED

- A. Establish 460 gpm ECCS flow.
Starting and stopping ECCS pumps.
- B. Establish 460 gpm ECCS flow.
Throttling ECCS valves.
- C✓ Establish 370 gpm ECCS flow.
Starting and stopping ECCS pumps.
- D. Establish 370 gpm ECCS flow.
Throttling ECCS valves.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because 460 gpm meets the curve requirement however it does not meet the intent of the step which is to meet the minimum flow requirements while still meeting the curve requirements. Second part correct in ECCS pumps may be started and stopped as necessary to accomplish the desired flow rate.*
- B. *Incorrect, Plausible because 460 gpm meets the curve requirement however it does not meet the intent of the step which is to meet the minimum flow requirements while still meeting the curve requirements. Plausible if student does not know the pumps can be started or stopped pumps as necessary. The applicant may think that due to a LOCA pumps must not be stopped.*
- C. *Correct, 0900 - 1000 (60 Min) Using ECA-1.1, Figure 1, the minimum value is slightly below 370 gpm. The Basis states "the operator is then instructed to establish the minimum ECCS flow needed to match decay heat in order to further decrease ECCS pump Flow and delay RWST depletion. This value of 370 gpm is in the acceptable region using the graph from time of trip and meets the requirement of Minimum Flow to delay RWST depletion. The ECCS pumps may be started and stopped as necessary to accomplish the desired flow rate.*
- D. *Incorrect, Correct flow rate wrong action. Plausible if student does not know that the pumps can be started or stopped pumps as necessary. The applicant may think that due to a LOCA pumps must not be stopped.*

Question Number: 18

Tier: 1 **Group** 1

K/A: W/E11 EK2.2

Loss of Emergency Coolant Recirculation

Knowledge of the interrelations between the Loss of Emergency Coolant Recirculation and the following:

Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Importance Rating: 3.9 / 4.3

10 CFR Part 55: 41.7 / 45.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the questions requires knowledge of minimum ECCS flow during a loss of recirculation event. The candidate must understand proper operation (minimum flow for the

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K/A Match: K/A is matched because the questions requires knowledge of minimum ECCS flow during a loss of recirculation event. The candidate must understand proper operation (minimum flow for the time since trip) for the ECCS system.

Technical Reference: ECA-1-1, Loss of RHR Sump Recirculation, Rev 12

Proposed references to be provided: ECA-1-1, Loss of RHR Sump Recirculation, Rev 12, (2 pages- page 12 and Figure 1 page 29 (with Acceptable Region and Unacceptable region deleted on the figure))

Learning Objective: 3-OT-ECA0101
02. Given the time of reactor trip, be able to use ECA-1.1 figure 1 to identify the minimum required SI flow.

Cognitive Level:

Higher	<u> X </u>
Lower	<u> </u>

Question Source:

New	<u> </u>
Modified Bank	<u> X </u>
Bank	<u> </u>

Question History: WBN bank question W/E11 EK2.2 017 used on AUDIT 08/2010

Comments:

19. 001 AA1.07 119

Given the following:

- Unit 1 is operating at 60% power when the Control Rods begin an uncontrolled withdrawal at 72 steps/minute.
- The OAC places 1-RBSS, ROD BANK SELECT to MAN stopping the rod movement.
- The operating crew determines a failure of the RCS temperature input to the Rod Control System resulted in the uncontrolled rod movement.
- The temperature input to the system has been repaired.
- Current conditions are:
 - Tavg is 1.4°F above Tref.
 - ROD SPEED indicates 48 Steps/min.
 - PASSIVE SUMMER ROD DEMAND indicates slightly over +1.0.
 - Control Bank D rods are at 176 steps withdrawn.

If 1-RBSS, ROD BANK SELECT is returned to AUTO, which ONE of the following identifies how the control rods will respond?

Control Rod position will...

- A✓ remain at 176 steps withdrawn.
- B. decrease because of the Tavg-Tref error.
- C. increase because the Rod Speed has not decayed to '0'.
- D. decrease because of the PASSIVE SUMMER ROD DEMAND.

DISTRACTOR ANALYSIS:

- A. *Correct, The rod position indications will not change when the rod control is restored to automatic with the conditions stated in the question.*
- B. *Incorrect, Plausible for the rod position to decrease because the rods would insert if the delta between Tavg and Tref had been higher.*
- C. *Incorrect, Plausible for the rod position to increase because the rods would withdraw if the demand signal had not decayed after the loop was defeated. However, the rod speed indication is not a function of the actual system demand signal.*
- D. *Incorrect, Plausible for the rod position to decrease because the rods would insert if the Passive Summer Demand had been higher. However, it would have had to be a minimum of 1.5 to cause motion.*

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Question Number: 19

Tier: 1 **Group:** 2

K/A: 001 AA1.07
Continuous Rod Withdrawal
Ability to operate and / or monitor the following as they apply to the
Continuous Rod Withdrawal
RPI

Importance Rating: 3.3 / 3.1

10 CFR Part 55: 41.7 / 45.5 / 45.6

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires ability to determine how the control rod position indications will change when restoring to normal conditions following a Continuous Rod Withdrawal event in accordance with the abnormal operating procedure.

Technical Reference: AOI-2, Malfunction of Reactor Control System,
Revision 0038

**Proposed references
to be provided:** None

Learning Objective: 3-OT-AOI0200
04. Explain the Subsequent Actions for Continuous Rod
Insertion/Withdrawal.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam.

Comments:

20. 036 AK3.03 120

Given the following:

- During receipt of new fuel, a non-irradiated fuel assembly is dropped on the refueling floor.
- A plant announcement is made per AOI-29, "Dropped or Damaged Fuel or Refueling Cavity Seal Failure," to evacuate the affected area.

In accordance with AOI-29, which ONE of the following completes the statements below?

The affected area is required to be evacuated to protect against the potential exposure to (1) radiation.

Non-fuel handling related work on the Refuel Floor can first be resumed when (2).

(1)

(2)

- | | |
|--|--|
| A. Alpha ONLY | Radiation Protection grants approval to inspect the fuel assembly. |
| B. <input checked="" type="radio"/> Alpha ONLY | the damaged fuel assembly has been inspected and stored. |
| C. Alpha/Beta/Gamma | Radiation Protection grants approval to inspect the fuel assembly. |
| D. Alpha/Beta/Gamma | the damaged fuel assembly has been inspected and stored. |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because Alpha (α) radiation may be produced from release of tramp uranium and/or fuel and the AOI does direct Radiation protection be notified of the condition.*
- B. *Correct, AOI-29 section 4.0, "Discussion," states that, "Radiation levels, in general, should not increase, but Alpha (α) radiation may be produced from release of tramp uranium and/or fuel" and the AOI also identifies non-fuel handling work cannot be resumed until the damaged fuel has been inspected and stored.*
- C. *Incorrect, Plausible because Gamma and Beta are types of radiation that would be present if the fuel assembly was not a new fuel assembly and the AOI does direct Radiation protection be notified of the condition.*
- D. *Incorrect, Plausible because Gamma and Beta are types of radiation that would be present if the fuel assembly was not a new fuel assembly and because the AOI identifying that non-fuel handling work cannot be resumed until the damaged fuel has been inspected and stored is correct.*

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Question Number: 20

Tier: 2 **Group** 1

K/A: 036 AK3.03
Fuel Handling Incidents
Knowledge of the reasons for the following responses as they apply to the
Fuel Handling Incidents:
Guidance contained in EOP for fuel handling incident.

Importance Rating: 3.7 / 4.1

10 CFR Part 55: 41.8 / 41.10 / 45.6 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of why
AOI-29 requires the evacuation of the area during a fuel handling
incident.

Technical Reference: AOI-29, Dropped or Damaged Fuel or Refueling Cavity
Seal Failure, Revision 0021

**Proposed references
to be provided:** None

Learning Objective:

- 6. Demonstrate ability/knowledge of AOI-29, to correctly:
 - a. Recognize Entry conditions.
 - b. Respond to Action steps.
 - c. Respond to Contingencies (RNO column).
 - d. Respond to Notes and Cautions.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question written for the 10/2011 exam.

Comments:

21. 037 AK1.01 021

Given the following:

- Unit 1 was operating at 100% when a steam generator tube leak occurred.
- The unit has been placed in Mode 3.
- The leaking steam generator pressure is 950 psig.
- The operating crew is currently determining the target incore temperature for RCS cooldown, per the following table in AOI-33, "Steam Generator Tube Leak."

LEAKING SG PRESSURE (PSIG)	TARGET INCORE TEMP (°F)
1100	491°F
1000	479°F
900	466°F
800	451°F
700	434°F
690	433°F

Which ONE of the following identifies the steam pressure setpoint on the steam dump system that would maintain the target incore temperature?

- A✓ 480 psig
- B. 495 psig
- C. 545 psig
- D. 560 psig

DISTRACTOR ANALYSIS:

- A. *Correct, The given S/G pressure of 950 psig requires the operator to use the target of 466°F as the step to determine the target says that if the ruptured S/G pressure is between the listed values, then use the lower value. From the steam tables, 466°F corresponds to 495 psia, which is approximately 480 psig.*
- B. *Incorrect, Plausible because the ruptured S/G pressure of 950 psig corresponds to a target of 466°F, which would give a saturation pressure of 495 psia. Failure to convert psia to psig will result in 495 psig appearing correct.*
- C. *Incorrect, Plausible if the applicant chooses the higher value (1000 psig) from the table rather than the correct, lower value (950 psig). 1000 psig gives a target temperature of 479°F which corresponds to a pressure of 560 psia, which is approximately 545 psig.*
- D. *Incorrect, Plausible if the applicant chooses the higher value (1000 psig) from the table rather than the correct, lower value (950 psig). 1000 psig gives a target temperature of 479°F which corresponds to a pressure of 560 psia. Failure to convert psia to psig will result in 545 psig appearing correct.*

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Question Number: 21

Tier: 1 **Group** 2

K/A: 037 AK1.01
Steam Generator (S/G) Tube Leak
Knowledge of the operational implications of the following concepts as they apply to Steam Generator Tube Leak:
Use of steam tables.

Importance Rating: 2.9* / 3.3

10 CFR Part 55: 41.8 / 41.10 / 45.3

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of how to use the steam tables to determine setpoint (steam dumps) used in the plant for a steam generator tube leak.

Technical Reference: AOI-33, Steam Generator Tube Leak, Revision 0034

Proposed references to be provided: Steam Tables

Learning Objective: 3-OT-AOI3300
06. Given the leaking SG's pressure, determine Target Incore Temperature for RCS depressurization.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question EOP0300 127 modified for the NRC 10/2011 exam.

Comments:

22. 051 AA2.02 122

Given the following:

- Main Turbine load is 660 MWe.
- Condenser vacuum is decreasing at 0.1 in-HgA/min due to air in-leakage.
- The crew has entered AOI-11, "Loss of Condenser Vacuum."
- Currently Condenser pressures are:

<u>Zone 'A'</u>	<u>Zone 'B'</u>	<u>Zone 'C'</u>
3.75 in-HgA	4.93 in-HgA	6.06 in-HgA

Which ONE of the following completes the statements below?

The turbine automatic 'low vacuum trip' (1) failed.

Zone (2) is currently at a condenser pressure that requires a plant trip.

REFERENCE PROVIDED

- | <u>(1)</u> | <u>(2)</u> |
|-------------------|------------|
| A. has | 'B' |
| B. has NOT | 'B' |
| C. has | 'C' |
| D. has NOT | 'C' |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the turbine 'Low Vacuum' trip automatic function is set above the values requiring a manual trip (which is not normally the way systems are set up) and the pressure in Zone 'B' being greater than the setpoint allowed is correct.*
- B. *Correct, The turbine automatic trip function has not failed. It is set to trip the turbine as the pressure rises somewhere between 6 and 12 in HgA in accordance with AOI-17, "Turbine Trip." the pressure in Zone 'B' is greater than the allowed pressure and with the load being 660 MWe the reactor power is greater than 50%, thus a reactor trip is required.*
- C. *Incorrect, Plausible because the turbine 'Low Vacuum' trip automatic function is set above the values requiring a manual trip (which is not normally the way systems are set up) and with the information removed from the provided reference identifying what the lines are representing is not recalled correctly, the wrong zone could be chosen.*
- D. *Incorrect, Plausible because the turbine 'Low Vacuum' trip automatic function not failing is correct (See A above.) and with the information removed from the provided reference identifying what the lines are representing is not recalled correctly, the wrong zone could be chosen.*

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Question Number: 22

Tier: 1 **Group** 2

K/A: 051 AA2.02
Loss of Condenser Vacuum
Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum:
Conditions requiring reactor and/or turbine trip.

Importance Rating: 43.5 / 45.13

10 CFR Part 55: 3.9 / 4.1

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the knowledge of the conditions where an automatic turbine trip will occur and the conditions that require a manual trip of the turbine/reactor to be initiated.

Technical Reference: AOI-17, Turbine Trip, Rev. 0048
AOI-11, Loss of Condenser Vacuum, Revision 0029

Proposed references to be provided: AOI-11, Appendix A, Condenser Vacuum ICS Graph (1 page with the Condenser Zone identifiers deleted)

Learning Objective: 3-OT-AOI1100
2. Identify Conditions that must be satisfied for Continuous Low-Load operation of the Turbo-Generator.
4. Describe the automatic Low-Vacuum Turbine Trip.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question written for the 10/2011 exam.

Comments:

23. 068 AA2.03 123

Given the following:

- Unit 1 was operating at 100% power when a Main Control Room evacuation was performed in accordance with AOI-30.2, "Fire Safe Shutdown," Series procedure C.69, "Fire Safe Shutdown Control Building."

Which ONE of the following completes the statements below with respect to Aux Control Room indications?

Tcold is determined using _____ (1) _____ installed instrumentation.

Thot is determined using _____ (2) _____ installed instrumentation.

(1)

(2)

- | | |
|--------------------|---------------------|
| A. RCS temperature | Incore Thermocouple |
| B. RCS temperature | RCS temperature |
| C. SG pressure | Incore Thermocouple |
| D✓ SG pressure | RCS temperature |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because while Thot instruments are available, RCS Tcold instruments are not available in the ACR and while using an alternate parameter is sometimes used (as in Tcold), Thot is not determined using Incore Thermocouple instruments. Incore thermocouple temperatures are not available in the ACR.*
- B. *Incorrect, Plausible because while Thot instruments are available, RCS Tcold instruments are not available in the ACR and using the installed RCS indicators to determine Thot is correct.*
- C. *Incorrect, Plausible because using associated loop SG pressure instrument to determine Tcold is correct but while using an alternate parameter is sometimes used (as in Tcold), Thot is not determined using Incore Thermocouple instruments. Incore thermocouple temperatures are not available in the ACR.*
- D. *Correct, As identified in Table 1 of the procedure, the Tcolds are determined using the Tsat scale on the associated SG pressure instrument and the Hot leg temperatures are determined using installed temperature indicators on each of the RCS loops.*

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Question Number: 23

Tier: 1 Group: 2

K/A: 068 AA2.03
Control Room Evacuation
Ability to determine and interpret the following as they apply to the Control Room Evacuation:
T-hot, T-cold, and in-core temperatures

Importance Rating: 4.0 / 4.2

10 CFR Part 55: 43.5 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to identify the instruments used following a control room evacuation to determine the status of Tcold and Thot.

Technical Reference: AOI-30.2, Fire Safe Shutdown, Revision 0031
AOI-30.2 C.69, Fire Safe Shutdown Control Building,
Revision 0005
Auxiliary Control Room pictures

Proposed references
to be provided: None

Learning Objective: 3-OT-AOI3000
12. Demonstrate Ability/knowledge of AOI-30.1 and 30.2
by:
a. Recognizing entry conditions
b. Responding to required actions of the AOI
c. Responding to contingencies (RNO)
d. Responding to Notes/Cautions

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question for the WBN 10/2011 NRC exam

Comments:

24. 074 EA1.06 124

Given the following:

- Following a LOCA the operating crew is performing FR-C.1, "Inadequate Core Cooling."
- Containment pressure peaked at 5.2 psid.
- Depressurizing the S/Gs to atmospheric pressure is ineffective in reducing incore T/C temperatures.
- All RCP support systems are available for RCPs 2 and 4.
- RCPs 1 and 3 have no ERCW supply for the motor coolers.
- S/G Narrow Range levels are:

<u>#1</u>	<u>#2</u>	<u>#3</u>	<u>#4</u>
40%	41%	32%	52%
- Core exit thermocouples have exceeded 1200°F.
- RCPs are to be started one at a time in an attempt to reduce core exit thermocouples below 1200°F.

Which ONE of the following identifies the RCPs that would be started in an attempt to reduce core exit thermocouple temperatures?

- A. RCP 4 ONLY
- B. ALL four of the RCPs
- C. RCPs 2 and 4 ONLY
- D. RCPs 1, 2, and 4 ONLY

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because RCP 4 has the highest steam generator level and its support system are available.*
- B. *Incorrect, Plausible because if the #3 steam generator levels had been greater than 39%, all four of the RCPs would be started, one at a time, until core exit temperatures were less than 1200°F even if the support systems are not available.*
- C. *Incorrect, Plausible because normally the RCPs are required to have their support systems available to allow the pump to be started.*
- D. *Correct, For loops with steam generator levels greater than 39%, FR-C.1 directs each of the RCPs to be started one at a time until core exit temperatures are less than 1200°F even if the support systems are not available. RCPs 1, 2, and 4 meet this criteria.*

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Question Number: 24

Tier: 1 **Group** 2

K/A: 074 EA1.06
Inadequate Core Cooling
Ability to operate and monitor the following as they apply to a Inadequate
Core Cooling:
RCPs

Importance Rating: 3.6 / 3.9

10 CFR Part 55: 41.7 / 45.5 / 45.6

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to analyze
conditions to determine which RCPs would be started during the
performance of the procedure for inadequate core cooling.

Technical Reference: FR-C.1, Inadequate Core Cooling, Revision 0016

**Proposed references
to be provided:** None

Learning Objective: 3-OTFRC0001
3. Given a set of plant conditions, use FR-C.1, C.2, and
C.3 to correctly diagnose and implement: Action
Steps, RNOs, Foldout Pages, Notes and Cautions

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question FRC0001 018 modified.

Comments:

25. W/E03 EK2.2 125

Given the following:

- A small break LOCA occurred on Unit 1.
- ES-1.2, "Post LOCA Cooldown and Depressurization," is in progress.
- RCS pressure is 1420 psig and one charging pump has been stopped.
- The crew is ready to stop the first SI pump.

Which ONE of the following completes the statements below?

When the SI pump is stopped, RCS subcooling will drop (1).

The minimum RCS subcooling value required to allow the second SI pump to be stopped is (2) than the value required for stopping the first pump.

- A. (1) and stabilize at a lower value due to an increase in RCS temperature with lower ECCS injection flow
(2) less
- B. (1) and stabilize at a lower value due to an increase in RCS temperature with lower ECCS injection flow
(2) greater
- C. (1) due to reduced ECCS injection flow and stabilize at a lower value when break flow equals ECCS injection flow.
(2) less
- D✓ (1) due to reduced ECCS injection flow and stabilize at a lower value when break flow equals ECCS injection flow.
(2) greater

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the total ECCS flow from the SI pumps will be decreased when the first SI pump is stopped but the RCS temperature rising is not the cause of RCS subcooling dropping. Also, the amount of subcooling required to stop the second SI pump does change, but more is required not less.*
- B. *Incorrect, Plausible because the total ECCS flow from the SI pumps will be decreased when the first SI pump is stopped but the RCS temperature rising is not the cause of RCS subcooling dropping. Also, the amount of subcooling required to stop the second SI pump being higher is correct.*
- C. *Incorrect, Plausible because the subcooling value will first drop due RCS pressure dropping because of a reduction in the ECCS injection flow when the SI pump is stopped, allowing the break flow to drop due to reduce RCS pressure. Also, the amount of subcooling required to stop the second SI pump does change, but more is required not less.*
- D. *Correct, The subcooling value will first drop due RCS pressure dropping because of a reduction in the ECCS injection flow when the SI pump is stopped. Then as the pressure in the RCS drops the break flow will drop. Eventually the RCS break flow and the ECCS injection flow will reach equilibrium at a lower pressure. The procedure does require a higher subcooling to stop the second pump.*

Question Number: 25

Tier: 1 **Group:** 2

K/A: W/E03 EK2.2
LOCA Cooldown and Depressurization
Knowledge of the interrelations between the (LOCA Cooldown and Depressurization) and the following:
Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Importance Rating: 3.7 / 4.0

10 CFR Part 55: 41.7 / 45.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the applicant to determine how RCS conditions including subcooling are affected due to stopping a pump supplying water used for heat removal during a post LOCA cooldown and depressurization event.

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Technical Reference: ES-1.2, Post LOCA Cooldown and Depressurization,
Revision 0015

**Proposed references
to be provided:** None

Learning Objective: 3-OT-EOP0100
18. Analyze and explain the process that leads to a new
RCS equilibrium pressure following the shutdown of
an ECCS pump during the ES-1.2 reduction
sequence

Cognitive Level:

Higher
Lower

 X

Question Source:

New
Modified Bank
Bank

 X

Question History: SQN bank question ES-1.2-B.2 009 with some wording
changes in the stem and choices but not enough to be a
modified question.

Comments:

26. W/E08 EK3.3 126

Following a Small Break LOCA, the crew is performing the actions contained in FR-P.1, "Pressurized Thermal Shock."

Which ONE of the following describes the reason for RCP restart in FR-P.1, "Pressurized Thermal Shock," if the SI termination criteria cannot be satisfied?

An RCP running...

- A✓ raises the RCS temperature entering the vessel downcomer.
- B. prevents vessel head voiding as the RCS pressure is dropped.
- C. restores pressurizer spray flow for reducing RCS pressure.
- D. reduces the minimum required subcooling to terminate SI.

DISTRACTOR ANALYSIS:

- A. *Correct, Starting an RCP results in mixing the warmer flow from the RCPs with the colder ECCS flow, creating a warmer combined flow entering the beltline region of the reactor vessel downcomer which can reduce the stress on the vessel.*
- B. *Incorrect, Plausible because with an RCP running there is less potential for reactor vessel head voiding.*
- C. *Incorrect, Plausible because an RCP does provide normal pressurizer sprays capability.*
- D. *Incorrect, Plausible because subcooling is involved in determining if RCP restart is required and the minimum subcooling value required to start the pump does change based on conditions.*

Question Number: 26

Tier: 1 Group 2

K/A: W/E08 EK3.3

Pressurized Thermal Shock

Knowledge of the reasons for the following responses as they apply to the (Pressurized Thermal Shock)

Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.

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Importance Rating: 3.7 / 3.8

10 CFR Part 55: 41.5 / 41.10, 45.6, 45.13

10CFR55.43.b: Not applicable

K/A Match: KA is matched because the question requires knowledge of the reasons controls may be manipulated to terminate ECCS flow under different conditions than normally required in the EOP network as allowed by the procedure when responding to a pressurized thermal shock.

Technical Reference: FR-P.1, Pressurized Thermal Shock, Revision 0015
WOG Background Document , FR-P.1 Background,
Revision 2

**Proposed references
to be provided:** None

Learning Objective: 3-OT-FRP0001
4. Justify the basis for using a less restrictive SI
termination criteria when performing FR-P.1.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: Beaver Valley bank question (2005 exam)

Comments:

27. W/E15 EG2.4.6 127

Given the following:

- A large break LOCA has occurred on Unit 1.
- The crew is performing E-1, "Loss of Reactor or Secondary Coolant," with the ECCS aligned for cold leg recirculation.
- The operating crew determines the criteria for entering FR-Z.2, "Containment Flooding," is met.

Which ONE of the following completes the statements below?

The implementation of FR-Z.2 is (1).

The procedure directs the sampling of the sump to (2).

- A. (1) required
(2) ensure shutdown margin is being maintained, since non-borated water has entered the containment sump
- B. (1) at the discretion of the crew.
(2) ensure shutdown margin is being maintained, since non-borated water has entered the containment sump
- C✓ (1) required
(2) to allow the TSC to determine if excess sump water can be transferred to tanks outside of containment
- D. (1) at the discretion of the crew
(2) to allow the TSC to determine if excess sump water can be transferred to tanks outside of containment

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the FR-Z.2 entry is due to an Orange Path condition which requires immediate entry into the procedure and if water level is high enough to meet entry conditions, then the source is from an unborated supply and SDM would be affected and a potential concern.*
- B. *Incorrect, Plausible because there is an FR-Z entry due to a Yellow Path condition which does allow crew discretion for entry into the procedure and if water level is high enough to meet entry conditions, then the source is from an unborated supply and SDM would be affected and a potential concern.*
- C. *Correct, FR-Z.2 is entered due to an Orange Path condition which requires immediate entry into the procedure and the sump is sampled to determine activity in order that the TSC can evaluate where to transfer the water for storage.*
- D. *Incorrect, Plausible because there is an FR-Z entry due to a Yellow Path condition which does allow crew discretion for entry into the procedure and sampling the sump to determine activity in order that the TSC can evaluate where to transfer the water for storage is correct.*

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Question Number: 27

Tier: 1 **Group** 2

K/A: W/E15 EG2.4.6
Containment Flooding
Emergency Procedures / Plan
Knowledge of EOP mitigation strategies.

Importance Rating: 3.7 / 4.7

10 CFR Part 55: 41.10 / 43.5 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the mitigation strategy for implementing FR-Z.2, Containment Flooding, and the strategy used in the procedure to allow determination of how to dispose/store the water when ready for transfer from containment.

Technical Reference: FR-0, Status Trees, Revision 0014
FR-Z.2, Containment Flooding, Revision 0007
WOG Emergency Procedure FR-Z.2 Background Document, Revision 2

Proposed references to be provided: None

Learning Objective: 3-OT-FRZ0001
12. List the three major action categories of FR-Z.2, Containment Flooding.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> </u>
Modified Bank	<u> X </u>
Bank	<u> </u>

Question History: WBN Bank question W/E15 EK1.2 027 modified.

Comments: W/E15 EK1.2 027 used on the WBN 5/2009 Exam

28. 003 G2.1.20 028

Given the following:

- Unit 1 is in Mode 5 preparing for an RCS heatup.
- RCP #2 is in service.
- RCP #4 has experienced the following start and run times as part of a maintenance PMT:
 - 1615 - started but stopped before it reached rated speed.
 - 1655 - started and then stopped after a 10 minute run.
 - 1740 - started and then stopped after a 10 minute run.
- The time is now 1800 and RCP #4 is ready to be placed in service.

Which ONE of the following identifies the earliest time the pump can be started and the breaker handswitch that will be used to start the RCP motor?

<u>Time</u>	<u>Handswitch</u>
A. 1820	1-HS-68-73AA, RCP 4 NORMAL BKR & LIFT PMP
B. 1820	1-HS-68-73BA, RCP 4 ALTERNATE BKR & XFER SELECTOR
C. 1850	1-HS-68-73AA, RCP 4 NORMAL BKR & LIFT PMP
D✓ 1850	1-HS-68-73BA, RCP 4 ALTERNATE BKR & XFER SELECTOR

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because 1820 would be the correct time if there had not been 3 starts within the past 2 hours as the minimum time the pump would have been required to be idle would be 30 minutes and while 1-HS-68-73AA, RCP 4 NORMAL BKR & LIFT PMP, is used with the stated conditions to start the lift pump, it is not used not to start the RCP motor. The normal breaker is the breaker that is closed while the unit is running during normal power operations.*
- B. *Incorrect, Plausible because 1820 would be the correct time if there had not been 3 starts within the past 2 hours as the minimum time the pump would have been required to be idle would be 30 minutes and because the pump being started from the Alternate Breaker handswitch is correct.*
- C. *Incorrect, Plausible because 1850 is the earliest time the RCP will be restarted because the RCP is to remain idle for at least 1 hour before a fourth start or attempted start is made and while 1-HS-68-73AA, RCP 4 NORMAL BKR & LIFT PMP, is used with the stated conditions to start the lift pump, it is not used to start the RCP motor. The normal breaker is the breaker that is closed while the unit is running during normal power operations.*
- D. *Correct, As identified in the precaution below, the pump should remain idle for at least 1 hour (which will be completed at 1850). While both of the handswitches are required to be used to place the RCP in service with the stated conditions, when the RCP motor is to be started the alternate breaker handswitch will be used because below 15% power, the station service supply from the unit has not been restored.*

SOI-68.02 PRECAUTIONS AND LIMITATIONS

E. RCP Maximum Starting Duty limits:

- 1. For Restart after any period running or attempted start where motor failed to achieve full speed before it is stopped: Motor must be idle at least 30 min before restart.
- 2. Consecutive Starts: In any 2 hr period: Maximum of 3 starts with minimum 30 min idle period before each restart. When 3 starts (or attempted starts) are made in 2 hrs, then a fourth start should NOT be made until motor is idle at least 1 hr.

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Question Number: 28

Tier: 2 **Group:** 1

K/A: 003 G2.1.20
Reactor Coolant Pump System (RCPS)
Conduct of Operations
Ability to interpret and execute procedure steps.

Importance Rating: 4.6 / 4.6

10 CFR Part 55: 41.10 / 43.5 / 45.12

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to interpret the procedure requirements when starting a RCP to return it to service after it has encountered previous starts.

Technical Reference: SOI-68.02, Reactor Coolant Pumps, Revision 0034

Proposed references to be provided: None

Learning Objective: 3-OT-SYS068B
12. Identify the RCPs' Normal and Alternate Power Supplies
15. Identify the RCP Motor Start Limits.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question SYS068B.15 004 modified

Comments:

29. 003 K6.02 929

Given the following:

- Unit 1 is operating at 100% power.
- Annunciator 95-C, RCP 1 STANDPIPE LEVEL HI/LO, alarms.

Which ONE of the following completes the statement below?

The operating crew will first attempt to clear the alarm by (1) the standpipe and if this action clears the alarm, the condition indicates a possible problem with the (2) seal on the RCP.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A✓ | filling | #3 |
| B. | filling | #2 |
| C. | draining | #3 |
| D. | draining | #2 |

DISTRACTOR ANALYSIS:

- A. *Correct, Corrective Action 1 of ARI-95-C directs the operator to attempt to clear the alarm by filling the standpipe. If the alarm clears during the fill process, the standpipe was losing level. A failure of the #3 seal would cause standpipe level to drop as identified in the ARI. See below.*
- B. *Incorrect, Plausible because the first part of the distractor to fill the standpipe is correct and the note before the step identifies the result of the fill might indicate a failure of the #2 seal if the alarm does not clear. A failure of the #2 seal would cause more flow to reach the standpipe causing a high level condition. Thus, filling the standpipe under these conditions would not allow the alarm to clear.*
- C. *Incorrect, Plausible because the level in the standpipe could be determined by draining the standpipe. If the level were high the alarm would clear during the drain evolution and if the level were low the alarm would not clear. Determining if the alarm will clear is key in identifying which seal has failed. Also plausible because the #3 seal being failed is correct.*
- D. *Incorrect, Plausible because the level in the standpipe could be determined by draining the standpipe. If the level were high the alarm would clear during the drain evolution and if the level were low the alarm would not clear. Determining if the alarm will clear is key in identifying which seal has failed. Also plausible because identifying the #2 seal being failed is determined by response to standpipe level change.*

ARI 95-C RCP 1 STANDPIPE LEVEL HI/LO

NOTES

1) If this annunciator resets during the performance of Corrective Action Step [1], the standpipe level was low. This indicates a possible #3 seal problem. If the annunciator remains illuminated after one to two minutes, the stand pipe level is high and a #1 or #2 seal failure may exist.

2) A high RCP Standpipe level in conjunction with reduced #1 seal leakoff flow and rising flow to the RCDT is indicative of a failed #2 seal.

Corrective Action

[1] **ATTEMPT** to clear alarm by performing the following:

- [1.1] **ENSURE** Primary Water Pump running **UNLESS** in the PWST BYPASS MODE.
- [1.2] **OPEN** 1-FCV-81-12 and -13, **AND OBSERVE** annunciator for reset.
- [1.3] **CLOSE** 1-FCV-81-12 and -13, promptly after alarm clears, when alarm re flashes (HI), when directed by another instruction, **OR** after twenty (20) seconds from start of fill.

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Question Number: 29

Tier: 2 **Group:** 1

K/A: 003 K6.02
Reactor Coolant Pump System (RCPS)
Knowledge of the effect of a loss or malfunction on the following will have
on the RCPS:
RCP seals and seal water supply

Importance Rating: 2.7 / 3.1

10 CFR Part 55: 41.7 / 45.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the how
an RCP seal malfunction affect the RCP standpipe and how the
determination is made on which seal is exhibiting trouble when
responding to a abnormal standpipe level alarm.

Technical Reference: ARI-95-101, Reactor Coolant Pumps, Revision 0033
AOI-24, RCP Malfunctions During Pump Operation,
Revision 0029

**Proposed references
to be provided:** None

Learning Objective: 3-OT-AOI2400
08. Explain why RCP Seal Standpipe Level Hi/Lo alarm
comes in on #3 Seal leak-off Hi flow.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question modified

Comments:

30. 004 A2.06 130

Given the following:

- Unit 1 is operating at 100% power after restart following a refueling outage.
- Rod Control in MANUAL.
- VCT level is currently at 32%.
- An AUO places an un-borated mixed bed demineralizer in service.

Which ONE of the following completes the statements below?

Assuming NO operator action is taken, the VCT level will ____ (1) ____.

In accordance with AOI-3, "Malfunction of Reactor Makeup Control," the first corrective action the RO will take that will stop the event in progress is to ____ (2) ____.

- A. (1) remain constant
(2) place 1-HS-62-79A, LTDN HI TEMP DIVERT, to 'V.C. TK'
- B. (1) remain constant
(2) initiate normal boration
- C✓ (1) rise over time
(2) place 1-HS-62-79A, LTDN HI TEMP DIVERT, to 'V.C. TK'
- D. (1) rise over time
(2) initiate normal boration

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because, unlike an inadvertent dilution due to makeup, no inventory is directly added to the VCT due to the unborated mixed bed and placing 1-HS-62-79A to the VCT position will divert letdown around the demin that is the source of the problem.*
- B. *Incorrect, Plausible because, unlike an inadvertent dilution due to makeup, no inventory is directly added to the VCT due to the unborated mixed bed and AOI-3, Malfunction of Reactor Makeup Control, does refer operators to AOI-34 to borate the RCS, however it will not stop the event in progress.*
- C. *Correct, the dilution event in progress does not add any inventory but it will increase Tavg which will cause pressurizer level to increase above setpoint, which will lower charging and place more coolant into the VCT. Also, placing 1-HS-62-79A to the VCT position will divert letdown around the demin that is the source of the problem.*
- D. *Incorrect, Plausible because the dilution event in progress does not add any inventory but it will increase Tavg which will cause pressurizer level to increase above setpoint, which will lower charging and place more coolant into the VCT. Also plausible because AOI-3, Malfunction of Reactor Makeup Control, does refer operators to AOI-34 to borate the RCS, however it will not stop the event in progress.*

Question Number: 30

Tier: 2 **Group:** 1

K/A: 004 A2.06
Chemical and Volume Control System
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.

Importance Rating: 4.2 / 4.3

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the operation of CVCS, i.e. how charging will respond as Tavg and pressurizer level change and that effect on VCT level and knowledge of how to stop an unborated mixed bed from diluting the RCS through

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K/A Match: K/A is matched because the question requires knowledge of the operation of CVCS, i.e. how charging will respond as Tavg and pressurizer level change and that effect on VCT level and knowledge of how to stop an unborated mixed bed from diluting the RCS through the CVCS.

Technical Reference: AOI-3, "Malfunction of Reactor Makeup Control," Rev. 0029

Proposed references to be provided: None

Learning Objective: 3-OT-AOI0300
04. List 3 ways Inadvertent Dilution could occur.
06. Explain the effect placing an unborated Mixed Bed Demin in service can have on RCS Boron Concentration.

Cognitive Level:

Higher	<u> X </u>
Lower	<u> </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question for the WBN 10/2011 NRC exam.

Comments:

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31. 004 A2.21 931

Given the following:

- Unit 1 is operating at 100% power.
- Annunciator 110-D, LTDN TO DEMINS TEMP HI, alarms.
- The OAC determines the indication on 1-TI-62-78, letdown temperature, has slowly increased from 120°F to 132°F and is stable.

Which ONE of the following completes the statements below?

The letdown temperature rise results in reactor power (1) .

The action required by the OAC is to (2) in accordance with the ARI.

Note: 1-HIC-62-78A - Letdown Heat Exch Outlet Temp Control

- A. (1) increasing
(2) ensure CVCS demineralizers bypassed and adjust 1-HIC-62-78A
- B. (1) decreasing
(2) ensure CVCS demineralizers bypassed and adjust 1-HIC-62-78A
- C. (1) increasing
(2) adjust 1-HIC-62-78A ONLY
- D✓ (1) decreasing
(2) adjust 1-HIC-62-78A ONLY

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible if the applicant does not recall the effect of a temperature rise on the resin's ability to exchange boron atoms. The second part is plausible, if the applicant believes that the temperature divert occurred at the alarm setpoint of 132°F.*
- B. *Incorrect, Plausible because as temperature is raised, the affinity of the resin for boron atoms decreases, resulting in a higher boron concentration in the system. The higher boron concentration leads to a reactor power decrease. The second part is plausible, if the applicant believes that the temperature divert occurred at 132°F.*
- C. *Incorrect, Plausible if the applicant does not recall the effect of a temperature rise on the resin's ability to exchange boron atoms. Plausible because the temperature did not rise to 137.5°F, the CVCS demineralizers were not bypassed. Recovery actions require that 1-HIC-62-78A be adjusted to return letdown temperature to 127°F.*
- D. *Correct, As temperature is raised, the affinity of the resin for boron atoms decreases, resulting in a higher boron concentration in the system. The higher boron concentration leads to a reactor power decrease. Since the temperature did not rise to 137.5°F, the CVCS demineralizers were not bypassed. Recovery actions require that 1-HIC-62-78A be adjusted to return letdown temperature to 127°F.*

Question Number: 31

Tier: 2 **Group:** 1

K/A: 004 A2.21
Chemical and Volume Control System
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:
Excessive letdown flow, pressure, and temperatures on ion exchange resins (also causes).

Importance Rating: 2.7 / 2.7

10 CFR Part 55: 41.5 / 43.5 / 45.3 / 45.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the impact of changing the temperature of the letdown on the ion

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K/A Match: K/A is matched because the question requires knowledge of the impact of changing the temperature of the letdown on the ion exchange ability of the demineralizer, and the recovery actions required to be taken to stabilize the plant.

Technical Reference: ARI-109-115, CVCS & RHR - RPS & ESF,
Revision 0018
AOI-3, Malfunction of Reactor Makeup Control,
Revision 0029

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS062
20. Discuss the function of the CVCS mixed bed and
cation bed demineralizers.
31. Given a set of plant parameters or indications
diagnose conditions and/or problems relative to the
CVCS.

Cognitive Level:

Higher
Lower

 X

Question Source:

New
Modified Bank
Bank

 X

Question History: WBN bank question SYS062A 011 modified. Used the correct answer and the best distractor for half of the question and added the first fill-in-the-blank to address the effect of the change in temperature.

Comments:

32. 005 A1.01 232

Given the following:

- Unit 1 is in Mode 5, midloop operation.
- RHR Train A in service at a flow rate of 2100 gpm.
- The RCS temperature is stable at 126°F.
- The operator throttles open 1-FCV-74-32, RHR HXS BYPASS.

Which ONE of the following completes the statement below?

As 1-FCV-74-32, RHR HXS BYPASS is throttled open, the RCS temperature will (1) and the RHR flow rate indicated on 1-M-6 will (2).

(1)

(2)

- | | |
|-------------|----------|
| A. decrease | increase |
| B. decrease | decrease |
| C✓ increase | increase |
| D. increase | decrease |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the typical thought process is when bypassing a heat exchanger less heat will be picked up allowing the temperature to drop and because of where the flow is measured the indicated flow rate increasing is correct.*
- B. *Incorrect, Plausible because the typical thought process is when bypassing a heat exchanger less heat will be picked up allowing the temperature to drop and because there is a flow element on the flow through the heat exchanger that would sense a lower flow but it is not the flow element that provides the indication on the control board.*
- C. *Correct, with the valve being opened further (until it is stopped by a restricting device placed on the valve during midloop operations), more flow to bypass the RHR HX. Less flow through the heat exchanger results in less cooling allowing RCS temperature to increase. Since total flow is measured downstream of where the HX Bypass connects to the HX discharge line (less overall system resistance), the flow indication will rise.*
- D. *Plausible because the RCS temperature increasing is correct and because there is a flow element on the flow through the heat exchanger that would sense a lower flow but it is not the flow element that provides the indication on the control board.*

Question Number: 32

Tier: 2 **Group** 1

K/A: 005 A1.01
Residual Heat Removal System
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including:
Heatup/cooldown rates

Importance Rating: 3.5 / 3.6

10 CFR Part 55: 41.5 / 45.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to predict and/or monitor changes in the RCS cooldown rate and RHR system flow rates associated with operating the RHRS controls,

Technical Reference: 1-47W810-1 R19
1-47W811-1 R55

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**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS074A
13. Explain how the RCS temperature is controlled using
the RHR System.
22. Explain the Normal RHR Cooldown mode by way of
a simplified drawing.

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank
Bank X

Question History: SQN bank question 005 A1.01 001 used on the SQN
4/2007 exam with changes in stem conditions and the
question statement and 2nd part of distractors B and D
changed. Not sufficient change to call bank modified.

Comments:

33. 006 K5.07 133

Given the following:

- Unit 1 was operating at 100% power when a reactor trip and SI with loss of offsite power occurred 20 minutes ago.
- Pressurizer pressure dropped to 1750 psig, then recovered five minutes later to 2235 psig.

Current conditions:

- Offsite power has been restored.
- Pressurizer level is currently at 68% and stable.
- RCS cold leg temperatures are 561°F and stable.
- RCS hot leg temperature is 590°F and slowly decreasing.
- RVLIS indicates 96%.
- All SGs are at 1125 psig and controlled by the SG PORVs.
- ES 1.1, "SI Termination," is being performed and is at the step for determining RCP status.

Which ONE of the following identifies the impact of the above conditions on RCP restart?

- A. RCP restart is **NOT** allowed; The resulting injection of cold water could result in reactor restart.
- B. RCP restart is **NOT** allowed; The resulting heat transfer from the steam generators could result in a pressure surge in the RCS.
- C. RCP restart is allowed only after an engineering analysis of the boration from ECCS injection during natural circulation operation.
- D✓ RCP restart is allowed; Natural circulation flow has been established and has removed the cold ECCS water from the cold legs.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because if natural circulation was not established the cold ECCS water would be stagnant in the Cold Legs resulting in a large mass of cold water being rapidly heated when the RCP was started which results in a positive reactivity addition. There is a Caution in SOI-68.02 that addresses the "Resumption of flow in that loop could flush unborated water to the core and cause a rapid change in shutdown margin", and this could result in a reactor restart, but it is not for the conditions in the question.*
- B. *Incorrect, Plausible because the cold ECCS water would be stagnant in the Cold Legs resulting in a large mass of cold water being sent into the core when the RCP was started which results in a pressure increase. There is a Caution in SOI-68.02 that addresses an "expected pressure transient inadvertently lifting a Pzr PORV" following dilution during the restart of an RCP, but it is not for the conditions in the question. Also a precaution in GO-6 stating "If all RCPs are stopped for greater than 5 minutes AND RCS temperature is greater than the charging and seal injection temperature, do **NOT** restart a pump UNTIL a Pzr steam bubble exists. This will minimize a pressure transient due to the previously injected cold water when the first RCP is started." Again different than conditions in the question.*
- C. *Incorrect, Plausible because of a Precaution in SOI-68.02 stating "Starting a RCP following a natural circulation cooldown during which boration of the RCS took place, can result in a rapid boron dilution of the reactor core. Reactor engineering staff should be consulted for analysis prior to RCP start." But from the conditions in the stem a cooldown has not been performed.*
- D. *Correct, the conditions indicate natural circulation is occurring which would have resulted in the cold ECCS flow being mixed with the warmer RCS water and moved from the cold legs through the reactor coolant system.*

Question Number: 33

Tier: 2 Group: 1

K/A: 006 K5.07
Emergency Core Cooling System
Knowledge of the operational implications of the following concepts as they apply to ECCS:
Expected temperature levels in various locations of the RCS due to various plant conditions

Importance Rating: 2.7 / 3.0

10 CFR Part 55: 41.5 / 45.7

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K/A Match: K/A is matched because the question requires knowledge of the operational implications of restarting an RCP following the injection of cold ECCS into the RCS while the RCS is at normal operating conditions during a loss of forced RCS flow.

Technical Reference: ES-1.1, SI Termination, Revision 0017
SOI-68.02, Reactor Coolant Pumps, Revision 0034
GO-6, Unit Shutdown From Hot Standby To Cold
Shutdown, Revision 0047

**Proposed references
to be provided:** None

Learning Objective: 3-OT-EOP0100
8. Given a set of plant conditions, use E-1, ES-1.1, ES-1.2, ES-1.3, and ES-1.4 to correctly diagnose and implement: Action Steps, RNOs, Foldout Pages, Notes, and Cautions.
3-OT-GO0600
4. State the precautions and operating requirements for the Reactor Coolant Pumps (RCPs) when performing a cooldown to Cold Shutdown per GO-6.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: Prairie Island 1 bank question 006 K507 in INPO bank

Comments:

34. 007 K5.02 034

The pressurizer (PZR) cold cal level is at 40% with a nitrogen blanket present.

Which ONE of the following choices completes the statement below?

When establishing a steam bubble, in accordance with GO-1, "Unit Startup From Cold Shutdown To Hot Standby," the pressurizer administrative maximum heat-up rate limit is (1) and the PORVs are closed and placed in P-AUTO when (2).

(1)

(2)

- | | | |
|-----|-------------------|--------------------------------------|
| A. | 75°F in one hour | Letdown flow exceeds charging flow |
| B.✓ | 75°F in one hour | PZR Liquid Temperature reaches 235°F |
| C. | 100°F in one hour | Letdown flow exceeds charging flow |
| D. | 100°F in one hour | PZR Liquid Temperature reaches 235°F |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because GO-1 identifies the administrative heatup rate is 75°F and there is a note prior to Step [10.18] in Section 5.2.1 stating "When letdown flow is ABOVE charging flow, and RCS pressure is either stable or slowly rising, a PZR steam bubble is forming." This would apply during bubble formation from solid water conditions which is different than the conditions in the question stem.*
- B. *Correct, GO-1(Rev 0070) Section 5.2.1 has a Caution prior to step [4] stating "Administrative PZR maximum heatup-rate is 75°F in 1 hour. 100°F in 1 hour shall NOT be exceeded. (TR 3.4.2)" and Step [8] states "When 1-TI-68-319, PZR LIQUID TEMP, reaches 230-240°F, then close PORVs, and place in P-AUTO.*
- C. *Incorrect, Plausible because 100°F is identified in the same Caution statement but it is the Tech Requirement limit not the administrative limit. Also there is a note prior to Step [10.18] in Section 5.2.1 stating "When letdown flow is ABOVE charging flow, and RCS pressure is either stable or slowly rising, a PZR steam bubble is forming." This would apply during bubble formation from solid water conditions which is different than the conditions in the question stem.*
- D. *Incorrect, Plausible because 100°F is identified in the same Caution statement but it is the Tech Requirement limit not the administrative limit. Also plausible because closing the PORVs if the temperature is 235°F is correct in accordance Step [8] which states "When 1-TI-68-319, PZR LIQUID TEMP, reaches 230-240°F, then close PORVs, and place in P-AUTO.*

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Question Number: 34

Tier: 2 **Group** 1

K/A: 007 K5.02
Pressurizer Relief Tank/Quench Tank System (PRTS)
Knowledge of the operational implications of the following concepts as they apply to PRTS:
Method of forming a steam bubble in the PZR

Importance Rating: 3.1 / 3.4

10 CFR Part 55: 41.5 / 45.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the changes in conditions (operational implications) due to forming a steam bubble in the pressurizer when starting with a nitrogen blanket in the pressurizer.

Technical Reference: GO-1, Unit Startup From Cold Shutdown to Hot Standby, Revision 0070

Proposed references to be provided: None

Learning Objective: 3-OT-GO0100
5. Describe the basic steps necessary to establish a steam bubble in the Pressurizer (PZR) with or without a Nitrogen blanket.

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank X
Bank

Question History: Question 007 K5.02 034 used on WBN 05/2009 exam modified by changing the first part of the question. The correct answer position relocated from C to B.

Comments:

35. 008 A3.02 135

Given the following:

- Unit 1 is at 100% power with Thermal Barrier Booster Pump (TBBP) 1B running.
- TBBP handswitches on 0-M-27 are aligned with:

1-HS-70-131A, THRM BAR BSTR PMP 1A (TBBP) is 'PULL A-P AUTO'.

1-HS-70-130A, THRM BAR BSTR PMP 1B (TBBP) is 'IN A AUTO'.

- Loss of Offsite Power occurs.

Which ONE of the following completes the statement below?

During the blackout relay sequencing to restore equipment, only the (1)
TBBP will start after a (2) second time delay.

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | 1A | 20 |
| B. | 1B | 20 |
| C✓ | 1A | 35 |
| D. | 1B | 35 |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the TBBP 1A handswitch alignment is in the Auto position to allow auto restart after a blackout and 20 seconds is the blackout timer for the ERCW pumps.*
- B. *Incorrect, Plausible because the CCS pump 1B-B handswitch alignment is in an Auto position but not the position required to allow auto restart after a blackout and 20 seconds is the blackout timer for the ERCW pumps.*
- C. *Correct, The normal alignment of the TBBPs is with the handswitches in A-P AUTO which allows the pumps to restart following a Blackout. With the TBBP 1B not in the A-P AUTO position, the pump cannot restart following the blackout. Only the TBBP 1A will restart and the blackout timer is set for 35 seconds.*
- D. *Incorrect, Plausible because the CCS pump 1B-B handswitch alignment is in an Auto position but not the position required to allow auto restart after a blackout and 20 seconds is the blackout timer for the ERECW pumps.*

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Question Number: 35

Tier: 2 Group 1

K/A: 008 A3.02
Component Cooling Water System (CCWS)
Ability to monitor automatic operation of the CCWS, including:
Operation of the CCW pumps, including interlocks and the CCW booster pump

Importance Rating: 3.2 / 3.2

10 CFR Part 55: 41.7 / 45.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to predict the TBBP(s) (which are the CCW booster pumps) that will be running following a change in plant conditions with a defined control switch alignment.

Technical Reference: SOI-70.01, Component Cooling Water (CCS) System,
Revision 0068
1-47W611-70-3 R4

Proposed references to be provided: None

Learning Objective: 3-OT-SYS070A
4. Explain the logic associated with each valve/pump control in the CCS.
8. Describe the thermal barrier system; include purpose, pump capacity, and logic.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN question SYS070A.19 004 modified.

Comments:

36. 010 A1.09 136

Given the following:

- Unit 1 is operating at 100% power.
- Abnormal RCS leakage has been detected.
- One of the pressurizer PORVs is suspected to have seat leakage.

Which ONE of the following completes the statements below?

Without any additional operator action, the operator could use the MCR indication for (1) to identify which PORV was leaking.

If the PORV is declared inoperable, the crew is required close the PORV Block valve within (2).

(1)

(2)

- | | |
|--|------------|
| A. TAILPIPE TEMPS on 1-M-4 | 1 hour |
| B. TAILPIPE TEMPS on 1-M-4 | 30 minutes |
| C. PZR VALVES ACOUSTIC MONITOR on 0-M-25 | 1 hour |
| D. PZR VALVES ACOUSTIC MONITOR on 0-M-25 | 30 minutes |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because there is a PORV tailpipe indication on 1-M-4 along with indications for each of the 3 safety valve tailpipe temperatures, but the PORV indicator is on the common tailpipe from both PORVs Tech Spec and allowing one hour to close the block valve is correct.*
- B. *Incorrect, Plausible because there is a PORV tailpipe indication on 1-M-4 along with indications for each of the 3 safety valve tailpipe temperatures, but the PORV indicator is on the common tailpipe from both PORVs and there are Tech Spec 3.4 actions required to be completed within 30 minutes (e.g. restore minimum temperature for criticality).*
- C. *Correct, there are flow indicating LEDs on the PZR Valves Acoustic Monitor for each PORV that will indicate which valve is leakage through and Tech Specs require the PORV Block valve to be closed within 1 hour.*
- D. *Incorrect, Plausible because the PZR Valves Acoustic Monitor which has LED indicating flow each of the PORVs is correct and there are Tech Spec 3.4 actions required to be completed within 30 minutes (e.g. restore minimum temperature for criticality).*

Question Number: 36

Tier: 2 **Group** 1

K/A: 010 A1.09
Pressurizer Pressure Control System (PZR PCS)
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including:
Tail pipe temperature and acoustic monitors

Importance Rating: 3.4 / 3.7

10 CFR Part 55: 41.5 / 45.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to monitor changes in parameters associated with PORV tailpipes and interpret the information to accurately determine which PORV is leaking.

Technical Reference: MCR photos
ARI-88-94, Reactor Coolant System, Revision 0022
Tech Spec LCO 3.4.11, Pressurizer Power Operated

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Technical Reference: MCR photos
ARI-88-94, Reactor Coolant System, Revision 0022
Tech Spec LCO 3.4.11, Pressurizer Power Operated
Relief Valves (PORVs)

**Proposed references
to be provided:** None

Learning Objective: 3-OT- SYS068K
3. Correctly locate control room controls and
indications associated with the Acoustic Monitoring
System, including:
a. alarm
b. panel
c. LED's
d. power switch
e. individual valve indications
f. tail pipe temperature indications

Cognitive Level:

Higher
Lower

 X

Question Source:

New
Modified Bank
Bank

 X

Question History: WBN bank question SYS068K.03 001 modified

Comments:

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37. 010 K6.04 237

Unit 1 is operating at 100% power when the following sequence of events occurs:

- Pressurizer Power Operated Relief Valve (PORV) 1-PCV-68-334 opens and fails to reseal when closed.
- Pressurizer PORV Block valve, 1-FCV-68-332, for PORV 334 cannot be closed.
- Pressurizer Relief Tank (PRT) pressure begins to slowly rise.
- The PRT pressure continues to rise until the PRT ruptures.

Which ONE of the following completes the statements below?

1-PCV-68-301, PRT VENT TO WDS VENT HDR, will automatically close when the PRT pressure reaches (1) psig.

When the PRT ruptures, the PORV tailpipe temperature will (2).

- | | <u>(1)</u> | <u>(2)</u> |
|-----|------------|-----------------------|
| A. | 6.5 psig | begin to drop |
| B. | 6.5 psig | rise at a faster rate |
| C.✓ | 8.0 psig | begin to drop |
| D. | 8.0 psig | rise at a faster rate |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because 6.5 psig is a correct value for the PRT PRESS HI annunciator to alarm and when the PRT rupture diaphragm blows the PORV tailpipe temperature starting to drop is correct.*
- B. *Incorrect, Plausible because 6.5 psig is a correct value for the PRT PRESS HI annunciator to alarm and because the leakage flow rate will rise when the PRT ruptures, the applicant may conclude that the temperature will start rising at a faster rate.*
- C. *Correct, 1-PCV-68-301 will automatically close when the PRT pressure reaches 8.0 psig and as demonstrated during the TMI event, when the PRT rupture diaphragm blows the PORV tailpipe temperature will start to drop.*
- D. *Incorrect, Plausible because 1-PCV-68-301 automatically closing when the PRT pressure reaches 8.0 psig is correct and because the leakage flow rate will rise when the PRT ruptures, the applicant may conclude that the temperature will start rising at a faster rate.*

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Question Number: 37

Tier: 2 Group 1

K/A: 010 K6.04
Pressurizer Pressure Control System
Knowledge of the effect of a loss or malfunction of the following will have
on the PZR PCS:
PRT

Importance Rating: 2.9 / 3.2

10 CFR Part 55: 41.7 / 45.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of PRT
conditions and how a loss of the PRT will affect indications in the
pressurizer pressure control system.

Technical Reference: ARI-88-94, Reactor Coolant System, Revision 0022
1-47W813-1, R43
Steam Tables

Proposed references
to be provided: None

Learning Objective: 3-OT-SYS068C
11. Describe the indication an operator has that a PORV
is open or leaking through.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> </u>
Modified Bank	<u> X </u>
Bank	<u> </u>

Question History: WBN bank question 010 K6.04 036 used on 05/2009
exam modified.

Comments:

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38. 012 K2.01 038

Which ONE of the following identifies the plant electrical boards that supply power to the listed components on Unit 1?

- | <u>SSPS Train B Reactor
Trip Breaker 48v UV coil</u> | <u>Reactor Trip Bypass Breaker A
(BYA) Control Power Circuit</u> |
|--|--|
| A✓ 120v AC Vital Instrument
Power Boards II and IV | 125V DC Vital Battery Board I |
| B. 120v AC Vital Instrument
Power Boards II and IV | 125V DC Vital Battery Board II |
| C. 120v AC Vital Instrument
Power Board II ONLY | 125V DC Vital Battery Board I |
| D. 120v AC Vital Instrument
Power Board II ONLY | 125V DC Vital Battery Board II |

DISTRACTOR ANALYSIS:

- A. *Correct, 120v AC Vital Instrument Power Boards II and IV supply the 48v Reactor Trip Undervoltage relay through an auctioneered circuit and the 125V DC Battery Board II is the control power to BYA.*
- B. *Incorrect, Plausible because the 120v AC Vital Instrument Power Boards II and IV supplying the 48v reactor Trip Undervoltage relay through an auctioneered circuit is correct and the 125V DC Battery Board II is the control circuit power supply Train B reactor trip breakers and BYA receives trip signal from Train B circuits.*
- C. *Incorrect, Plausible because the 120v AC Vital Instrument Power Boards II is the only power supply to other components in SSPS Train B (e.g. Slave relays) and the 125V DC Battery Board I is the control power supply to BYA.*
- D. *Incorrect, Plausible because the 120v AC Vital Instrument Power Boards II is the only power supply to other components in SSPS Train B (e.g. Slave relays) and the 125V DC Battery Board II is the control circuit power supply Train B reactor trip breakers and BYA receives trip signals from Train B SSPS Reactor Trip circuits.*

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Question Number: 38

Tier: 2 **Group** 1

K/A: 012 K2.01
Reactor Protection System
Knowledge of bus power supplies to the following:
RPS channels, components, and interconnections.

Importance Rating: 3.3 / 3.7

10 CFR Part 55: 41.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the knowledge of the bus power supplies to Reactor Protection System components

Technical Reference: 1-45W600-99-1 R7
N3-99-4003, Reactor Protection System, Revision 0021

Proposed references to be provided: None

Learning Objective: 3-OT-SYS099A
2. Sketch a basic drawing of the Solid State Protection System.

Cognitive Level:
Higher
Lower X

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam.

Comments:

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39. 013 K4.19 039

Given the following:

- Unit 1 has been shutdown for a refueling outage.
- GO-6, "Unit Shutdown from Hot Standby to Cold Shutdown," is in progress.
- The lowest RCS Tcold temperature and pressure trend is:

<u>Time</u>	<u>Temp</u>	<u>Pressure</u>
0500	349°F	395 psig
0530	337°F	380 psig
0600	324°F	345 psig
0630	302°F	340 psig
0700	280°F	340 psig
0730	257°F	340 psig
0800	235°F	340 psig
0830	214°F	340 psig
0900	199°F	330 psig
0930	185°F	330 psig

Which ONE of the following is the earliest of the identified times that one of the Centrifugal Charging Pumps is required to be tagged with its breaker racked down and the reason for the requirement?

<u>Time</u>	<u>Reason</u>
A. 0600	to be in compliance with TR 3.1.3 - Charging Pump, Shutdown.
B✓ 0600	to be in compliance with LCO 3.4.12 - Cold Overpressure Mitigation System.
C. 0900	to be in compliance with TR 3.1.3 - Charging Pump, Shutdown.
D. 0900	to be in compliance with LCO 3.4.12 - Cold Overpressure Mitigation System.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because 0600 is the correct time and because TR-3.1.3 does address having one Centrifugal Charging Pump but it is not to limit the number to one pump. It is to ensure there is at least one pump operable.*
- B. *Correct, One of the Centrifugal Charging Pumps is required to be made inoperable and tagged with a Hold Order prior to the lowest Tcold dropping below 325°F (which happens at 0600) and the reason is to be in compliance with the COMs Tech Spec in order to prevent over-pressurizing the RCS.*
- C. *Incorrect, Plausible because there is a four hour allowance to make the pump inoperable after entering Mode 4 and the four hour window does expire at 0900; but the 4 hours is only applicable if the lowest Tcold is maintained at 325°F or higher. Also plausible because TR-3.1.3 does address having one Centrifugal Charging Pump but it is not to limit the number to one pump. It is to ensure there is at least one pump operable.*
- D. *Incorrect, Plausible because there is a four hour allowance to make the pump inoperable after entering Mode 4 and the four hour window does expire at 0900; but the 4 hours is only applicable if the lowest Tcold is maintained at 325°F or higher. Also plausible because the reason being to comply with the COMs Tech Spec in order to prevent over-pressurizing the RCS is correct.*

Question Number: 39

Tier: 2 **Group:** 1

K/A: 013 K4.19
Engineered Safety Features Actuation System (ESFAS)
Knowledge of ESFAS design feature(s) and/or interlock(s) which provide
for the following:
Reason for opening breaker on high-head injection pump

Importance Rating: 3.0* / 3.4*

10 CFR Part 55: 41.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the why one high head injection pump is required to have its breaker open and placed in a non-operating position.

Technical Reference: GO-6, Unit Shutdown From Hot Standby To Cold
Shutdown, Revision 0047

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Technical Reference: GO-6, Unit Shutdown From Hot Standby To Cold
Shutdown, Revision 0047
Tech Spec LCO 3.4.12, Cold Overpressure Mitigation
System, Amendment 55
Tech Requirement TR-3.1.3, Charging Pump,
Shutdown, Revision 38

**Proposed references
to be provided:** None

Learning Objective: 3-OT-GO0600
3. Discuss the major steps for taking the unit from Hot
Standby to Cold Shutdown per GO-6.

Cognitive Level:

Higher	<u> X </u>
Lower	<u> </u>

Question Source:

New	<u> </u>
Modified Bank	<u> X </u>
Bank	<u> </u>

Question History: WBN bank question GO0600.03 012 modified for the
WBN 10/2011 NRC exam.

Comments:

40. 022 K4.05 240

Given the following:

- Unit 1 was operating at 100% power when a design basis LOCA occurred.

Which ONE of the following identifies system(s) directly providing Containment Cooling during the first minute following the Phase B containment isolation?

- A✓ Containment Spray only
- B. Air Return Fans and Ice Condenser
- C. Containment Ventilation System and Ice Condenser
- D. Air Return Fans and Containment Spray

DISTRACTOR ANALYSIS:

- A. *Correct, of the systems identified in the choices, only the Containment Spray will be providing containment cooling during the first minute after a Phase B isolation resulting from a design basis LOCA. Containment Spray starts at the Phase B setpoint of 2.8 psid and spray RWST water into the upper containment.*
- B. *Incorrect, Plausible because the Air Return Fans do provide cooling during a design basis LOCA by forcing air recirculation between upper and lower containment, but they do not start until 9 minutes after the accident but the ice condensers do supply cooling within the first minute.*
- C. *Incorrect, Plausible because while the containment ventilation systems do cool the containment during normal operations, they are tripped during a design basis LOCA and because the Ice Condenser providing cooling during the first minute is correct.*
- D. *Incorrect, Plausible because while the Air Return Fans do provide cooling during a design basis LOCA by forcing air recirculation between upper and lower containment, they do not start until 9 minutes after the accident and the Containment Spray does cool the containment during the first minute following a Phase B isolation during a design basis LOCA.*

Question Number: 40

Tier: 2 Group: 1

K/A: 022 K4.05
Containment Cooling System (CCS)
Knowledge of CCS design feature(s) and/or interlock(s) which provide for

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K/A: 022 K4.05
Containment Cooling System (CCS)
Knowledge of CCS design feature(s) and/or interlock(s) which provide for
the following:
Containment cooling after LOCA destroys ventilation ducts

Importance Rating: 2.6* / 2.7

10 CFR Part 55: 41.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because a design basis LOCA could damage the
ventilation duct work in lower containment and the question requires
knowledge of the design features (systems) that would provide
containment cooling immediately following the accident initiation.

Technical Reference: N3-30RB-4002, Reactor Building Ventilation System,
Revision 0022
N3-61-4001, Ice Condenser System, Revision 0018
WBN FSAR Amendment 8

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS061A
1. State the design basis of the Ice Condenser System
in accordance with FSAR section 6.7.
2. State the function of the Ice Condenser System in
accordance with the system description.
3-OT-SYS072A
01. Explain the design basis of the Containment Spray
System in accordance with FSAR section 6.2.2.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> </u>
Modified Bank	<u> X </u>
Bank	<u> </u>

Question History: Surry bank question used on the 2003 exam modified
for use on WBN 10/2011 exam.

Comments:

41. 025 A4.01 041

Given the following:

- Unit 1 is operating at 100% power when a LOCA occurs.
- A Safety Injection has been actuated.
- Containment pressure is 1.1 psig and slowly rising.

Which ONE of the following identifies the expected position of 1-FCV-61-110, GLYCOL COOLED FLOOR RETURN HEADER ISOL?

- A. ☒ CLOSED due to a containment isolation signal.
- B. ☐ CLOSED due to an Auxiliary Building isolation signal.
- C. ☐ OPEN unless the containment pressure rises to Hi-Hi setpoint.
- D. ☐ OPEN unless Glycol Storage Tank level reaches Lo-Lo setpoint.

DISTRACTOR ANALYSIS:

- A. *Correct because the valve should be closed due to the safety injection signal actuating a Phase A containment isolation which automatically closes the valve.*
- B. *Incorrect, Plausible because an isolation signal generated from the safety injection signal did close the valve but it is the containment isolation not the Auxiliary Building isolation (both of which are generated when a safety Injection occurs) and the most of the glycol system is located in the Aux Building.*
- C. *Incorrect, Plausible because as the containment pressure continues to rise a Phase B isolation will occur at 2.8 psig. This signal closes other valves. Also plausible because the current containment pressure is below the HI containment pressure setpoint (1.5 psig).*
- D. *Incorrect, Plausible because there are valves that automatically close when the Glycol Expansion tank reaches a Lo-Lo level. (e.g. 1-FCV-61-193B).*

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Question Number: 41

Tier: 2 **Group** 1

K/A: 025 A4.01
Ice Condenser System
Ability to manually operate and/or monitor in the control room:
Ice condenser isolation valves

Importance Rating: 3.0* / 2.7*

10 CFR Part 55: 41.7 / 45.5 to 45.8

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to determine the expected position of a valve in the ice condenser glycol flow path during off-normal plant conditions.

Technical Reference: 1-47W611-63-1 R13
1-47W611-61-2 R6
1-47W611-88-1 R24
1-47w611-30-6 R13

Proposed references to be provided: None

Learning Objective: 3-OT-SYS061A
16. Describe the logic for the glycol containment isolation valves.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10-2011 NRC exam

Comments:

42. 026 A1.06 342

Which ONE of the following is required to automatically start the Containment Spray Pump 1A-A room cooler?

- A. Containment Spray Pump 1A-A running ONLY.
- B. Room temperature increases to 95°F ONLY.
- C✓ Either Containment Spray Pump 1A-A running OR room temperature increases to 95°F.
- D. Room temperature increases to 95°F ONLY if the Containment Spray pump running.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the cooler does start when pump starts but also starts when room temp increases to 95°F.*
- B. *Incorrect, Plausible because the cooler does start when room temp increases to 95°F, but also starts on pump start.*
- C. *Correct, Logic for auto start of the containment spray pump room cooler is the pump starting or the room temperature increasing to 95°F.*
- D. *Incorrect, Plausible because the start of the pump and the temperature are starting conditions for the room cooler but it is either, not both. The logic is 'OR' not 'AND'.*

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Question Number: 42

Tier: 2 **Group** 1

K/A: 026 A1.06
Containment Spray System (CSS)
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including:
Containment spray pump cooling

Importance Rating: 2.7 / 3.0

10 CFR Part 55: 41.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to predict the changes in Containment Spray Pump cooling associated with operating the CSS system and controls.

Technical Reference: 1-45W760-72-1 R13
1-45W760-30-19 R9

Proposed references to be provided: None

Learning Objective: 3-OT-SYS072A
06. Describe the auto start signals for the Containment Spray Pump room coolers.

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank
Bank X

Question History: SQN bank question with the correct answer relocated.

Comments:

43. 026 A4.05 043

Given the following:

- Containment spray pumps are running after automatically starting during a LOCA.
- Containment pressure has dropped and the procedure directs the pumps be stopped.

Which ONE of the following identifies the minimum signals required to be reset to allow the Containment Spray pumps to remain off when their control switches are returned to 'A AUTO' after the pumps are stopped?

- A✓ Containment Spray, only
- B. Phase B and Containment Spray, only
- C. Safety Injection and Containment Spray, only
- D. Safety Injection, Phase B and Containment Spray

DISTRACTOR ANALYSIS:

- A. *Correct, In accordance with the references, the minimum actions required to stop Containment Spray pumps and place them in AUTO is to reset the Containment Spray signal.*
- B. *Incorrect, Plausible because the Phase B is a signal required to be reset once it has been actuated and it would be actuated with the conditions in the question, however, only the Containment Spray signal is required to be reset to allow the spray pumps to be removed.*
- C. *Incorrect, Plausible because Safety Injection is a signal required to be reset once it has been actuated and it would be actuated with the conditions in the question, however, only the Containment Spray signal is required to be reset to allow the spray pumps to be removed.*
- D. *Incorrect, Plausible because Safety Injection and Phase B are signals that are required to be reset once they have been actuated and both would be actuated with the conditions in the question, however only the Containment Spray signal is required to be reset to allow the spray pumps to be removed.*

Question Number: 43

Tier: 2 Group 1

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K/A: 026 A4.05
Containment Spray System (CSS)
Ability to manually operate and/or monitor in the control room:
Containment spray reset switches

Importance Rating: 3.5 / 3.5

10 CFR Part 55: 41.7 / 45.5 to 45.8

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to operate the switches required to allow the containment spray pumps to be stopped and placed in AUTO after starting due to a accident signal.

Technical Reference: 1-47W611-72-1 R8
1-47W611-88-1 R24
E-1, Loss of Reactor or Secondary Coolant,
Revision 0016

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS072A
05. Describe the Containment Spray Pumps, include
power supply, logic, capacity and type.
16. Given a set of plant conditions, determine the correct
response of the Containment Spray System.

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank
Bank X

Question History: Turkey point question 026 A4.05 9 (used on a Turkey
Point Audit exam) in 2008 changed to make applicable
to WBN but not significantly modified.

Comments:

44. 039 K5.08 244

Given the following:

- At EOL, a reactor startup is in progress following a 6-day outage.
- The Reactor Engineer has provided an ECP which predicts the reactor going critical at 120 steps on Control Bank D.

Which ONE of the following completes the statements below?

____ (1) ____ will result in the critical rod height being HIGHER than the value predicted by the ECP.

____ (2) ____ is the maximum allowed tolerance between the ECP and the actual critical position before the insertion of all control banks is required.

- A. (1) An inadvertent drop in steam pressure of 50 psig
(2) 1000 pcm
- B. (1) A closure of all MSIVs
(2) 1000 pcm
- C. (1) An inadvertent drop in steam pressure of 50 psig
(2) 750 pcm
- D. ✓ (1) A closure of all MSIVs
(2) 750 pcm

DISTRACTOR ANALYSIS:

- A. *Incorrect, A drop in pressure resulting from the failure of 1-PIC-1-33 causes a drop in RCS temperature. The drop in RCS temperature results in a positive reactivity addition. This causes critical rod height to be lower than the ECP. Plausible if the effect of the controller malfunction is not properly determined and 100 PCM limit is used in the same procedure step as determining the maximum allowed tolerance but it is for Mode 2 entry determination.*
- B. *Incorrect, Plausible because the closure of all MSIVs is correct and 100 PCM limit is used in the same procedure step as determining the maximum allowed tolerance but it is for Mode 2 entry determination.*
- C. *Incorrect, A drop in pressure resulting from the failure of 1-PIC-1-33 causes a drop in RCS temperature. The drop in RCS temperature results in a positive reactivity addition. This causes critical rod height to be lower than the ECP. Plausible if the effect of the controller malfunction is not properly determined and the 750 PCM limit is correct for the maximum tolerance.*
- D. *Correct, The closure of the MSIVs results in an increase in steam pressure, and causes the SG PORVs to lift. This results in an increase in RCS temperature, which results in a negative reactivity addition. This causes critical rod height to be HIGHER than the ECP. The maximum deviation tolerance allowed between the ECP and the actual critical position is 750 PCM.*

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Question Number: 44

Tier: 2 Group 1

K/A: 039 K5.08
Main and Reheat Steam System (MRSS)
Knowledge of the operational implications of the following concepts
as they apply to the MRSS:
Effect of steam removal on reactivity

Importance Rating: 3.6 / 3.6

10 CFR Part 55: 41.5 / 45.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the knowledge of how
changing steam flow (e.g. SG PORVs vs Steam Dump setpoints)
affects Tavg and how that change in Tavg affects reactivity.

Technical Reference: GO-2, Reactor Startup, Revision 0039
3-OT-GO0200, Revision 7

Proposed references
to be provided: None

Learning Objective: 3-OT-GO0200
8. Given conditions indicative of an erroneous Estimated
Critical Position (ECP) calculation during the initial
pull to critical, describe what steps should be taken by
the operator and why.
3-OT-SIP1100
2. Describe the six variables which affect the Estimated
Critical Condition.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: WBN Bank question 039 K5.08 044

Comments:

45. 059 A3.03 045

Given the following:

- Unit 1 is operating at 550 MWe.
- Operators have placed the second main feed pump in service.
- Annunciator 49-E, MN/STBY FWP SUCTION NPSH LO, alarms.
- The operating crew determines Main Feed Pump Suction pressure to be 120 psig.

Which ONE of the following identifies the action required by the Annunciator Response Instruction?

- A. If suction pressure cannot be restored to greater than 250 psig, a turbine trip is required.
- B✓ Suction pressure is low and needs to be raised but currently is above the minimum required.
- C. Unless suction pressure is restored to greater than 250 psig, a trip of one MFP is required.
- D. Unless suction pressure is restored to greater than annunciator 49-E setpoint, a trip of both MFPs is required.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because 250 psig is the minimum required MFP suction pressure for loads greater than 600 MWe. If both MFPs were required to be tripped, a turbine trip would be required.*
- B. *Correct, the minimum suction pressure for the MFPs is 100 psig when operating at less than 600 MWe and 250 psig when operating at greater than 600 MWe. With the unit at 550 MWe the pressure is above the minimum required pressure but as evidenced by the alarm, it is lower than normal and needs to be increased.*
- C. *Incorrect, Plausible because if the load had been greater than 600 MWe and suction pressure could not be maintained above 250 psig, a trip of one of the MFP would be required by the ARI.*
- D. *Incorrect, Plausible because both of the main feed water pumps would be required to be tripped if the required minimum suction pressure could not be maintained but this alarm is a differential pressure not the actual suction pressure to the MFPs.*

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Question Number: 45

Tier: 2 **Group** 1

K/A: 059 A3.03
Main Feedwater (MFW) System
Ability to monitor automatic operation of the MFW, including:
Feedwater pump suction flow pressure

Importance Rating: 2.5 / 2.6

10 CFR Part 55: 41.7 / 45.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the knowledge of the response to an alarm associated with low MFP suction pressure.

Technical Reference: SOI-2&3.01, Condensate And Feedwater System,
Revision 0112
ARI-43-49, CNDS & Condenser, Revision 0013

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS003A
14. Evaluate precautions and limitations necessary for
operation of the Feedwater System per SOI-2 &
3.01, "CONDENSATE AND FEEDWATER
SYSTEM".

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10-2011 NRC exam

Comments:

46. 061 A3.04 346

Given the following:

- Unit 1 was at 100% power with the TD AFW pump unavailable.
- S/G #2 experiences a steam line break inside containment.
- S/G #2 conditions are as follows:
 - Level is currently 12% WR.
 - Pressure is 80 psig and decreasing.
- No operator action has been taken on the AFW system.

Which ONE of the following completes the statement below?

____(1)____ will have been automatically closed to prevent ____ (2) ____.

*Note: 1-LCV-3-156 is MD AFW PUMP 1A-A SG 2 LEVEL CONTROL
1-LCV-3-156A is SG 2 AUX FEEDWATER 1-LCV-3-156 BYPASS*

- A✓ (1) 1-LCV-3-156 ONLY
(2) Cavitation damage to the valve
- B. (1) 1-LCV-3-156 ONLY
(2) AFW pump runout
- C. (1) Both 1-LCV-3-156 and 1-LCV-3-156A
(2) Cavitation damage to the valves
- D. (1) Both 1-LCV-3-156 and 1-LCV-3-156A
(2) AFW pump runout

DISTRACTOR ANALYSIS:

- A. *Correct, Only 1-LCV-3-156 automatically closes at 500 psig decreasing pressure to protect the MD AFW LCV from cavitation.*
- B. *Incorrect, Plausible because only 1-LCV-3-156 automatically closing at 500 psig decreasing pressure is correct and there is protection for the AFW pump from runout but this protection is provided by a PCV on the pump discharge, not the LCV.*
- C. *Incorrect, Plausible because 1-LCV-3-156 does automatically close on lowering pressure and there are conditions that will close both the main and bypass valves in the feedwater system (e.g. high level in the steam generator as well as feedwater isolation automatically closes both valves in the main feedwater system.) and the prevention of valve cavitation is the reason for the closing in the question.*
- D. *Incorrect, Plausible because 1-LCV-3-156 does automatically close on lowering pressure and there are conditions that will close both the main and bypass valves in the feedwater system (e.g. high level in the steam generator as well as feedwater isolation automatically closes both valves in the main feedwater system.) There is protection for the AFW pump from runout but this protection is provided by a PCV on the pump discharge , not the LCV.*

3.3.3 MDP Pressure Control Valves (PCVs)

A. A 4" PCV in the discharge of each MDP throttles closed to create sufficient backpressure to prevent pump run-out when SG pressures are low (during cooldown or for a faulted SG). This avoids potential for pump cavitation damage. The PCV throttles closed in response to lowered differential pressure (DP) across the pump. It continues to close until a predetermined pump DP, corresponding to an acceptable operating point on the pump curve is achieved. The PCV will control flow to less than 700 gpm. The value used for MSLB analysis assumed failure of this controller.

B. The PCVs are safety-grade air operated valves (AOVs) and have trained air supplies (Ref. 7.2.2). The train A MDP's PCV is supplied by train A air, and the train B pump's PCV is supplied by train B air. Remote manual controls for these valves are in the ACR, which duplicates the MCR functions. Transfer switches are provided to shift control of these valves from the MCR to the ACR to provide electrical isolation of the MCR upon evacuation of the MCR.

3.3.4 MDP Level Control Valves (LCVs)

A. The 4" LCVs are AOVs powered by separate trains of ACA (see Ref. 7.2.2) and 1E dc power. These valves are normally closed (energized solenoid) which begin to modulate (de-energized solenoid) to automatically control SG level by regulating MDP flow whenever the associated MDP is operating. These valves close when their associated downstream pressure switches (PS) sense feedwater header pressure less than their setpoint which is intended to prevent cavitation damage to the LCV.

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Question Number: 46

Tier: 2 **Group** 1

K/A: 061 A3.04
Auxiliary / Emergency Feedwater (AFW) System
Ability to monitor automatic operation of the AFW, including:
Automatic AFW isolation.

Importance Rating: 4.1 / 4.2

10 CFR Part 55: 41.7 / 45.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the knowledge of the automatic setpoints which would isolate portions of the AFW system from the steam generators.

Technical Reference: N3-3B-4002, Auxiliary Feedwater System, Rev. 0016
SOI-3.02, Auxiliary Feedwater, Revision 0049

Proposed references to be provided: None

Learning Objective: 3-OT-SYS003B
22. Identify the initiating signals that swap the Motor Driven Pumps LCV's from normal to the bypass LCV.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10-2011 NRC exam

Comments:

47. 061 K4.02 047

Given the following:

- Unit 1 is operating at 4% power.
- Main Feed Pump 'B' is in service.
- Main Feed Pump 'A' is **NOT** reset.
- All Steam Generator levels are at 38% NR.

Which ONE of the following identifies the status of the AFW Pumps immediately after Main Feedwater Pump 'B' trips?

- A. Only the TDAFW pump has automatically started.
- B. Only the MDAFW pumps have automatically started.
- C✓ Both the MDAFW pumps and TDAFW Pump have automatically started.
- D. Neither the MDAFW pumps nor TDAFW Pump have automatically started.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because there is a condition (blackout) where only the TD AFW pump would be automatically started immediately.*
- B. *Incorrect, Plausible because there is a condition (level low in only one steam generator) where only the MD AFW pump would be automatically started immediately.*
- C. *Correct, When the MFPT 1B trips, the control circuit will see both MFPTs as tripped due to MFPT 1A not being reset. Both MFPTs tripped is a condition that will start both MD AFW pumps and the TD AFW pump.*
- D. *Incorrect, Plausible because none of the AFW pumps would have been started if MFPT 1A had been reset when MFPT 1B tripped and because the steam generator levels are above the level required to start any AFW pump.*

Question Number: 47

Tier: 2 Group 1

K/A: 061 K4.02
Auxiliary / Emergency Feedwater (AFW) System

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K/A: 061 K4.02
Auxiliary / Emergency Feedwater (AFW) System
Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following:
AFW automatic start upon loss of MFW pump, S/G level, blackout, or safety injection

Importance Rating: 4.5 / 4.6

10 CFR Part 55: 41.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of AFW design features and/or interlocks which provide for starting the AFW pumps upon loss of MFW pump.

Technical Reference: 1-47W611-3-1 R12
1-47W611-3-3 R12
1-47W611-3-4 R18
SOI-3.02, Auxiliary Feedwater System, Revision 0049

Proposed references to be provided: None

Learning Objective: 3-OT-SYS003B
10. Identify the A-Auto start signals of the Motor-Driven AFW pumps.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: Robinson bank question 000054AA1.02 (used on Robinson 2008 exam) modified to make applicable to WBN.

Comments:

48. 062 A2.01 148

Given the following:

- Unit 1 is operating at 60% power.
- 480V Shutdown Board 1A2-A de-energizes due to an internal fault.
- The crew enters AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards."

Which ONE of the following completes the statement below?

The loss of the board results in (1) and the condition can be mitigated by (2) in accordance with AOI-43.01.

- A. (1) increasing Main Turbine Oil temperature
(2) placing 1-TIC-24-69, MTOT TEMP TEMP CONTROL, in MAN and opening the TCV
- B✓ (1) the loss of most radiation monitor rate meters in the MCR
(2) transferring Instrument Power Rack A to ALTERNATE
- C. (1) a turbine trip due to Stator Cooling Water temperature increasing
(2) transferring Instrument Power Rack A to ALTERNATE
- D. (1) increasing Generator Hydrogen temperature
(2) placing 1-TIC-24-48, GENERATOR H2 TEMP CONTROL, in MAN and opening the TCV

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because of loss of the main turbine oil temperature control would result if the 480V Shutdown Board 1B2-B had been lost resulting in a loss of Instrument Power Rack B instead of loss of the Instrument Power Rack A. Placing the controller to manual would have allowed the operator to manually control the oil temperature.*
- B. *Correct, the loss of the board will result in a loss of power to the Instrument Power Rack A which will result in a loss of power for most of the radiation monitor rate meters in the main control room and the power can be restored by transferring the rack power to alternate which allows the rate meters to then be reset.*
- C. *Incorrect, Plausible because the Stator Cooling water temperature control loop is supplied from the Instrument Power Rack A but its loss does not result in a loss of cooling for the system. However, a 480V Shutdown Board 1B2-B resulting in a loss of hydrogen cooling will cause the Stator Cooling Water system to heatup causing an automatic turbine trip unless the Rack B is swapped to alternate or manual control of Hydrogen temperature is established.*
- D. *Incorrect, Plausible because of loss of the generator hydrogen temperature control would result if the 480V Shutdown Board 1B2-B had been lost resulting in a loss of Instrument Power Rack B instead of loss of the Instrument Power Rack A. Placing the controller to manual would have allowed the operator to manually control the generator hydrogen temperature.*

Question Number: 48

Tier: 2 **Group:** 1

K/A: 062 A2.01
AC Electrical Distribution System
Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:
Types of loads that, if de-energized, would degrade or hinder plant operation.

Importance Rating: 3.4 / 3.9

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

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of secondary side loads that are affected by the loss of a 480V

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K/A Match: K/A is matched because the question requires knowledge of secondary side loads that are affected by the loss of a 480V shutdown board and the actions required to mitigate the consequence of the affect.

Technical Reference: AOI-43.01, Loss of Unit 1 Train A Shutdown Board,
Revision 0009
1-45W700-1 R31 1-45W600-35-1 R12
1-45W600-35-2 R11 1-45W600-35-4 R11
1-45W1646-3 R18 1-45W1646-4 R23
1-45W600-47-6 R6

Proposed references to be provided: None

Learning Objective: 3-OT-AOI4300
2. Analyze alarms and indications for loss of a 6.9kV Shutdown Board, and evaluate their importance to system operation per AOI.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

49. 063 G2.1.25 049

Given the following:

- Unit 1 is operating at 100% power.
- A battery discharge test is in progress on 125v DC Battery IV and the 125v DC Battery Board V is connected to the 125v DC Battery Board IV.
- 0-SI-0-3, "Weekly Log," is being performed.

Using 0-SI-0-3, Appendix A, which ONE of the following identifies the status of the 125v DC Battery Board IV and the 120v AC Vital Inverter 2-IV?

REFERENCE PROVIDED

	<u>125v DC Battery Board IV</u>	<u>Vital Inverter 2-IV</u>
A.	Operable	Inoperable
B.	Operable	Operable
C✓	Inoperable	Inoperable
D.	Inoperable	Operable

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the 125V DC Battery Board IV can remain operable when connected to 125v DC Vital Battery Board V and there is a charger on the board. However, charger V is not a qualified charger. Also, because the inverter being inoperable due to not having a DC power supply is correct.*
- B. *Incorrect, Plausible because the 125V DC Battery Board IV can remain operable when connected to 125v DC Vital Battery Board V and there is a charger on the board. However, charger V is not a qualified charger. Also, because the inverter is in service, has an available supply from Bat Bd IV. The applicant must understand the meaning of available and if misapplied then the inverter could be determined to be operable in error.*
- C. *Correct, When the 125V DC Battery V is being used to supply one of the 125v DC Vital Battery Boards, the 125V DC Battery Charger V must be disconnected from the 125v DC Battery Board V and a spare charger aligned to the Battery Board being supplied. Also, for the inverter to be operable it must be aligned to a DC power supply. The completed charts show that the 125V DC Battery Charger V remains connected with no spare charger connected and that the inverter is not aligned to a DC supply.*
- D. *Incorrect, Plausible because the 125V DC Battery Board IV being inoperable is correct due to the charger alignments and because the inverter is in service, has a power supply (connected to the Instrument Power Board) and has an available supply from Bat Bd IV. The applicant must understand the meaning of available and if misapplied then the inverter could be determined to be operable in error.*

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Question Number: 49

Tier: 2 **Group:** 1

K/A: 063 G2.1.25
D.C. Electrical Distribution
Conduct of Operations
Ability to interpret reference materials, such as graphs, curves, tables, etc.

Importance Rating: 3.9 / 4.2

10 CFR Part 55: 41.10 / 43.5 / 45.12

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires ability to extract information from completed tables in a surveillance procedure to determine the status of the D.C. Electrical Distribution system and the 120v AC vital system it supports.

Technical Reference: 0-SI-0-3, Weekly Log, Revision 0045
Tech Spec 3.8.7, Inverters-Operating
1-45W700-1 R31

Proposed references to be provided: 0-SI-0-3, Weekly Log, Appendix A , Rev 0042 pages 9 and 10 with Notes removed from page 10

Learning Objective: 3-OT-SYS057P
11. State the 125V DC Vital system parameters governed by TS

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

50. 063 K3.02 050

Given the following

- Unit 1 was operating at 100% power when a safety injection occurred.
- Eighteen (18) seconds after Safety Injection, a loss of 125v Vital DC Power Channel II occurs.

Which ONE of the following identifies the current status of RHR pump 1B-B?

- A. RHR pump 1B-B is **NOT** running but can be started from the MCR handswitch.
- B. RHR pump 1B-B is **NOT** running and can **NOT** be started from the MCR handswitch.
- C. RHR pump 1B-B is running and can be stopped from the MCR handswitch.
- D✓ RHR pump 1B-B is running but can **NOT** be stopped from the MCR handswitch.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible if the time delays associated with the pump starting with a blackout present are used. The delay times would exceed the 18 seconds (DG Start and RHR blackout time delay relay) and there are 3 other Vital DC boards available to supply the control power. One of which does supply the breaker but it is a manual transfer, not an automatic transfer.*
- B. *Incorrect, Plausible since RHR pump 1A-A cannot be started or stopped from the control room handswitch after the loss of 125v DC Vital channel II and because if a blackout signal had been concurrent with the SI condition, then the DG start time and pump start delay time would have exceeded the time prior to the loss of the control power.*
- C. *Incorrect, Plausible because the pump being running is correct and there are 3 other channels of 125v DC available that could have been determined to be the control power supply for the pump's breaker.*
- D. *Correct, RHR pump 1A-A would have started immediately when the Safety injection was initiated but after the 125v DC Channel II power was lost, the pump could not be stopped from its handswitch in the main control room.*

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Tier: 2 Group 1

K/A: 063 K3.02
D.C. Electrical Distribution
Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following:
Components using DC control power

Importance Rating: 3.5 / 3.7

10 CFR Part 55: 41.7 / 45.6

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the applicant to know a major breaker supplied with control power from 125v DC Vital Channel II and how a loss of the power supply to the control power affects the ability to start and stop the component.

Technical Reference: AOI-21.02, Loss of DC Vital Battery Bd II, Revision 0021
1-45W724-2 R24
1-45W760-74-1 R12

Proposed references to be provided: None

Learning Objective: 3-OT-SYS057A
8. Identify the failure position (open, closed, or 'as is') of a 6.9kv or 480v Shutdown Board breaker upon loss of control power to that board.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: Surry bank question 063 K3.02 used during 10-2009.
Modified for use at WBN. Changes in the stem made a different answer correct.

Comments:

51. 064 K3.01 151

Given the following:

- Unit 1 is operating at 100% power with DG 1A-A connected to the shutdown board during performance of the monthly surveillance instruction.
- CCP 1A-A is in service.
- 1 phase of the 50 overcurrent relay acutates on Shutdown Board 1A-A Emergency Feeder Breaker 1912.
- 1 second later Offsite power is lost.

Which ONE of the following identifies how the RHR pump 1A-A and CCP 1A-A are affected?

- A. The CCP will continue to run and the RHR pump will not be started.
- B. The CCP will be tripped and neither pump will sequenced on by blackout relays.
- C. Both the CCP and the RHR pump will be sequenced on by blackout relays.
- ☒ D. Only the CCP will be sequenced on by blackout relays.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the 50 relay is not a lockout relay and the breaker is allowed to reclose automatically following the lost of offsite power. If concluded no lock out means the breaker could close prior to the offsite power loss, the CCP would not trip and with no accident present the RHR pump will not be started.*
- B. *Incorrect, Plausible because the CCP being tripped is correct but neither pump being sequenced back on is not correct. Plausible to conclude that the 50 relay would not only trip the board but lockout the DG as many electrical protection relays do perform the lock out function.*
- C. *Incorrect, Plausible because if an accident had been present both of the pumps would have been sequenced on by blackout relays when the diesel generator restores the voltage and load sequencing was being performed.*
- D. *Correct, After the instantaneous overcurrent relay (50) trips and offsite power is lost, a loss of voltage to the board occurs which results in the DG start and blackout sequence initiation. After 1.5 seconds with the DG already running the DG reconnects to the board and blackout loads begin sequencing on. Since no accident is present, the CCP will be started and the RHR pump will not be started.*

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Question Number: 51

Tier: 2 Group 2

K/A: 064 K3.01
Emergency Diesel Generator (ED/G) System
Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following:
Systems controlled by automatic loader

Importance Rating: 3.8 / 4.1

10 CFR Part 55: 41.7 / 45.6

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the questions requires knowledge of how a diesel generator failure will affect load that have been connected during a blackout sequence as well as loads waiting on timers to allow the load to be sequenced on to a shutdown board.

Technical Reference: 1-45W724-1 R25
1-45W760-74-1 R12

Proposed references to be provided: None

Learning Objective: 3-OT-SYS201A
1. Identify the 7 plant 6.9kV Bds & buses and describe each:
e. Protection on the supplies and feeders for each Bd.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: WBN Bank question

Comments:

52. 073 K1.01 152

Given the following:

- Annunciator 186A, MCR INTAKE 0-RM-90-125/126 RAD HI, alarms.
- Both 0-RM-90-125, "MCR INTAKE" and 0-RM-90-126, "MCR INTAKE" have the RED light LIT on 0-M-12.

Which ONE of the following completes the statement below?

The MCR is maintained at a positive pressure by the _____ (1) _____ and if 0-RM-90-206A, MCR EMERG INTAKE, subsequently detects high radiation, the outside air supply will _____ (2) _____ to the alternate source.

- A. (1) Main Control Room Air Handling Units
(2) automatically realign
- B. (1) Main Control Room Air Handling Units
(2) require manual action to realign
- C. (1) Control Building Emergency Air Pressurization Fans
(2) automatically be realigned
- D✓ (1) Control Building Emergency Air Pressurization Fans
(2) require manual action to realign

DISTRACTOR ANALYSIS:

- A. *Plausible because a positive pressure is maintained during normal plant operations by the MCR Air Handling Units. Also plausible because there are automatic alignment changes made by control room radiation monitors*
- B. *Incorrect, Plausible because a positive pressure is maintained during normal plant operations by the MCR Air Handling Units and if radiation is subsequently detected by the MCR EMERG INTAKE monitor, the procedure directs a manual transfer to the alternate source if determined to be needed.*
- C. *Incorrect, Plausible because the Control Building Emergency Air Pressurization Fans do maintain the positive pressure in the MCR to minimize outside contaminants from entering the MCR. Also plausible because there are automatic alignment changes made by control room radiation monitors.*
- D. *Correct, RM-90-125 and 126 initiate a CRI. A CRI isolates the ductwork from the Control Building Air Pressurization Fans and starts the Control Building Emergency Air Pressurization Fans. A positive pressure is maintained to minimize outside contaminants from entering the MCR. If radiation is subsequently detected by the MCR EMERG INTAKE monitor, the procedure directs a manual transfer to the alternate source if determined to be needed.*

Question Number: 52

Tier: 2 **Group** 1

K/A: 073 K1.01
Process Radiation Monitoring (PRM) System
Knowledge of the physical connections and/or cause-effect relationships
between the PRM system and the following systems:
Those systems served by PRMs

Importance Rating: 3.6 / 3.9

10 CFR Part 55: 41.2 to 41.9 / 45.7 to 45.8

10CFR55.43.b: Not applicable

K/A Match: This question matches the K/A by having the candidate determine the cause-effect of Rad Monitors 0-RM-90-125 & 126 and the Control Room Ventilation system.

Technical Reference: 1-47W611-31-1 R23
SOI-31.01, Control Building HVAC System, Rev. 0051
N3-30CB-4002, Control Building Heating, Ventilation, Air

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Technical Reference: 1-47W611-31-1 R23
SOI-31.01, Control Building HVAC System, Rev. 0051
N3-30CB-4002, Control Building Heating, Ventilation, Air
Conditioning, and Air Cleanup System, Revision 16
SOI-30.05, Auxiliary Bldg HVAC Systems, Revision
0051

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS031A
3. Describe the ventilation flow path provided by the
control building ventilation system during normal and
emergency operation.

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank
Bank X

Question History: SQN bank question CB Vent-B.4.G #1 used on the SQN
SEPT 2010 NRC exam. Made wording changes in the
stem, relocated the correct answer and changed one
distractor. Modification is not significant.

Comments:

53. 076 A4.01 153

Given the following:

- Unit 1 is operating at 100% power.
- ERCW pump handswitch status:
 - A-A is in P-T-L
 - B-A is in A-AUTO and pump stopped.
 - C-A is in A-AUTO and pump running.
 - D-A is in A-AUTO and pump stopped.
 - Emergency Power Selector Switches are positioned to B-A and C-A, respectively.
- A loss of offsite power occurs.

Which ONE of the following completes the statements below?

Prior to the loss of the offsite power, Tech Spec LCO 3.7.8 Essential Raw Cooling Water (ERCW) System (1) met.

After the blackout sequence relays complete restoration of loads on the Shutdown Boards, 0-PI-67-18A, A ERCW SUP HDR PRESS, will indicate (2) before the loss of offsite power.

- | | <u>(1)</u> | <u>(2)</u> |
|----|----------------|-------------|
| A. | was | same as |
| B✓ | was | higher than |
| C. | was NOT | same as |
| D. | was NOT | higher than |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the required alignment meets the LCO prior to the loss of offsite power. The requirement is for that either the A-A pump or the B-A pump to be operable. The B-A pump, while not in service, will start on a blackout or a Safety injection signal. ect, the alignment met the LCO prior to the loss of offsite power, so no entry was required. The requirement is for that either the A-A pump or the B-A pump to be operable. The B-A pump, while not in service, will start on a blackout or a Safety injection signal. However the same Train loads will exist after the loss of offsite power and additional pump will be started, resulting in a flow change.*
- B. *Correct, prior to the loss of the offsite power, Tech Spec LCO 3.7.8 Essential Raw Cooling Water (ERCW) System was met. the LCO requires 2 trains but only one pump running on a train is sufficient, provided another pump on the opposite unit same train shutdown board is operable. After the SI signal there would be 2 pumps running. One pump on each of the Train A Shutdown Boards supplying the same loads; so the pressure indication will be elevated*
- C. *Incorrect, Plausible because there is only 1 pump is service in the initial setup of the question and the LCO requirement is for 2 pumps to be operational on a train which can be mistaken as required to be in service and if the pump controls alignment or initial pump status was different the pressure would be the same*
- D. *Incorrect, Plausible because there is only 1 pump is service in the initial setup of the question and with an additional pump running after the blackout the pressure indication will be elevated.*

Question Number: 53

Tier: 2 **Group** 1

K/A: 076 A4.01
Service Water System (SWS)
Ability to manually operate and/or monitor in the control room:
SWS pumps

Importance Rating: 2.9 / 2.9

10 CFR Part 55: 41.7 / 45.5 to 45.8

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to identify how the ERCW pump parameters would be expected to change following restart during a blackout condition (monitoring) and the affect the event would have on the ERCW pressure (monitoring) after the board was restored.

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Technical Reference: Tech Spec 3.7.8, Essential Raw Cooling Water
(ERCW), Amendment 69 and the associated
Bases
1-47W611-67-1 R11

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS067A
13. Given a loss of power, determine the correct
response of the ERCW System including:
b. ERCW Pumps.
24. Regarding Technical Specifications and Technical
Requirements for this system:
c. Given a status set of plant conditions, apply the
appropriate Technical Specifications and
Technical Requirements.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

54. 078 K2.02 154

Given the following:

- Unit 1 is in Mode 3 following a reactor trip when a loss of off-site power occurs.
- All Diesel Generators start and restore the shutdown boards.

Which ONE of the following completes the statements below?

As control air pressure drops, Control and Station Air Compressor 'A'
____ (1) _____ as needed automatically.

The compressor is supplied from ____ (2) _____.

- A. (1) will start and load
(2) 480V SD Bd 1A2-A
- B. (1) will start and load
(2) 480V SD Bd 2A2-A
- C✓ (1) must be manually started but will load
(2) 480V SD Bd 1A2-A
- D. (1) must be manually started but will load
(2) 480V SD Bd 2A2-A

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the compressor will load/unload as needed automatically after it is manually started and the power supply being from a Unit 1 480V board is correct.*
- B. *Incorrect, Plausible because the compressor will load/unload as needed automatically after it is manually started and the Auxiliary Air Compressor A-A is supplied from a Unit 2 480V board.*
- C. *Correct, The Control and Service Air Compressor A is one of the two compressors that can be restarted following a Blackout but it must be started manually and the compressor is supplied from the 480V Shutdown Board 1A-2A.*
- D. *Incorrect, Plausible because the compressor start being manual is correct and the Auxiliary Air Compressor A-A is supplied from a Unit 2 480V board.*

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Tier: 2 Group 1

K/A: 078 K2.02
Instrument Air System
Knowledge of bus power supplies to the following:
Emergency air compressor

Importance Rating: 3.3* / 3.5*

10 CFR Part 55: 41.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the applicant to have knowledge of the bus power supplies to the auxiliary(emergency) air compressors.

Technical Reference: SOI-32.01, Control Air System, Revision 0051
AOI-10, Loss of Control Air, Revision 0040
AOI-35, Loss of Offsite Power, Revision 0038

Proposed references
to be provided: None

Learning Objective: 3-OT-SYS032A
9. Explain how the sequencing device operates to control the control air compressors in "Hand" and "Auto".
3-OT-AOI3500
2. Given a list of symptoms, Identify Event, determine Automatic Actions and Operator Actions required per AOI-35.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: WBN bank question 078 K2.02 054

Comments:

55. 103 K1.03 055

Which ONE of the following identifies ventilation systems that exhaust out a Shield Building Exhaust Vent?

- A. EGTS Cleanup Fans and Annulus Vacuum Control Fans
- B✓ EGTS Cleanup Fans and Containment Purge Exhaust Fans
- C. Fuel Handling Exhaust Fans and Annulus Vacuum Control Fans
- D. Fuel Handling Exhaust Fans and Containment Purge Exhaust Fans

DISTRACTOR ANALYSIS:

- A. *Incorrect, EGTS Fans can exhaust out the Shield Building Exhaust Vents but Annulus Vacuum Control Fans exhaust out the Auxiliary Building Vent. Plausible because the EGTS Fans exhausting out the Shield Building Exhaust Vents is correct and the annulus vacuum fans perform the same function of maintaining differential pressure between the containment and the annulus, only they run during normal operation and are isolated when the EGTS cleanup fans start.*
- B. *Correct, the EGTS Fans and Containment Purge Exhaust Fans can exhaust out the Shield Building Exhaust Vents. The Containment Purge Exhaust Fans only exhaust through the Shield Building Exhaust Vent for the applicable unit. The EGTS Fans discharge to a Shield Building Exhaust Vent or recirculation back to the containment annulus depending on differential pressure.*
- C. *Incorrect, Both the Fuel Handling Exhaust Fans and Annulus Vacuum Control Fans exhaust out the Auxiliary Building Vent. Plausible because the Fuel Handling Exhaust Fans are moving air that has the potential to have radioactivity and the annulus vacuum fans perform the same function of maintaining differential pressure between the containment and the annulus, only they run during normal operation and are isolated when the EGTS cleanup fans start.*
- D. *Incorrect, Fuel Handling Exhaust Fans exhaust out the Auxiliary Building Vent (not the shield building vent) but Containment Purge Exhaust Fans do exhaust out the Shield Building Exhaust Vents. Plausible because the Fuel Handling Exhaust Fans are moving air that has the potential to have radioactivity and the Containment Purge Exhaust Fans exhausting out the Shield Building Exhaust Vents is correct.*

Question Number: 55

Tier: 2 Group 1

K/A: 103 K1.03
Containment System

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K/A: 103 K1.03
Containment System
Knowledge of the physical connections and/or cause effect relationships
between the containment system and the following systems:
Shield building vent system

Importance Rating: 3.1* / 3.5*

10 CFR Part 55: 41.2 to 41.9 / 45.7 to 45.8

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the
which stacks provide the flow release path for various ventilation
systems including the identification of containment ventilation
systems that exhaust out the shield building vent

Technical Reference: 1-47W866-1 R59
1-47W866-10 R33
1-47W866-11 R27

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS065A
4. Describe the Annulus Vacuum System Flowpath per
1-47W866-1.
5. Describe how the EGTS and Annulus Vacuum
Systems maintain annulus pressure.

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank
Bank X

Question History: SQN bank question 103 K1.03 055 used on the SQN
1/2009 RETAKE exam.

Comments: SQN question written new for the retake exam

56. 001 K2.01 056

Given the following:

- 480v Emergency Common Transformer is out of service.

Which ONE of the following describes the effect on the Control Rod Drive MG Sets if 6900v Unit Board 1C is de-energized by relay operation?

- A. Both MG sets lose power to the motor.
- ☒ B. Neither MG set loses power to the motor.
- C. Only "A" MG set loses power to the motor.
- D. Only "B" MG set loses power to the motor.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible if the applicant does not recall how the loss of the Unit Board power supplies affects the operation of the MG sets or misapplies the interaction between MG set motor breaker tripping due to board undervoltage resulting in the MG set generator breaker tripping and concludes the both M-G sets would be tripped.*
- B. *Correct, Plausible because while the 480v Unit Boards that supply the MG sets are powered from the Unit 1 6.9 kV Unit Boards, neither is supplied from the 6.9kV Boards 1C. The 480v Unit Boards supplying the M-G sets 1A and 1B are supplied from the 6.9kv Unit Boards 1A and 1D, respectively.*
- C. *Incorrect, Plausible because M-G Set 1A would lose power if the 6.9kV Board 1A were to trip.*
- D. *Incorrect, Plausible because M-G Set 1B would lose power if the 6.9kV Board 1D were to trip.*

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Question Number: 56

Tier: 2 **Group:** 2

K/A: 001 K2.01
Control Rod Drive System
Knowledge of bus power supplies to the following:
One line diagram of power supply to the M/G sets.

Importance Rating: 3.5 / 3.6

10 CFR Part 55: 41.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the one line diagram of the power supply to the M/G Sets from the 6.9kv Unit Board to the 480v MG set motors.

Technical Reference: 1-15E500-1,R35
SOI-85.01 ATT 1P, Control Rod Drive and Indication
System Power Checklist 85.01P, Revision 0040

Proposed references to be provided: None

Learning Objective: 3-OT-SYS085A
2. Identify the power supply to the MG Sets.

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank X
Bank

Question History: SQN bank question used on the SQN 1/2008 Audit exam with stem changed to make a different answer correct

Comments:

57. 015 A1.08 057

Given the following:

- Unit 1 is operating at 80% steady state power with all controls in automatic.

Which ONE of the choices below completes the following sentence?

Assuming no operator action, RCS temperature will INCREASE if the
____ (1) ____ fails ____ (2) ____.

(1)

(2)

- | | |
|---|------|
| A. N43 Power Range <u>lower</u> detector | HIGH |
| B. N43 Power Range <u>upper</u> detector | LOW |
| C. Rod control auctioneered high nuclear power signal | HIGH |
| D. Rod control auctioneered high nuclear power signal | LOW |

DISTRACTOR ANALYSIS:

- A. *Incorrect, N41 PR lower detector failing high causes sum of N41 upper and lower detectors to fail high. This is the input into the rod control power mismatch circuit and, since the auctioneered high signal (N41) is greater than turbine power, control rods move in, causing RCS temperature to go down. Plausible because power range detectors are input to the control program and failures can cause RCS temperature changes.*
- B. *Incorrect, N41 PR upper detector failing low causes sum of N41 upper and lower detectors to decrease. One of the remaining PR detector outputs N42-N44 is already or becomes the auctioneered high signal, (i.e. there is no change to the auctioneered high signal) and control rods do not move, so no change to RCS temperature. Plausible because power range detectors are input to the control program and failures can cause RCS temperature changes.*
- C. *Incorrect, This would cause the RCS temperature to decrease because rods would insert as a result of the failure. Plausible because a failure of the 'auctioneered signal' will cause RCS temperature to increase but it would be a failure in the opposite direction.*
- D. *Correct, The auctioneered high nuclear power signal failing low causes control rods to move out and RCS temperature to go up. This is because the Tav_g would appear to be lower than T_{ref}.*

Question Number: 57

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Tier: 2 Group 2

K/A: 015 A1.08
Nuclear Instrumentation
Ability to predict and/or monitor changes in parameters to prevent
exceeding design limits) associated with operating the NIS controls
including:
Changes in RCS temperature.

Importance Rating: 3.3 / 3.4

10 CFR Part 55: 41.5 / 45.5

10CFR55.43.b: Not applicable

K/A Match: Question requires applicant to predict the effect of a failure of NIS or
associated components on RCS temperature.

Technical Reference: WBN-SDD-N3-85-4003, Control Rod Drive System,
Revision 0013

Proposed references
to be provided: None

Learning Objective: 3-OT-SYS085A
7. Describe the effects of normal control rod motion on
RCS T_{avg} .
10. Identify and explain the input channels to the
automatic rod control system.
11. Explain how the rod control inputs serve to position
the control rods on a given change in any one.

Cognitive Level:

Higher	
Lower	<u>X</u>

Question Source:

New	
Modified Bank	
Bank	<u>X</u>

Question History: WBN bank question 015 A1.08 058 used on 2006 exam
with minor formatting changes.

Comments:

58. 016 A3.02 158

Given the following:

- Unit 1 is operating at 100% power with all controls in automatic.
- 1-XS-68-339E, PZR LEVEL CONTROL CHANNEL SELECT, is selected to the LI-68-339/B320 position.
- A small leak develops on the upper tap fitting for Pressurizer level transmitter 1-LT-68-339.

Which ONE of the following completes the statement below?

1-LI-68-339 indication will start ____ (1) ____ and the actual pressurizer level will ____ (2) ____.

(1)

(2)

- | | | |
|----|----------|-----------------|
| A. | rising | remain constant |
| B✓ | rising | be dropping |
| C. | dropping | remain constant |
| D. | dropping | be dropping |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the leak causing 1-LI-68-339 to start rising is correct and if 1-XS-68-339E, PZR LEVEL CONTROL CHANNEL SELECT, been in the LI-68-335/B320 position the pressurizer level would have remained constant. Also the indicated level would be dropping if the leak had been on the opposite sensing tap.*
- B. *Correct, The leak will cause 1-LI-68-339 to start rising and since 1-LI-68-339 is selected for control, the pressurizer level control system will throttle the level control valve in the closed direction causing the actual pressurizer level to start dropping.*
- C. *Incorrect, Plausible because the leak causes the ΔP to start dropping but a dropping DP causes indicated level to start rising (this concept could be reversed, in error, by the applicant). If 1-XS-68-339E, PZR LEVEL CONTROL CHANNEL SELECT, been in the LI-68-335/B320 position the pressurizer level would have remained constant. Also, the indicated level would be dropping if the leak had been on the opposite sensing tap.*
- D. *Incorrect, Plausible because the leak causes the ΔP to start dropping but a dropping ΔP causes indicated level to start rising (this concept could be reversed by the applicant) and with 1-XS-68-339E, PZR LEVEL CONTROL CHANNEL SELECT, in the LI-68-339/B320 position, 1-LI-68-339 is selected for control. The pressurizer level control system will be throttling the level control valve in the closed direction causing the actual pressurizer level to start dropping.*

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Question Number: 58

Tier: 2 **Group** 2

K/A: 016 A3.02
Non-Nuclear Instrumentation System (NNIS)
Ability to monitor automatic operation of the NNIS, including:
Relationship between meter readings and actual parameter value

Importance Rating: 2.9* / 2.9*

10 CFR Part 55: 41.7 / 45.5

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to determine the relationship between actual pressurizer level and an indicated level when a malfunction occurred on the system.

Technical Reference: AOI-20, Malfunction of Pressurizer Level Control System, Revision 0032

Proposed references to be provided: None

Learning Objective: 3-OT-SYS068C
12. Identify the program setpoints, and describe any automatic actions relative to the pressurizer level program.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: WBN bank question SYS068C.08 014 with editorial changes in the stem and changes to parts of 2 distractors.

Comments:

59. 028 K5.04 059

Given the following:

- Unit 1 was operating at 100% power when a small break LOCA resulted in a reactor trip and safety injection.
- The crew is now performing E-1, "Loss of Reactor or Secondary Coolant," and is determining if the Hydrogen Recombiners are to be placed in service.
- Containment Hydrogen analyzers 1-H2I-43-200 and 1-H2I-43-210 indicate 0.5%.

Assuming conditions do not change, which ONE of the following identifies the hydrogen mitigation systems that will be in service when E-1 is completed?

- A✓ ONLY the hydrogen igniters
- B. ONLY the hydrogen recombiners
- C. BOTH the hydrogen igniters and the hydrogen recombiners
- D. NEITHER the hydrogen igniters nor the hydrogen recombiners

DISTRACTOR ANALYSIS:

- A. *Correct, The hydrogen igniters would have been placed in service during the performance of E-0 Appendix A and the recombiners would not be placed in service because the hydrogen concentration is below the minimum value of 0.6% required for placing them in service.*
- B. *Incorrect, Plausible because the hydrogen recombiners are placed in service during performance of E-1, but only if the hydrogen concentration greater than 0.6% and lower than 5.0%. The current value of 0.5% could be misapplied to the operation of the recombiners and igniters.*
- C. *Incorrect, Plausible because both the recombiners and igniters would be in service if the hydrogen concentration at been 0.6% when checked during performance of E-1.*
- D. *Incorrect, Plausible because the concentration at 0.5% is below the concentration of hydrogen to be flammable and there is a concentration range where the recombiners are placed in service and if outside the range on either side they are not placed in service.*

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Question Number: 59

Tier: 2 Group 2

K/A: 028 K5.04
Hydrogen Recombiner and Purge Control System (HRPS)
Knowledge of the operational implications of the following concepts as they
apply to the HRPS:
The selective removal of hydrogen

Importance Rating: 2.6? / 3.2?

10 CFR Part 55: 41.5 / 45.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires applying supplied data
to the procedural requirements to determine the impact on the
operation of the hydrogen removal systems.

Technical Reference: E-0, Reactor Trip or Safety Injection, Revision 0030
E-1, Loss of Reactor or Secondary Coolant,
Revision 0016

Proposed references
to be provided: None

Learning Objective: 3-OT-EOP0001
5. For a given H₂ concentration in containment
determine if the H₂ igniter should be energized and
explain why or why not.
8. Given a set of plant conditions, use E-1, ES-1.1,
ES-1.2, ES-1.3, and ES-1.4 to correctly diagnose and
implement: Action Steps, RNOs, Foldout Pages,
Notes, and Cautions.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

60. 034 K6.02 860

Given the following:

- Unit 1 is at 100% RTP.
- Fuel Assembly shuffles are being made in the Spent Fuel Pit.
- 0-RM-90-102, Spent Fuel Pit Radiation Monitor, has been declared INOPERABLE and removed from service due to an instrument malfunction.
- Auxiliary Building Supply fans 1A and 2B are running.

Which ONE of the following completes the statements below?

Technical Specifications would (1) continued movement of fuel assemblies in the Spent Fuel Pit.

If 0-RM-90-103, Spent Fuel Pit Radiation Monitor, subsequently detected Hi Radiation, (2) Auxiliary Building General Supply fan(s) would trip.

(1)

(2)

A. **NOT** allow

ONLY 2B

B. **NOT** allow

1A and 2B

C. allow

ONLY 2B

D. allow

1A and 2B

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the radiation monitor function is to detect damage to a fuel assembly which is most likely to occur while fuel is be moved fuel and because only the 2B fan tripping since the radiation monitors are trained in respect to isolating the Auxiliary Building with 0-RM-90-103 being Train B.*
- B. *Incorrect, Plausible because the radiation monitor function is to detect damage to a fuel assembly which is most likely to occur while fuel is be moved fuel and also plausible because due to the separation relays that allow the tripping of all supply and exhaust fans if high radiation is detected on either of the radiation monitors making the tripping of both 1A and 2B supply fans correct.*
- C. *Incorrect, Plausible because Tech Specs allowing fuel movement in the Spent Fuel Pit with only one SFP Radiation monitor operable is correct and because the radiation monitors are trained in respect to isolating the Auxiliary Building with 0-RM-90-102 being Train A and 0-RM-90-103 being Train B.*
- D. *Correct, Tech Specs allows fuel movement in the Spent Fuel Pit with only one SFP Radiation monitor. The SFP Radiation Monitors are trained in respect to isolating the Auxiliary Building with 102 being Train A and 103 being Train B; however there are separation relays that allow for tripping of all supply and exhaust fans if high radiation is detected on either of the radiation monitors.*

Question Number: 60

Tier: 2 **Group** 2

K/A: 034 K6.02
Fuel Handling Equipment System (FHES)
Knowledge of the effect of a loss or malfunction on the following will have
on the Fuel Handling System:
Radiation monitoring systems

Importance Rating: 2.6 / 3.3

10 CFR Part 55: 41.7 / 45.7

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the knowledge of the effect of a loss of spent fuel pool area radiation monitors and the effect of that loss on Fuel Handling Systems, in this case the effect on whether or not fuel movement can continue and the effect on the

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K/A Match: K/A is matched because the question requires the knowledge of the effect of a loss of spent fuel pool area radiation monitors and the effect of that loss on Fuel Handling Systems, in this case the effect on whether or not fuel movement can continue and the effect on the Auxiliary Building Isolation function related to the Auxiliary building Supply fans.

Technical Reference: 1-47W611-30-5 R7
Technical Specifications 3.3.8, "Auxiliary
Building Gas Treatment System (ABGTS)
Actuation Instrumentation."

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS030A
4. Describe all Auxiliary Building
7. Explain the events that take place on an ABI and
why.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: Modified SQN question 034 K6.02 061 used on SQN
1/2009 retake.

Comments:

61. 041 A2.02 161

Given the following:

- Unit 1 was operating at 100% power when a reactor trip occurred.
- A steam dump 'Tavg Hi' bistable malfunction resulted in 6 Steam Dump valves remaining full open as Tavg dropped following the reactor trip.

Which ONE of the following completes the statements below?

Tavg dropping to 550°F will result in ____ (1) ____.

If the operators had placed the handswitches listed below to OFF prior to Tavg reaching 550°F, the steam dump valves would have closed ____ (2) ____ was/were placed to OFF.

Note:

1-HS-1-103A, STEAM DUMP FSV "A"

1-HS-1-103B, STEAM DUMP FSV "B"

- A✓ (1) all 6 of the steam dump valves closing
(2) after either switch
- B. (1) all 6 of the steam dump valves closing
(2) only after both switches
- C. (1) only the 3 cooldown valves remaining open
(2) after either switch
- D. (1) only the 3 cooldown valves remaining open
(2) only after both switches

DISTRACTOR ANALYSIS:

- A. *Correct, When Tavg drops to 550°F, the Lo-Lo Tavg interlock causes all 6 of the steam dump valves to close. Placing either of the handswitches to OFF will result in removing the air to the steam dump valves thus causing the valves to close; so placing 1-HS-1-103A to OFF will close the valves.*
- B. *Incorrect, Plausible because all 6 steam dump valves closing is correct and placing both handswitches to OFF is a action directed in some procedures when the steam dump valves are to be closed (e.g., AOI-39).*
- C. *Incorrect, Plausible because there is a relationship between the cooldown valves and 550°F. The cooldown valves are the only steam dump valves that can be reopened with Tavg less than 550°F, but require operator action to bypass the interlock. Also, because placing both handswitches to OFF will result in removing the air to the steam dump valves thus causing the valves to close; so placing 1-HS-1-103A to OFF will close the valves.*
- D. *Incorrect, Plausible because there is a relationship between the cooldown valves and 550°F. The cooldown valves are the only steam dump valves that can be reopened with Tavg less than 550°F, but require operator action to bypass the interlock. Also, because placing both handswitches to OFF is a action directed in some procedures when the steam dump valves are to be closed (e.g., AOI-39).*

Question Number: 61

Tier: 2 **Group** 2

K/A: 041 A2.02
Steam Dump System (SDS)/Turbine Bypass Control
Ability to (a) predict the impacts of the following malfunctions or operations on the SDS; and (b) based on those predictions or mitigate the consequences of those malfunctions or operations:
Steam valve stuck open

Importance Rating: 3.6 / 3.9

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

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to predict how Tavg dropping due to steam dump valves being stuck open will affect the dump valves and the identification of the action required by the operating crew to mitigate the affect prior to reaching a Lo-Lo setpoint.

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Technical Reference: 1-47W611-1-2 R12
SOI-1.02, Steam Dump System, Revision 0013

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS001B
04. Identify the purpose and function of the steam dump
valves designated as cooldown valves.
18. Explain when the bistables open the steam dump
valves and how many valves will be tripped open at
one time by the Hi or Hi-Hi bistables.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question SYS001B.25 007 modified.

Comments:

62. 071 K3.05 162

Given the following:

- Unit 1 is operating at 100% power.
- Waste Gas Decay Tank J relief valve develops a flange leak and the tank contains high activity gas.

Which ONE of the following identifies how the radiation monitors listed below will respond to the gas release?

Note:

0-RE-90-118, Waste Gas Rad Monitor

0-RE-90-101, Auxiliary Building Ventilation Monitor

1-RE-90-400, Unit 1 Shield Building Vent Monitor

- A. Both 0-RE-90-118 and 1-RE-90-400 will detect the release.
- ☒ B. Only 0-RE-90-101 will detect the release.
- C. Only 1-RE-90-400 will detect the release.
- D. Both 0-RE-90-118 and 0-RE-90-101 will detect the release.

DISTRACTOR ANALYSIS:

- A. *Incorrect, leakage must enter the WGDT release line to pass by waste gas radiation monitor 0-RE-90-118 and its normal release point monitored by 1-RE-90-400. Flange leakage would not enter this line but rather the general Aux Building Spaces where it would eventually pass by Aux building stack radiation monitor 0-RE-90-101. Therefore for flange leakage, 0-RE-90-118 nor 1-RE-90-400 would detect the release but 0-RE-90-101 would. Plausible if applicant does not understand the relationship between the ventilation system and rad monitors.*
- B. *Correct, leakage must enter the WGDT release line to pass by waste gas radiation monitor 0-RE-90-118. Flange leakage would not enter this line but rather the general Aux Building Spaces where it would eventually pass by Aux building stack radiation monitor 0-RE-90-101. Therefore for flange leakage, 0-RE-90-118 nor 1-RE-90-400 (the normal release point) would detect the release but 0-RE-90-101 would detect the release.*
- C. *Incorrect, leakage must enter the WGDT release line to pass by waste gas radiation monitor 0-RE-90-118 and 0-RE-90-400. Flange leakage would not enter this line but rather the general Aux Building Spaces where it would eventually pass by Aux building stack radiation monitor 0-RE-90-101. If the leakage had been through the seat of the valve and the normal release point was aligned 0-RE-90-400 would have detected the release. Therefore for flange leakage, 0-RE-90-118 would not detect the release but 0-RE-90-101 would detect the release. Plausible if applicant does not understand the relationship between the ventilation system and rad monitors and thinks the gas would exit via the Shield Building Stack which is where a normal gas decay tanks release is routed.*
- D. *Incorrect, leakage must enter the WGDT release line to pass by waste gas radiation monitor 0-RE-90-118. Flange leakage would not enter this line but rather the general Aux Building Spaces where it would eventually pass by Aux building stack radiation monitor 0-RE-90-101. Therefore for flange leakage, 0-RE-90-118 would not detect the release but 0-RE-90-101 would detect the release. Plausible if applicant does not understand the relationship between the ventilation system and rad monitors*

Question Number: 62

Tier: 2 Group: 2

K/A: 071 K3.05
Waste Gas Disposal System (WGDS)
Knowledge of the effect that a loss or malfunction of the Waste Gas Disposal System will have on the following:
ARM and PRM systems

Importance Rating: 3.2 / 3.2

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10 CFR Part 55: 41.7 / 45.6

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of how a leaking flange on the will affect the radiation monitoring systems at the station.

Technical Reference: 1-47W830-4 R20
1-47W866-1 R57
1-47W866-2 R27
1-47W866-10 R33

Proposed references to be provided: None

Learning Objective: 3-OT-SYS030A
4. Describe all Auxiliary Building Heating/Ventilation/Air-Conditioning System major components as to power supplies, start and stop logic and operations.
3-OT-SYS077B
9. List each of the waste gas release points at the plant.

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank
Bank X

Question History: SQN question 060 AA1.02 022 that was used on the January 2008 exam with some wording changes in the stem and all choices, but not a modified question.

Comments:

63. 072 A4.01 163

Given the following:

- Unit 1 is operating at 100% power.
- While performing a board walkdown, the incoming OAC determines annunciator 174-E, 1-RR-90-1 AREA MONITORS INSTR MALF, is LIT.

Which ONE of the following completes the statements below?

In accordance with ARI for window 174-E, the operator would determine which Area Radiation Monitor was the cause of the annunciator being LIT by the (1) on the associated rate meter.

A condition that would cause the alarm is the (2) .

- A✓ (1) GREEN light being DARK
(2) rate meter function switch in ALARM ADJ
- B. (1) GREEN light being DARK
(2) sample flow less than setpoint
- C. (1) RED, AMBER and GREEN lights all being LIT
(2) rate meter function switch in ALARM ADJ
- D. (1) RED, AMBER and GREEN lights all being LIT
(2) sample flow less than setpoint

DISTRACTOR ANALYSIS:

- A. *Correct, In accordance with ARI 174-E, a corrective action is to "**CHECK** rate meters [0-M-12] for loss of green light to determine which instrument is malfunctioning" and the function switch being in the ALARM ADJ position is listed as a probable cause of the alarm.*
- B. *Incorrect, Plausible because the associated rate meter green light being dark is correct and a sample flow less than setpoint will cause an instrument malfunction alarm on a process radiation monitor.*
- C. *Incorrect, Plausible because there are condition that will cause all 3 lights to be lit on an area radiation monitor (e.g. momentary loss of power) and the function switch being in the ALARM ADJ position is listed as a probable cause of the alarm.*
- D. *Incorrect, Plausible because there are condition that will cause all 3 lights to be lit on an area radiation monitor (e.g. momentary loss of power) and a sample flow less than setpoint will cause an instrument malfunction alarm on a process radiation monitor.*

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Question Number: 63

Tier: 2 **Group:** 2

K/A: 072 A4.01
Area Radiation Monitoring System
Ability to manually operate and/or monitor in the control room:
Alarm and interlock setpoint checks and adjustments

Importance Rating: 3.0* / 3.3

10 CFR Part 55: 41.7 / 45.5 to 45.8

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to monitor the conditions of the area radiation monitor using control room indications and the knowledge of the effect of placing the function switch alarm adjustment position.

Technical Reference: ARI-173-179, U-1 Radiation Detectors, Revision 0046

Proposed references to be provided: None

Learning Objective: 3-OT-SYS090A
07. Determine Interlocks and/or cause-effect relationships between the Rad Monitoring Systems (ARM & Process) and the areas they monitor. Include HVAC systems and area isolations.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> </u>
Modified Bank	<u> X </u>
Bank	<u> </u>

Question History: WBN bank question SYS090A.32 003 modified.

Comments:

64. 075 G2.1.31 164

Given the following:

- Unit 1 has reduced power due to a condenser tube leak that has been identified in the East Side tubes.
- The unit is currently at 34% power.
- CCWP 1D has been removed from service.
- CCWPs 1A, 1B, and 1C are each running 235 amps.
- East side amertap system has been shutdown.
- Condenser Vacuum Pumps 1A and 1B are in service.

Which ONE of the following identifies an additional operating condition that MUST be established when removing the East Side Waterboxes from service in accordance with SOI-27.01, "Condenser Circulating Water System?"

- A. Turbine load MUST be reduced.
- ☒ B. An additional CCWP is required to be stopped.
- C. Stop one of the Condenser Vacuum Pumps.
- D. Discharge valves on running CCWPs must be throttled.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the load is already below the 'less than 35%' recommended, and it is not a requirement. The procedure states "... Operation in this condition should be below the line of the Backpressure vs. Load limitation Curve below. While load below 35% is recommended, the actual power during performance is at the Shift Manager's discretion."*
- B. *Correct, In accordance with SOI-027.01, Section 8.6.1 has a caution stating "Maximum of two CCW Pumps may be RUNNING when either Water box is isolated." Also see Precaution B below.*
- C. *Incorrect, Plausible because the air removal line from the water box is required to be isolated but the vacuum pump is not required to be stopped.*
- D. *Incorrect, Plausible because there are conditions that allow/require the CCWP discharge valves to be throttled when less than 4 CCWPs are running, but not when removing a set of waterboxes with three pumps running. See Precaution B below.*

3.0 PRECAUTIONS AND LIMITATIONS

- B. Condenser Inlet & Outlet valves should NOT be opened or fully closed with four, (4) CCWPs operating. One Condenser flow path may be isolated with two, (2) -pump operation.
- C. When operating with less than 4 CCWPs, pump discharge valves may be throttled to maintain pump amps less than 256 (rated).

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Question Number: 64

Tier: 2 **Group:** 2

K/A: 075 G2.1.31
Circulating Water System
Conduct of Operations
Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.

Importance Rating: 4.6 / 4.3

10 CFR Part 55: 41.10 / 45.12

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to determine the desired plant (CCW) alignment for the conditions stated in the question (removal of a set of water boxes).

Technical Reference: SOI-27.01, Condenser Circulating Water System,
Revision 0047

Proposed references to be provided: None

Learning Objective: 3-OT-SYS0027A
12 State and explain the different modes of cooling tower operation.
19. Explain how to drain the water boxes and what precautions that need to be adhered to during drain down.

Cognitive Level:

Higher X
Lower

Question Source:

New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

65. 086 K1.02 065

Which ONE of the following identifies why 0-SW-026-0320, RAW SERVICE WATER ISOLATION VALVE 0-FCV-26-320, located in the Makeup Water Treatment Plant Control Room, would be placed to OFF?

- A. Prevent exceeding maximum flow rating of the water treatment system following the start of any fire pump.
- B. Prevent overpressurizing the water treatment system following the start of any fire pump.
- C. Prevent the automatic closure of 0-FCV-26-320 due to a diesel fire pump start.
- D✓ Prevent automatic closure of 0-FCV-26-320 when an electric fire pump start signal is generated.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because due to the pressure rise on the system when a fire pump is started there would be an increase in flow through the system.*
- B. *Incorrect, Plausible because the pressure on the system rises rapidly when a fire pump is started and this would result in an increase in the pressure inside the demin beds and piping.*
- C. *Incorrect, Plausible because the actual reason is to prevent the isolation of the RSW to the Makeup water Treatment building during a start of the fire pumps but it is the electric fire pumps starting not the diesel fire pump starting that causes the isolation.*
- D. *Correct, As identified in SOI-26.01, "High Pressure Fire Protection System," the switch is placed to OFF to prevent the isolation of the RSW to the Makeup Water Treatment Building during a start of the electric fire pumps.*

SOI-26.01

8.3.2 Electric Fire Pump Manual Start

[4] IF RSW/DI Process water isolation to Makeup Water Treatment Building is NOT desired, **THEN**

PLACE switch 0-SW-026-0320, RAW SERVICE WATER ISOLATION VALVE 0-FCV-26-320 located in compartment HC of 0-MCC-281-1, to **OFF** (MWTP Control Room). (N/A in emergency)

Question Number: 65

Tier: 2 **Group** 2

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K/A: 086 K1.02
Fire Protection System
Knowledge of the physical connections and/or cause/effect relationships
between the Fire Protection System and the following systems:
Raw service water

Importance Rating: 2.7* / 3.2*

10 CFR Part 55: 41.2 to 41.9 / 45.7 to 45.8

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the physical connections between the Fire Protection System and the Raw Service Water system as well as a cause/effect relationship with the Fire protection system when a fire pump is started and how the effect can be defeated.

Technical Reference: SOI-26.01, High Pressure Fire Protection System,
Revision 26
1-45W760-26-1 R25
1-45W600-57-3 R16

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS026A
5. Correctly locate and state the normal alignment of
control room controls and indications associated with
the HPFP system, including:
a. Pump handswitches
b. Valve handswitches

Cognitive Level:
Higher
Lower X

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

66. G 2.1.14 166

Given the following:

- Unit 1 is being returned to service following a refueling outage.

Which ONE of the following is **NOT** identified in the GO procedures as requiring a Public Address (PA) announcement be made?

- A. Entering Mode 4
- B. Reactor Startup Initiation
- C. Reactor Critical
- D. Opening MSIVs

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the GO does require a P/A announcement when Mode 4 is to be entered.*
- B. *Incorrect, Plausible because the GO does require a P/A announcement when reactor startup is initiated.*
- C. *Incorrect, Plausible because the GO does require a P/A announcement when the reactor is made critical.*
- D. *Correct, There is no requirement in the GOs to require a plant P/A announcement when the MSIVs are to be opened.*

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Question Number: 66

Tier: 3 **Group:** n/a

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

Importance Rating: 3.1 / 3.1

10 CFR Part 55: 41.10 / 43.5 / 45.12

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of plant
conditions requiring an announcement to the plant.

Technical Reference: GO-2, Reactor Startup, Revision 0039
ES-0.1, Reactor Trip Response, Revision 0023

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SPP1000
5. Describe Unit Operator responsibilities.
20. Describe the responsibilities of operations personnel
as it pertains to "Back To Basics" fundamentals,
including: h. Communications

Cognitive Level:
Higher
Lower X

Question Source:
New X
Modified Bank _____
Bank _____

Question History: New question for the WBN 10/2011 NRC exam

Comments:

67. G 2.1.19 067

Using the attached ICS AFD TARGET DISPLAY screen printout, which ONE of the following choices completes the following statements?

The AFD HIGH LIMIT is (1).

If (2) outside of the limit, TS LCO 3.2.3, "Axial Flux Difference," action statement will be entered.

REFERENCE PROVIDED

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|-----------------------------|
| A. | -5 | any NIS channel is |
| B. | -5 | at least 2 NIS channels are |
| C. | +7 | any NIS channel is |
| D✓ | +7 | at least 2 NIS channels are |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible if candidate determines that -5 (high end of the normal control band) is the high limit. Also, it takes 2 channels outside the band to require entry in the Tech Spec LCO.*
- B. *Incorrect, Plausible if candidate determines that -5 (high end of the normal control band) is the high limit. Also, the second part of the response is correct.*
- C. *Incorrect, Plausible since the first part of the distractor is correct, however it takes two channels outside the limit for entry into the Tech Spec LCO.*
- D. *Correct, The AFD high limit as demonstrated on the supplied AFD Target Display and COLR indicates that 7 is the high limit. Per T.S. 3.2.3, if two or more NI channels are indicating outside the limit then entry into the Tech Spec LCO is required.*

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Question Number: 67

Tier: 3 **Group** n/a

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

Importance Rating: 3.9 / 3.8

10 CFR Part 55: 41.10 / 45.12

10CFR55.43.b: Not applicable

K/A Match: Applicant is required to review an ICS (plant computer) screen to determine the AFD limits and how the points provided by the NIS channels would be used to identify Tech Spec entry.

Technical Reference: T.S. 3.2.3, Axial Flux Difference (AFD)
COLR Unit 1 Cycle 11, Figure 3 Axial Flux Difference
Acceptable Operation Limits as a Function of
Rated Thermal Power (RAOC), Revision 0

Proposed references to be provided: ICS 'AFD TARGET DISPLAY' with the high and low values & limits removed from display

Learning Objective: 3-OT-T/S0302
3. Given plant conditions, determine if the unit is in compliance with applicable LCOs.

Cognitive Level:

Higher	
Lower	<u>X</u>

Question Source:

New	<u>X</u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: SQN bank question G 2.1.19 used on the 02/2010 exam. Values changed for WBN.

Comments:

68. G 2.1.40 468

Given the following:

- The Unit is in Mode 6, with refueling operations in progress.
- The 30th fuel assembly is being loaded into the core.

Which ONE of the following conditions, in accordance with FHI-7, "Fuel Handling and Movement," will require fuel handling activities be stopped immediately?

- A. An unanticipated rise in count rate by a factor of two occurs on any responding nuclear channel during any single loading step.
- B✓ Communications is lost between Containment and the Control Room.
- C. Water in the Spent Fuel Pit is not clear enough to view the Fuel top Nozzles without supplemental lighting.
- D. Boron concentration drops by 18 ppm as determined by two successive samples of Reactor Coolant.

DISTRACTOR ANALYSIS:

- A. *Plausible because unanticipated changes in count rate will result in the stopping of fuel movement but the change required is an increase of a factor of two on both responding nuclear channels to stop fuel movement or a factor of 5 on either channel.*
- B. *Correct, If communication is lost between the control room and containment then fuel loading must stop.*
- C. *Incorrect, Plausible because a water clarity resulting in the inability to view the top nozzle will result in the stopping of fuel movement but is only required to be stopped when top nozzles are not viewable with supplemental lighting.*
- D. *Incorrect, Plausible because a decrease in RCS boron concentration on 2 successive samples will result in the stopping of fuel movement but the decrease in boron concentration is by 20 ppm vs. 18 ppm stated in the stem of the question.*

Question Number: 68

Tier: 3 Group n/a

K/A: G 2.1.40

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K/A: G 2.1.40
Conduct of Operations
2.1.40 Knowledge of refueling administrative requirements.

Importance Rating: 2.8 / 3.9

10 CFR Part 55: 41.10

10CFR55.43.b: Not applicable

K/A Match: This question matches the K/A by requiring the applicant to identify a condition during refueling that would result in an administrative requirement to stop the movement of fuel.

Technical Reference: FHI-7, "Fuel Handling and Movement," Revision 35

Proposed references to be provided: None

Learning Objective: 3-OT-SYS079A
12. Identify the Tech Specifications/ Tech. Requirements relative to Fuel Handling with regard to:
a. Boron concentration
b. Source Range Neutron Monitoring
c. Decay time
d. Water level over the core
e. Communications
f. Definition: Refueling Mode

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> </u>
Modified Bank	<u> </u>
Bank	<u> X </u>

Question History: WBN bank question with distractor D modified to eliminate subset issue

Comments:

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69. G 2.2.17 169

Given the following:

- Unit 1 is operating at 100% power.
- Maintenance is to be performed on AFW Pump 1B-B.
- 'Protected Equipment' portable sign stands have been placed locally at AFW Pump 1A-A.
- An engineer request permission from the CRO to enter the area protected.

Which ONE of the following completes the statements below in accordance with ODM-4.0, "Protected Equipment?"

____(1)____ is the organization responsible for the placement of the 'Protected Equipment' portable sign stands.

The CRO would direct the engineer to contact the ____ (2) ____ to get approval to enter the area being protected.

- | <u>(1)</u> | <u>(2)</u> |
|----------------|------------------|
| A✓ Operations | Shift Manager |
| B. Operations | Work Control SRO |
| C. Maintenance | Shift Manager |
| D. Maintenance | Work Control SRO |

DISTRACTOR ANALYSIS:

- A. *Correct, ODM-4, Protected Equipment, assigns the responsibility for the placement of the 'Protected Equipment' signs to Operations and the CRO would direct the engineer to the Shift Manager to get approval to enter the area protected.*
- B. *Incorrect, Plausible because Operations has the responsibility for placing the signs and the CRO directing the engineer to the Work Control SRO is plausible because the Work Control SRO is the individual who has the primary interface role with plant support organizations.*
- C. *Incorrect, Plausible because Maintenance is the organization doing the work and because the CRO directing the engineer to the Shift Manager to get approval to enter the area protected is correct.*
- D. *Incorrect, Plausible because Maintenance is the organization doing the work and the CRO directing the engineer to the Work Control SRO is plausible because the Work Control SRO is the individual who has the primary interface role with plant support organizations.*

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Question Number: 69

Tier: 3 **Group:** N/A

K/A: G 2.2.17
Equipment Control
Knowledge of the process for managing maintenance activities during power operations, such as risk assessment, work prioritization, and coordination with the transmission system operator.

Importance Rating: 2.6 / 3.8

10 CFR Part 55: 41.10 / 43.5 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the process for managing on-line work to reduce the risk of making redundant equipment inoperable while performing maintenance on safety related equipment.

Technical Reference: ODM-4.0, Protected Equipment, Revision 1

Proposed references to be provided: None

Learning Objective: 3-OT-TI1240
03. Describe the procedures/processes for controlling temporary and aggregate (cumulative) risk.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question for the WBN 10/2011 NRC exam

Comments:

70. G 2.2.18 070

During shutdown for a Refueling Outage, which ONE of the following identifies the highest level of risk that can be voluntarily entered and who must approve entering the risk in accordance with NPG-SPP-07.2.11, "Shutdown Risk Management."

- | | |
|-----------|----------------|
| A✓ ORANGE | Plant Manager |
| B. ORANGE | Outage Manager |
| C. RED | Plant Manager |
| D. RED | Outage Manager |

DISTRACTOR ANALYSIS:

- A. *Correct, NPG-SPP-07.2.11, Shutdown Risk Management, identifies an Orange Risk as the highest level of risk to be voluntarily entered and identifies the approval of the Plant Manager as being required to enter the risk.*
- B. *Incorrect, Plausible because Orange is the highest level of risk that can be entered voluntarily and the Outage Manager can approve entering lower level risk.*
- C. *Incorrect, Plausible because RED is a established risk category that can be entered but it is only entered due to unexpected condition caused by equipment failure/plant alignment and voluntary entry into the risk is not allowed. Also, because the Plant Manager is correct for entering the highest level of risk that can be voluntarily entered.*
- D. *Incorrect, Plausible because RED is a established risk category that can be entered but it is only entered due to unexpected condition caused by equipment failure and is voluntary entry into the risk is not allowed. Also, because the Outage Manager can approve entering lower level risk.*

NPG-SPP-07.2.11

3.4 J.3

Orange Condition - Considered high risk with less than the desired complement of equipment. Written guidance/contingency plans should be made before entering preplanned conditions of this type. These can include, but are not limited to; temporary systems, temporary procedures, procedure revisions, or requirements in shift orders to compensate for degraded plant conditions. The plant manager must authorize this evolution.

3.4 J.4

Red Condition - Considered very high risk with less than the adequate complement of plant equipment. This condition should be avoided and if inadvertently entered, immediate actions should be taken to return the plant to higher DID conditions (i.e., Orange, Yellow, or Green). Previously written contingency plans will be utilized when attempting to restore from a Red Condition. If conditions change, or equipment failures result in red condition, prompt reversal of the evolution in progress, restoration of equipment or implementation of a contingency plan should occur.

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Question Number: 70

Tier: 3 **Group** n/a

K/A: G 2.2.18
Equipment Control
Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.

Importance Rating: 2.6 / 3.9

10 CFR Part 55: 41.10 / 43.5 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of the process for managing risk associated with maintenance activities during shutdown conditions.

Technical Reference: NPG-SPP-07.2.11, Shutdown Risk Management,
Revision 0000

Proposed references to be provided: None

Learning Objective: 3-OT-TI1240
03. Describe the procedures/processes for controlling temporary and aggregate (cumulative) risk.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question for the WBN 10/2011 NRC exam.

Comments:

71. G 2.2.40 071

Given the following:

- The crew implemented AOI-33, "Steam Generator Tube Leak," due to a tube leak in SG #1 and has placed the unit in Mode 3.
- ES-0.1, "Reactor Trip Response," has been completed and the crew has resumed performance of AOI-33.

As a result of actions directed in AOI-33, which ONE of the following will require an entry into a Technical Specification Action statement?

- A. Closing the SG #1 Main Steam Isolation Valve.
- B. Adjusting the SG #1 PORV controller setpoint to 90%.
- C. ✓ Isolating the TD AFW pump steam supply valve from SG #1.
- D. Blocking Low Steamline pressure and Low PZR pressure SI actuation.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the MSIVs components included in Tech Specs but the act of closing them does not require a Tech Spec entry.*
- B. *Incorrect, Plausible because the SG PORVs are components included in Tech Specs but the action to adjust the setpoint does not require a Tech Spec entry.*
- C. *Correct, Isolating the TD AFW pump steam supply from the SG #1 requires entry into LCO 3.7.5 action statements with the unit in Mode 3.*
- D. *Incorrect, Plausible because the SSPS functions can result in a Tech Spec entry but the action to block the signal as directed in the procedure does not require a Tech Spec entry.*

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Question Number: 71

Tier: 3 Group n/a

K/A: G 2.2.40
Equipment Control
Ability to apply Technical Specifications for a system.

Importance Rating: 3.4 / 4.7

10 CFR Part 55: 41.10 / 43.2 / 43.5 / 45.3

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to recognize conditions resulting in an applicable Tech Spec LCO being required to be entered.

Technical Reference: AOI-33, Steam Generator Tube Leak, Revision 0034
Tech Spec LCO 3.7.5, Auxiliary Feedwater System,
Amendment 55

Proposed references
to be provided: None

Learning Objective: 3-OT-SYS003B
7. Identify in which Modes the CST and the AFW
System are governed by Tech Specs.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question

Comments:

72. G 2.3.13 972

Given the following:

- Unit 1 is operating at 100% power.
- Annunciator 183-C, AB VENT 0-RM-101 RAD HI, alarms.
- Operators have been unsuccessful in identifying the source of the release.

Which ONE of the following completes the statement below?

If the alarm source is **NOT** known, the ARI directs the operators to _____ within 2 hours of the alarm receipt.

- A. stop and lock out the Fuel Handling Area Exhaust fans
- B✓ close LWR CNTMT PURGE EXH PRESS RLF, 1-FCV-30-40 & 1-FCV-30-37
- C. manually initiate an Auxiliary Building Isolation signal
- D. notify RADCON to restrict nonessential entry into the Auxiliary Building

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the Fuel Handling Area Exhaust discharge to the Aux Bldg vent and radiation in this discharge would be detected by the 0-RM-90-101. Stopping and locking out the fans would terminate a release from the fans. Also, the Fuel Handling Area Exhaust fans are directed to be stopped and locked out in accordance with AOI-29, "Dropped or Damaged Fuel or Refueling Cavity Seal Failure," if different radiation monitors are not normal.*
- B. *Correct, the Annunciator Response Instruction for 183-C, AB VENT 0-RM-101 RAD HI directs the LWR CNTMT PURGE EXH PRESS RLF, 1-FCV-30-40 & 1-FCV-30-37 if the determination of the leak source cannot be determined within 2 hours unless it is known that the leak is not from containment.*
- C. *Incorrect, Plausible because there are steps in AOI-31, "Abnormal Release of Radioactive Material," that require a manual initiation of an Auxiliary Building Isolation due to a radiation monitor alarm but not an alarm from 0-RM-90-101. Also plausible because the release is known to be going out the Auxiliary Building Vent.*
- D. *Incorrect, Plausible because there are conditions where RADCON will restrict access to certain areas of the plant based on radiological conditions.*

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Question Number: 72

Tier: 3 Group: n/a

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

Importance Rating: 3.4 / 3.8

10 CFR Part 55: 41.12 / 43.4 / 45.9 / 45.10

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the knowledge of the required actions by the licensed operator due to a radiation monitor alarming indicating an unplanned release in progress.

Technical Reference: AOI-29, Dropped or Damaged Fuel or Refueling Cavity Seal Failure, Revision 0021
ARI-180-187, Common Radiation Detectors, Revision 0033
AOI-31, Abnormal Release of Radioactive Material, Revision 0023

Proposed references to be provided: None

Learning Objective: 3-OT-SYS090A
07. Determine Interlocks and/or cause-effect relationships between the Rad Monitoring Systems (ARM & Process) and the areas they monitor. Include HVAC systems and area isolations.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question for the WBN 10/2011 exam

Comments:

73. G 2.3.4 173

Given the following:

- A LOCA has occurred and a SAE has been declared.
- The TSC and OSC have been activated.
- To prevent damage to equipment needed for protection of the public, it is recommended that an individual make an entry into the 1A-A Safety Injection Pump Room 1A.
- Projected dose rate in the pump room is 1.0×10^5 mR/hr.
- Duration of the exposure is expected to be 6 minutes.

Which ONE of the following individuals must authorize this exposure?

- A. Radcon Manager ONLY
- B. ✓ Site Emergency Director
- C. Plant Manager
- D. Radcon Manager OR Site Vice President

DISTRACTOR ANALYSIS:

- A. *Incorrect, per EPIP-15 of the Radiological Emergency plan the Site Emergency Director must authorize emergency dose limits in excess of TVA admin limits and 10 CFR 20. Applicant may select since the Radcon Manager is responsible for completing the paperwork and he must authorize exceeding the limit during non-emergency conditions.*
- B. *Correct, with a projected dose of $1.0E+5$ mr/hr, the total dose to respond to this emergency condition is 10 Rem. $((1.0E+5 \text{ mr/hr} / 60 \text{ minutes}) \times 6 \text{ minutes})$. Per EPIP-15 of the Radiological Emergency plan the Site Emergency Director must authorize emergency dose limits in excess of TVA administrative limits and 10 CFR 20.*
- C. *Incorrect, per EPIP-15 of the Radiological Emergency plan the Site Emergency Director must authorize emergency dose limits in excess of TVA admin limits and 10 CFR 20. Applicant may select since Plant Manager must approve exceeding 5 R during non-emergency conditions.*
- D. *Incorrect, per EPIP-15 of the Radiological Emergency plan the Site Emergency Director must authorize emergency dose limits in excess of TVA admin limits and 10 CFR 20. Applicant may select since Radcon Manager or Site Vice President because both are required to provide additional approval to exceed 5 R during non-emergency conditions for planned special exposures*

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Question Number: 73

Tier: 3 **Group** n/a

K/A: G2.3.4
Radiation Control
Knowledge of radiation exposure limits under normal or emergency conditions.

Importance Rating: 3.2 / 3.7

10 CFR Part 55: 41.12 / 43.4 / 45.10

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires the ability to calculate a dose, realize the dose is above normal limits and have the knowledge of the position required to authorize receiving the dose.

Technical Reference: EPIP-15, Emergency Exposure Guidelines,
Revision 0014
NPG- SPP-05.1, Radiological Controls, Revision 0002

Proposed references to be provided: None

Learning Objective: 3-OT-RAD0003
6. List the extreme emergency exposure guidelines

Cognitive Level:
Higher
Lower X

Question Source:
New
Modified Bank
Bank X

Question History: WBN bank question G2.3.4 072 9 (question was used on the SQN 1/2009 exam)

Comments:

74. G 2.4.11 074

Given the following:

- Unit 1 is operating at 50% power, with all systems aligned normally with Train A CCP and CCS pumps in service.
- A loss of 1A-A 6.9KV Shutdown Board due a differential relay operation occurs.
- The OAC observes RCP Seal Water Injection flow to all RCPs to be "0."
- The Control Building AUO reports extensive damage to the 1A-A 6.9 KV Shutdown Board bus bars.
- The crew implements AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards."

Under these conditions, RCP seal cooling is (1) and in accordance with AOI-43.01, the crew will (2).

(1)

(2)

- | | |
|----------------|---|
| A. ✓ available | Isolate letdown prior to starting CCP 1B-B. |
| B. unavailable | Isolate letdown prior to starting CCP 1B-B. |
| C. available | Start CCP 1B-B prior to isolating letdown. |
| D. unavailable | Start CCP 1B-B prior to isolating letdown. |

DISTRACTOR ANALYSIS:

- A. *Correct, The loss of the 1A-A 6.9KV Shutdown Board will cause a loss of the 1A Component Cooling Water pump, which will in turn cause an automatic start of the 1B-B Component Cooling Water Pump due to a low pressure and an automatic start of the TBBP 1B-B due to low flow. The Component Cooling Water flowing through the thermal barrier heat exchanger will cool the RCS water flowing into the seal prior to the manual start of the CCP 1B-B. The AOI will then have letdown isolated prior to the start of the CCP 1B-B.*
- B. *Incorrect, RCP seal cooling would not be unavailable. Component Cooling Water flow through the thermal barrier heat exchanger would be supplying the cooling, but letdown would be isolated prior to starting the CCP 1B-B. Plausible, since the loss of the 1A-A 6.9KV Shutdown Board will cause a loss of the 1A Component Cooling Water pump, which would cause a loss of seal cooling if the Component Cooling Water pump 1B-B did not have an auto start generated and because isolating letdown prior to starting CCP 1B-B is correct.*
- C. *Incorrect, Plausible, since seal cooling will be available as described in 'B' above. However the AOI will have letdown isolated before the CCP1B-B is manually started. Plausible because seal cooling being available is correct and the AOI would have started the CCP 1B-B prior to isolating letdown if the component cooling water flow through the thermal barrier heat exchanger had not been present.*
- D. *Incorrect, RCP seal cooling would not be unavailable. Component Cooling Water flow through the thermal barrier heat exchanger would be supplying the cooling, and the CCP 1B-B would not be started prior to isolating letdown. Plausible, since the loss of the 1A-A 6.9KV Shutdown Board will cause a loss of the 1A Component Cooling Water pump, which would cause a loss of seal cooling if the Component Cooling Water pump 1B-B did not have an auto start generated and the AOI would have started the CCP 1B-B prior to isolating letdown if the Component Cooling Water flow through the thermal barrier heat exchanger had not been present.*

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Question Number: 74

Tier: 3 **Group** n/a

K/A: 062 G2.4.11
Emergency Procedures / Plan
Knowledge of abnormal condition procedures.

Importance Rating: 4.0 / 4.2

10 CFR Part 55: 41.10 / 43.5 / 45.13

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of an abnormal procedure (AOI-43.01 and Annunciator response instructions).

Technical Reference: AOI-43.01, "Loss of Unit 1 Train A Shutdown Boards,"
Revision 0009
ARI-102-108, HVAC and CVCS, Revision 0026

Proposed references to be provided: None

Learning Objective: 3-OT-AOI4300
4. Demonstrate ability/knowledge of AOI, by:
a. Recognizing Entry conditions
b. Responding to Actions
c. Responding to Contingencies (RNO)
d. Responding to Notes/Cautions

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: WBN bank question 062 G2.4.11 047 used in 06/0210 on an audit exam.

Comments:

75. G 2.4.31 175

Given the following:

- The plant is operating at 100% power.
- Annunciator 114-A, SSPS-A GENERAL WARNING is LIT.

Which ONE of the following completes the statement below?

_____ (1) _____ will cause the alarm and the probable source of the alarm can be determined locally by _____ (2) _____.

(1)

(2)

- | | |
|--|--|
| A. Racking in Reactor Trip
Bypass Breaker A | Semi-Automatic Tester Board edge
LED lights |
| B. ✓ A blown Ground Return Fuse | Semi-Automatic Tester Board edge
LED lights |
| C. Racking in Reactor Trip
Bypass Breaker A | Status Lights on the outside of the
SSPS Panels |
| D. A blown Ground Return Fuse | Status Lights on the outside of the
SSPS Panels |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible, since the local action is correct. Also because racking in the Train A bypass breaker causes a separate alarm.*
- B. *Correct, LED lights are used to determine cause of alarm, and a blown ground return fuse is a specific cause of the GENERAL WARNING ALARM.*
- C. *Incorrect, Plausible, since the local action is associated with determining the cause of a ROD URGENT FAILURE alarm is to check the status of lights on the outside of the cabinets and there are lights on the outside of the SSPS cabinets. Also because racking in the Train A bypass breaker causes a separate alarm.*
- D. *Incorrect, Plausible, since the local action is associated with determining the cause of a ROD URGENT FAILURE alarm is to check the status of lights on the outside of the cabinets and there are lights on the outside of the SSPS cabinets. Also because a blown ground return fuse is a specific cause of the GENERAL WARNING ALARM.*

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Question Number: 75

Tier: 3 **Group** n/a

K/A: G 2.4.31
Emergency Procedures/ Plan
Knowledge of annunciator alarms, indications, or response procedures.

Importance Rating: 4.2 / 4.1

10 CFR Part 55: 41.10 / 45.3

10CFR55.43.b: Not applicable

K/A Match: K/A is matched because the question requires knowledge of an annunciator response procedure.

Technical Reference: ARI-109-115, CVCS & RHR - RPS & ESF, Revision 0018

Proposed references to be provided: None

Learning Objective: 3-OT-SYS099A
14 Identify where "General Warning" indications can be found.

Cognitive Level:

Higher
Lower X

Question Source:

New
Modified Bank
Bank X

Question History: WBN Bank question 012 G2.4.31 036 used on 5/2008 exam

Comments:

76. 011 EG 2.4.41 376

Which ONE of the following completes the statements below?

____ (1) ____ of the barriers in EPIP-1, "Emergency Plan Classification Logic," Fission Product Barrier Matrix contain(s) a decision point based directly on a RVLIS threshold level.

The RVLIS threshold level that first requires a classification declaration to be made is ____ (2) ____.

- | | (1) | (2) |
|----|--------|------|
| A. | Only 1 | <44% |
| B. | 2 | <44% |
| C. | Only 1 | <33% |
| D. | 2 | <33% |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because many of the criteria only appear in one of the barriers and 44% is the void content of the RCS while the RCPs are in service that would result in a vessel level of less than 33% during a LOCA if the RCPs were to trip.*
- B. *Incorrect, Plausible because RVLIS level appears in both Fuel Clad Barrier (as a Potential LOSS) and in the RCS Barrier (as a LOSS) and 44% is the void content of the RCS while the RCPs are in service that would result in a vessel level of less than 33% during a LOCA if the RCPs were to trip.*
- C. *Incorrect, Plausible because many of the criteria only appear in one of the barriers and less than 33% being the RVLIS value during a LOCA that will require a declaration is correct.*
- D. *Correct, Valid RVLIS level less than 33% appears in both 1.1 Fuel Clad Barrier and in 1.2 RCS Barrier. RVLIS appears in the Fuel Clad Barrier as a Potential LOSS and in the RCS Barrier as a LOSS.*

Question Number: 76

Tier: 1 Group 1

K/A: 011 EG2.4.41

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K/A: 011 EG2.4.41
Large Break LOCA
Emergency Procedures / Plan
Knowledge of the emergency action level thresholds and classifications.

Importance Rating: 2.9 / 4.6

10 CFR Part 55: 41.10 / 43.5 / 45.11

10CFR55.43.b: 6,7

K/A Match: K/A is matched because the question requires knowledge of the emergency action level threshold value for reactor vessel level and the barriers that are affected by the Reactor Vessel Level Indicating System indicating below the minimum required.
Question is SRO because it requires detailed knowledge of the procedures used to evaluate plant conditions to determine Emergency Classifications and this determination is an SRO function.

Technical Reference: EPIP-1, "Emergency Plan Classification Logic," Fission
Product Barrier Matrix, Revision 0035
FR-0, Status Trees, Revision 0014

**Proposed references
to be provided:** None

Learning Objective: 3-OT-PCD048C
1. Classify emergency events
16. Recognize conditions which constitute activation of the emergency response facilities regardless of the time of day when an emergency has been declared.

Cognitive Level:

Higher	_____
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	_____
Bank	_____

Question History: New question for the WBN 10/2011 NRC exam

Comments:

77. 025 AG2.4.21 277

Given the following:

- Unit 1 was shutdown 24 hours ago for a refueling outage.
- RHR pump 1B-B is tagged for maintenance.
- Current RCS temperature is 135°F and 80 psig.
- RHR pump 1A-A trips and cannot be restarted.
- RCS temperature begins to rise.
- The crew is performing AOI-14, "Loss of RHR Shutdown Cooling," and Section 3.9, "RCS Alternate Cooling Method with RX Vessel Head Installed," has been initiated.

Which ONE of the following completes the statements below?

The cooling method that is directed to be attempted first after AOI-14 Section 3.9 is implemented is (1).

A condition that will result in a REP declaration being required is (2).

- A. (1) RCS feed and bleed using a CCP and a pressurizer PORV
(2) the RCS incore temperature > 200°F
- B✓ (1) Natural circulation in the RCS using the steam generators
(2) the RCS incore temperature > 200°F
- C. (1) RCS feed and bleed using a CCP and a pressurizer PORV
(2) a failure to establish RHR within 15 minutes
- D. (1) Natural circulation in the RCS using the steam generators
(2) a failure to establish RHR within 15 minutes

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because RCS feed and bleed with a CCP and a pressurizer PORV is a cooling process implemented by Section 3.9 of the AOI and because EPIP-1 requiring a declaration following the loss of RHR when the incore temperatures exceed 200°F is correct.*
- B. *Correct, Section 3.9 will check for conditions to establish cooling by natural circulation in the RCS and EPIP-1 will require an ALERT to be declared following the loss of RHR when the incore temperatures exceed 200°F.*
- C. *Incorrect, Plausible because RCS feed and bleed with a CCP and a pressurizer PORV is a cooling process implemented by Section 3.9 of the AOI and because "exceeding 15 minutes" is a time frame used in several conditions for requiring a declaration of the REP (e.g. electrical board not available for > 15 minutes, fire lasting >15 minutes, rad assessments not completed within 15 minutes, etc.)*
- D. *Incorrect, Plausible because establishing natural circulation is correct and because "exceeding 15 minutes" is a time frame used in several conditions for requiring a declaration of the REP (e.g. electrical board not available for > 15 minutes, fire lasting >15 minutes, rad assessments not completed within 15 minutes, etc.)*

Question Number: 77

Tier: 1 **Group** 1

K/A: 025 AG2.4.21
Loss of Residual Heat Removal System
Emergency Procedures / Plan
Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.

Importance Rating: 4.0 / 4.6

10 CFR Part 55: 41.7 / 43.5 / 45.12

10CFR55.43.b: 5, 6

K/A Match: K/A is matched because the question requires knowledge of core cooling and heat removal processes directed by the AOI following a loss of the RHR system and is SRO because of requiring detailed knowledge of the procedure content (including flowpath through the procedure) to prevent radioactive releases and the requirements for implementation of the Radiological Emergency Plan following a loss

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K/A Match: K/A is matched because the question requires knowledge of core cooling and heat removal processes directed by the AOI following a loss of the RHR system and is SRO because of requiring detailed knowledge of the procedure content (including flowpath through the procedure) to prevent radioactive releases and the requirements for implementation of the Radiological Emergency Plan following a loss of the RHR system.

Technical Reference: AOI-14, Loss of RHR Shutdown Cooling, Revision 0037
EPIP-1, Emergency Plan Classification Logic,
Revision 0035

**Proposed references
to be provided:** None

Learning Objective: 3-OT-AOI400
5. Explain Alternate RHR Cooling methods.
3-OT-PCD048C
1. Classify emergency events.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question AOI1400.05 001 modified

Comments:

78. 026 AA2.06 278

Given the following:

- Unit 1 is operating at 100% power with the following components out of service and tagged for maintenance:
 - CCP 1B-B
 - CCS pump 1B-B
- Component Cooling Water pump 1A-A trips due to motor failure.
- AOI-15, "Loss of Component Cooling Water (CCS)," is implemented.

Which ONE of the following correctly completes the statements below?

In accordance with AOI-15, (1) minutes is the maximum time the Reactor Coolant Pumps are allowed to remain in service.

Implementation of (2) is required.

Note:

Attachment 1 - Alignment of ERCW to CCP 1A-A Lube Oil Coolers

Attachment 2 - Alignment of CCS Train B to SFP HX B

(1)

(2)

- | | |
|-------|-------------------|
| A✓ 10 | only Attachment 1 |
| B. 10 | both Attachments |
| C. 12 | only Attachment 1 |
| D. 12 | both Attachments |

DISTRACTOR ANALYSIS:

- A. *Correct, AOI-15 has a Caution stating "RCPs can be operated for up to 10 minutes after loss of CCS flow" and during performance of the AOI, a step will direct the performance of Attachment 1, but the step directing the performance of Attachment 2 will not be performed because the "if...then" condition is not met due to the 2A header being available.*
- B. *Incorrect, Plausible because the time being 10 minutes is correct and both Attachments would be performed if the 2A header was not available.*
- C. *Incorrect, Plausible because 12 minutes is a time in the procedure section being performed but it is the time that a CCP may survive (not the time required to remove the RCPs) and only Attachment 1 being performed is correct.*
- D. *Incorrect, Plausible because 12 minutes is a time in the procedure section being performed but it is the time that a CCP may survive (not the time required to remove the RCPs) and both Attachments would be performed if the 2A header was not available.*

Question Number: 78

Tier: 1 **Group** 1

K/A: 026 AA2.06
Loss of Component Cooling Water
Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water:
The length of time after the loss of CCW flow to a component before that component may be damaged

Importance Rating: 2.8* / 3.1*

10 CFR Part 55: 43.5 / 45.13

10CFR55.43.b: 5

K/A Match: The K/A is matched because the question requires knowledge of the length of time after the loss of CCW flow to the RCPs before they are required to be removed to prevent being damaged and is SRO because it requires the knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps to mitigate the damage due to the loss of Component Cooling Water.

Technical Reference: AOI-15, Loss of Component Cooling Water (CCS),

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Technical Reference: AOI-15, Loss of Component Cooling Water (CCS),
Revision 0032

**Proposed references
to be provided:** None

Learning Objective: 3-OT-AOI1500
11. Demonstrate ability/knowledge of AOI, by:
a. Recognizing Entry conditions.
b. Responding to Actions.
c. Responding to Contingencies (RNO).
d. Responding to Notes/Cautions.

Cognitive Level:

Higher X
Lower

Question Source:

New
Modified Bank X
Bank

Question History: WBN bank question AOI1500 002 modified for the WBN
10/2011 NRC exam.

Comments:

79. 038 EG2.4.18 379

Given the following:

- Unit 1 was operating at 100% power when a Safety Injection occurred due to a tube rupture in SG #2.
- The crew determined a Target Incore Temperature of 466°F and has initiated a rapid RCS cooldown in accordance with E-3, "Steam Generator Tube Rupture."
- Before reaching the Target Incore Temperature, SG #2 pressure begins dropping in an uncontrolled manner.

Which ONE of the following completes the statements below?

The basis for cooling the RCS to a Target Incore Temperature of 466°F is to
(1) _____.

Based on current plant conditions, the SRO will transition to ECA-3.1,
"SGTR and LOCA Subcooled Recovery," (2) _____.

- A. (1) ensure adequate RCS subcooling is maintained after the subsequent RCS depressurization
(2) immediately
- B✓ (1) ensure adequate RCS subcooling is maintained after the subsequent RCS depressurization
(2) after the Target Incore Temperature is reached
- C. (1) provide the maximum amount of RCS temperature reduction without exceeding Pressurized Thermal Shock limits
(2) immediately
- D. (1) provide the maximum amount of RCS temperature reduction without exceeding Pressurized Thermal Shock limits
(2) after the Target Incore Temperature is reached

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because establishing sufficient subcooling of the RCS so that the primary system will remain subcooled after the RCS pressure is decreased to stop the primary to secondary leakage is correct. Procedure transition plausible because a transition to ECA-3.1 will be made but not until after the cooldown is complete and if any steam generator other than the ruptured steam generator had faulted, then an immediate transition would be required but the transition would be to E-2.*
- B. *Correct, The step is to establish sufficient subcooling of the RCS so that the primary system will remain subcooled after the RCS pressure is decreased to stop the primary to secondary leakage. Procedurally if the ruptured steam generator pressure starts to drop uncontrolled during the cooldown, E-3 will be continued complete the cooldown to Target incore temperature and after the target temperature is reached step will address the need to make the transition to ECA-3.1.*
- C. *Incorrect, Plausible because the RCS is being rapidly cooled and the bases discusses the concern for a PTS condition and how the target temperature table is built to preclude a PTS condition. Procedure transition plausible because a transition to ECA-3.1 will be made but not until after the cooldown is complete and if any steam generator other than the ruptured steam generator had faulted, then an immediate transition would be required but the transition would be to E-2.*
- D. *Incorrect, Plausible because the RCS is being rapidly cooled and the bases discusses the concern for a PTS condition and how the target temperature table is built to preclude a PTS condition. The second part is plausible because the correct procedure path is to continue the cooldown in E-3 and make the transition to ECA-3.1 after the cooldown is complete.*

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Question Number: 79

Tier: 1 **Group** 1

K/A: 038 EG2.4.18
Steam Generator Tube Rupture
Knowledge of the specific bases for EOP's

Importance Rating: 3.3 / 4.0

10 CFR Part 55: 41.10 / 43.1 / 45.13

10CFR55.43.b: 5

K/A Match: This question matches the K/A by requiring the candidate to apply the basis for the step in E-3 to perform a rapid cooldown of the RCS. SRO by requiring the knowledge of specific EOP step basis, and applying the information to make the correct procedure selection.

Technical Reference: WOG E-3 Background HP-Rev 2, Step 5
E-3, Steam Generator Tube Rupture, Revision 0023

Proposed references to be provided: None

Learning Objective: 3-OT-EOP0300
5. Given a set of plant conditions, use E-3, ES-3.1, ES-3.2, and ES-3.3 to correctly diagnose and implement: Action Steps, RNOs, Foldout Pages, Notes and Cautions.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question EOP0300 010 modified for the for the WBN 10/2011 NRC exam

Comments:

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80. 056 AA2.74 280

Given the following:

- Unit 1 is operating at 100% power with 1-FCV-68-332, BLOCK VALVE FOR PORV 334, closed as required by Tech Specs due to PZR PORV 334 being inoperable but capable of being cycled.
- The following sequence of events occur:
 - 1300 - Both 161kV Offsite power supplies are lost.
 - 1400 - Annunciator 91-A, PZR PORV/SAFETY OPEN, alarms due to PORV 340A opening and the PORV sticks open in mid-position during a pressure transient.
 - 1401 - The OAC reports:
 - 1-TI-68-331, PORV 340A & 334 TAILPIPE TEMP, rising,
 - PORV 340A GREEN and RED indicating lights DARK, and
 - 1-FCV-68-333A, BLOCK VALVE FOR PORV 340A has been closed.
 - 1500 - Both offsite power supplies are restored.

Which ONE of the following completes the statements below?

The indicating lights on 1-HS-68-340A, PZR PORV 340AA, were DARK at 1401 due to the ____ (1) ____.

Tech Specs ____ (2) ____ allow continued operation in Mode 1 for an unlimited period of time with the current status of the pressurizer PORVs.

- A. (1) loss of offsite power
(2) will
- B. (1) loss of offsite power
(2) will **NOT**
- C. (1) valve being at mid-position
(2) will
- D✓ (1) valve being at mid-position
(2) will **NOT**

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because there are circuits that would not have power while offsite power was lost. Also, plausible because there are conditions with both PORVs failed and isolated that will allow the unit to continue to operate in Mode 1 for an unlimited time period.*
- B. *Incorrect, Plausible because there are circuits that would not have power while offsite power was lost. Also plausible because the unit being required to be placed in MODE 3 within 78 hours of the PORV 340A failure is correct.*
- C. *Incorrect, Plausible because neither the RED nor the GREEN indicating light being lit is due to the PORV being stuck in the mid position and there are conditions (both PROVs inoperable but capable of being cycled) with both PORVs isolated that will allow the unit to continue to operate in Mode 1 for an unlimited time period.*
- D. *Correct, with PORV 340A stuck in the mid position neither the RED nor the GREEN indicating light will be lit and the status of PORV 340A requires the plant be placed in MODE 3 within 78 hours of the failure.*

Question Number: 80

Tier: 1 **Group** 1

K/A: 056 AA2.74
Loss of Off-Site Power
Ability to determine and interpret the following as they apply to the Loss of Offsite Power:
PORV position

Importance Rating: 3.6 / 3.7

10 CFR Part 55: 43.5 / 45.13

10CFR55.43.b: 2

K/A Match: K/A is matched because the question requires the ability to determine the status of PORV indications during a loss of offsite power and is SRO because the questions requires knowledge of Tech Spec information below the line.

Technical Reference: Tech Spec LCO 3.4.11, Pressurizer PORVs,
Amendment 55
1-45W600-68-1 R12

Proposed references None

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to be provided:

Learning Objective:

3-OT-T/S0304

4. Given plant conditions and parameters correctly determine the applicable Limiting Conditions for Operations or Technical Requirements for the various components of the RCS.

3-OT-SYS068C

11. Describe the indication an operator has that a PORV is open or leaking through.

Cognitive Level:

Higher

X

Lower

Question Source:

New

X

Modified Bank

Bank

Question History:

New question for the WBN 10/2011 NRC exam.

Comments:

81. W/E04 EA2.1 081

Given the following:

- During performance of ECA-1.2, "LOCA Outside Containment," the crew determines RCS pressure is rising after RHR Train B cold leg injection valve 1-FCV-63-94 is closed.
- The crew then stops and locks out RHR pump 1B-B and closes its suction valve.

Which ONE of the following identifies the required procedure transition?

- A. ES-1.1, "SI Termination"
- B. E-1, "Loss of Reactor or Secondary Coolant"
- C. ECA-1.1, "Loss of Emergency Coolant Recirculation"
- D. ES-1.2, "Post LOCA Cooldown and Depressurization"

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because ES-1.1 is a sub-procedure in the LOCA series of emergency procedures and would be a transition that could be required subsequent to the E-1 transition depending on the RCS pressure trend.*
- B. *Correct, the RCS pressure rising indicates that the leak has been terminated and with the RCS pressure rising the transition to E-1 is directed by the step in ECA-1.1.*
- C. *Incorrect, Plausible because if the RCS pressure had been dropping after the valve closure, then the transition would be to ECA-1.1*
- D. *Incorrect, Plausible because ES-1.2 is a sub-procedure in the LOCA series of emergency procedures and would be a transition that could be required subsequent to the E-1 transition depending on the RCS pressure trend.*

Question Number: 81

Tier: 1 Group 1

K/A: W/E04 EA2.1
LOCA Outside Containment
Ability to determine and interpret the following as they apply to

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K/A: W/E04 EA2.1
LOCA Outside Containment
Ability to determine and interpret the following as they apply to
the (LOCA Outside Containment)
Facility conditions and selection of appropriate procedures during
abnormal and emergency operations.

Importance Rating: 3.4 / 4.3

10 CFR Part 55: 43.5 / 45.13

10CFR55.43.b: 5

K/A Match: K/A is matched because the question requires the ability to assess
plant conditions to determine the proper procedure transition during a
LOCA outside containment event. The question is SRO because it
requires 'Assessing plant conditions (normal, abnormal, or
emergency) and then selecting a procedure or section of a procedure
to mitigate, recover, or with which to proceed.'

Technical Reference: ECA-1.2, LOCA Outside Containment, Revision 0005
WOG ECA-1.2 Background, Revision 2
E-1, Loss of Reactor or Secondary coolant,
Revision 0016

**Proposed references
to be provided:** None

Learning Objective: 3-OT-ECA0101
08. Given a set of plant conditions, use procedures
ECA-1.1 and 1.2 to identify any required procedure
transition.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank
Bank X

Question History: VOGTLE 2010 bank question WE04EA2.1 01 used on
the VOGTLE 2010 exam with wording changes in stem
and to allow use at WBN. Stem conditions modified but
no choices changed.

Comments:

82. 003 AA2.02 482

Given the following:

- Unit 1 power was reduced to recover a dropped control rod in Control Bank D, Group 2.
- Following recovery of the dropped rod, the lift coils for the appropriate rods are reconnected.
- Annunciator 86-A, CONTROL ROD URGENT FAILURE, has **NOT** been reset.
- Rod Control is placed to MANUAL using 1-RBSS, ROD BANK SELECT.

Which ONE of the following completes the statements below?

When the OAC places the IN-HOLD-OUT switch lever to the IN position,
____(1)____.

The basis for the reactor power reduction required by Tech Spec 3.1.5,
Group Rod Alignment Limits is to ensure ____ (2) ____.

- A. (1) no rod motion will occur
(2) AFD remains within limits
- B. (1) ONLY Bank D Group 2 rods will step IN
(2) Core design limits for local LHR are not exceeded
- C✓ (1) no rod motion will occur
(2) Core design limits for local LHR are not exceeded
- D. (1) ONLY Bank D Group 2 rods will step IN
(2) AFD remains within limits

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible since the first part is correct, with a Rod Urgent Failure alarm in all rod motion is blocked while in Auto or Manual. Also the second part is not correct for a reason in Tech Spec basis for a misaligned rod, but plausible because AFD would be changing as the rod is being withdrawn during recovery of the rod*
- B. *Incorrect, Plausible since during the recovery of the dropped rod an Urgent Failure alarm is generated in power cabinet 2 BD due to having all lift coils disconnected but demanding a signal for movement while withdrawing the dropped rod. This will not prevent rod movement in the other group due to the position of the selector switch being in the CBD position. However with the selector switch in the MAN position all rod motion is stopped. Also the reason for 75% power is correct according to Tech Spec 3.1.5 bases.*
- C. *Correct, With the rod control selector switch in the MAN position and Rod Control Urgent Failure alarms will stop/prevent all rod motion. The candidate will have to determine the difference between system response based on the input signals from the bank selector switch. If the switch is positioned to CBD as is the case when the rod is recovered the power cabinet for the other group would receive an Urgent Failure Alarm and block rod movement for that group, however the other group would still function and allow the rod to be recovered. The candidate must recognize the position of the selector switch, and its affect on rod motion. Also per Tech Spec 3.1.5 bases, "The reduction of power to 75% RTP ensures that local LHR increases due to a misaligned RCCA will not cause the core design criteria to be exceeded."*
- D. *Incorrect, Plausible since during the recovery of the dropped rod an Urgent Failure alarm is generated in power cabinet 2 BD due to having all lift coils disconnected but demanding a signal for movement while withdrawing the dropped rod. This will not prevent rod movement in the other group due to the position of the selector switch being in the CBD position. Also the second part is not correct for a reason in Tech Spec basis for a misaligned rod, but plausible because AFD would be changing as the rod is being withdrawn during recovery of the rod.*

Question Number: 82

Tier: 1 Group 2

K/A: 003 AA2.02

Dropped Control Rod

Ability to determine and interpret the following as they apply to the

Dropped Control Rod:

Signal inputs to rod control system

Importance Rating: 2.7 / 2.8

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10 CFR Part 55: 43.5 / 45.13

10CFR55.43.b: 2

K/A Match: This question matches the K/A by having the candidate determine the Urgent Failure Signals affect on rod control depending on the position of the rod bank selector switch during a dropped rod recovery. SRO by having the candidate recall from the Tech Spec bases the reason for reducing reactor power to 75% during a dropped rod recovery.

Technical Reference: Tech Spec 3.1.5 and bases
AOI-2, Malfunction of Reactor Control System,
Revision 0038

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS085A
20. Differentiate between the Rod Urgent Failure and
Non-Urgent Failure alarms. Explain the cause and
effect of the alarms and how resetting of alarms is
accomplished.
26. Discuss applicable Technical Specifications,
Technical Requirements, and Bases.

Cognitive Level:
Higher X
Lower

Question Source:
New
Modified Bank X
Bank

Question History: WBN bank question and a McGuire question combined
and modified for use at WBN

Comments:

83. 028 AA2.07 283

Given the following:

- Unit 1 was operating at 100% power with 1-RBSS, ROD BANK SELECT, in MAN.
- 1-XS-68-339E, PZR LEVEL CONTROL CHANNEL SELECT, is selected to LI-68-339 & 335.
- Performance of 1-SI-68-33, "Measurement Of Reactor Coolant Pump Seal Injection Flow," Section 6.2, "Determination of Seal Leakage," is in progress.
- The CRO has adjusted 1-HIC-62-89A, CHRG HDR-RCP SEAL FLOW CONTROL, as required and is now ready to record the seal injection flow rates for each of the RCPs.
- The 'Auctioneered High Tavg' signal fails LOW.

Which ONE of the following completes the statements below?

Due to the 'Auctioneered High Tavg' signal failure, the RCP seal injection flow indication will (1).

The Bases for Tech Spec LCO 3.5.5 requiring performance of this test is to ensure (2).

- A. ✓ (1) remain the same
(2) sufficient CCP flow to the RCS through ECCS injection lines during an accident
- B. (1) remain the same
(2) CCP flow to the RCP seals remains within 8-13 gpm after an actuation of the ECCS during an accident
- C. (1) decrease
(2) sufficient CCP flow to the RCS through ECCS injection lines during an accident
- D. (1) decrease
(2) CCP flow to the RCP seals remains within 8-13 gpm after an actuation of the ECCS during an accident

DISTRACTOR ANALYSIS:

- A. *Correct, As identified in LCO 3.5.5, the surveillance requirement requires the pressurizer level control valve to be fully open to perform the test. This condition is established in the Surveillance Instruction by taking manual control of the level control valve and positioning it fully open for the test. While the Tavg signal (used to determine pressurizer program level setpoint) failure would normally cause the valve to close, the valve remain full open due to being in manual leaving RCP seal injection flow unaffected. Also, the bases background for T/S 3.5.5 Seal Injection Flow states "The restriction on reactor coolant pump (RCP) seal injection flow limits the amount of ECCS flow that would be diverted from the injection path following an accident." (Also, see below)*
- B. *Incorrect, Plausible because the seal injection flow remaining the same is correct and while the RCPs seal flow is designed to be maintained during an accident the bases is to limit the flow to the seals not to ensure the seal flow remains in the normal range.*
- C. *Incorrect, Plausible because the seal injection flow dropping would be correct if the level control valve had been in automatic and the bases is correct.*
- D. *Incorrect, Plausible because the seal injection flow dropping would be correct if the level control valve had been in automatic and while the RCPs seal flow is designed to be maintained during an accident the bases is to limit the flow to the seals not to ensure the seal flow remains in the normal range.*

The intent of the LCO limit on seal injection flow is to make sure that flow through the RCP seal water injection line is low enough to ensure that sufficient centrifugal charging pump injection flow is directed to the RCS via the injection points (Ref. 2).

The LCO is not strictly a flow limit, but rather a flow limit based on a flow line resistance. In order to establish the proper flow line resistance, a pressure and flow must be known. The flow line resistance is determined by assuming that the RCS pressure is at normal operating pressure and that the charging pump discharge pressure is greater than or equal to the value specified in this LCO. The charging pump discharge header pressure remains essentially constant through all the applicable MODES of this LCO. A reduction in RCS pressure would result in more flow being diverted to the RCP seal injection line than at normal operating pressure. The valve settings established at the prescribed charging pump discharge header pressure result in a conservative valve position should RCS pressure decrease. The additional modifier of this LCO, the pressurizer level control valve being full open, is required since the valve is designed to fail open for the accident condition. With the discharge pressure and control valve position as specified by the LCO, a flow limit is established. It is this flow limit that is used in the accident analyses.

The limit on seal injection flow, combined with the charging pump discharge header pressure limit and an open wide condition of the pressurizer level control valve, must be met to render the ECCS OPERABLE. If these conditions are not met, the ECCS flow will not be as assumed in the accident analyses.

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Tier: 1 Group 2

K/A: 028 AA2.07
Pressurizer Level Control Malfunction
Ability to determine and interpret the following as they apply to the
Pressurizer Level Control Malfunctions:
Seal water flow indicator for RCP

Importance Rating: 2.6 / 2.9

10 CFR Part 55: 43.5 / 45.13

10CFR55.43.b: 2

K/A Match: The question matches the K/A because it requires the ability to determine how a pressurizer level control system malfunction will affect the RCP seal water flow indications for the RCPs while the plant is in alignment to perform a Surveillance Requirement. SRO because it requires knowledge of the plant alignment requirements for performance of the Surveillance Requirement and also the bases of the applicable Tech Spec.

Technical Reference: 1-SI-68-33, Measurement Of Reactor Coolant Pump
Seal Injection Flow, Revision 0012
Tech Spec 3.5.5 Bases

Proposed references
to be provided: None

Learning Objective: 3-OT-T/S0305
2. Determine the bases for each specification, as
applicable, to the ECCS.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam.

Comments:

84. 068 AG2.1.7 384

Given the following:

0915 - The crew establishes control in the Auxiliary Control Room.

0915 - Tech Spec 3.0.3 is entered.

1030 - The crew initiates a natural circulation cooldown and the following S/G pressure trends are observed:

<u>Time</u>	<u>S/G Pressures</u>
1030	1040 psig
1050	825 psig
1110	550 psig
1130	470 psig
1150	385 psig

Which ONE of the following completes the statements below?

In accordance with Tech Specs, the crew (1) violated the limit for RCS cooldown rate.

The unit must be placed in Mode 5 no later than (2).

A. (1) has
(2) 1515 the next day

B. (1) has
(2) 2215 the next day

C. (1) has **NOT**
(2) 1515 the next day

D. (1) has **NOT**
(2) 2215 the next day

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible if the candidate mistakes the Admin limit on cooldown rate which is 50°F/hr for the Tech Spec cooldown rate of 100°F/hr. Also the time to be in Mode 5 for Tech Spec 3.0.3 is 37 hrs. (Mode 3 within 7 hrs, Mode 4 within 13 hrs). Since the plant was in Mode 3 at the time of entering 3.0.3, the candidate may determine that the 7 hrs would not be allowed and reduce the time to Mode 5 by that amount, thus Mode 5 would be at 1515 the next day.*
- B. *Incorrect, Plausible if the candidate mistakes the Admin limit on cooldown rate which is 50°F/hr for the Tech Spec cooldown rate of 100°F/hr. The second part is correct; the crew has 37 hrs from the time of discovery to enter Mode 5, thus 2315 the next day.*
- C. *Incorrect, Plausible since the first part is correct. The Tech Spec limit of 100°F/hr was never violated during the cooldown, however the Admin limit of 50°F/hr was. The second part of the answer is not correct as explained in distractor A analysis.*
- D. *Correct, The Tech Spec cooldown rate limit of 100°F/hr was never violated during the cooldown. The operators are directed by AOI-27 to use the saturation temperature for the S/G pressure to determine the RCS temperature when on natural circulation. Also the plant has 37 hrs from the time of discovery to enter Mode 5. Time of discovery was listed at 0915. (0915 plus 37 hrs = 2215 the next day)*

Question Number: 84

Tier: 1 **Group** 2

K/A: 068 AG2.1.7
Control Room Evacuation
Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.

Importance Rating: 4.4 / 4.7

10 CFR Part 55: 41.5 / 43.5 / 45.12 / 45.13

10CFR55.43.b: 2

K/A Match: This question matches the K/A by having the applicant evaluate the plant data on S/G pressures and relate that information to RCS temperature to determine if RCS Tech Spec cooldown rate has been violated. SRO by having the applicant apply the times for Mode entry when Tech Spec 3.0.3 has been applied to current plant conditions.

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Technical Reference: AOI-27, Main Control Room Inaccessibility,
Revision 0028
Tech Spec LCO 3.0.3, Amendment 55

**Proposed references
to be provided:** None

Learning Objective: 3-OT-AOI2700
12. Demonstrate ability/knowledge of AOI, to correctly:
a. Recognize Entry conditions.
b. Respond to Action steps.
c. Respond to Contingencies (RNO column).
d. Respond to Notes & Cautions.
3-OT-T/S0000
13. Briefly discuss what the term LCO 3.0.3 means to
plant operation

Cognitive Level:

Higher	<u>X</u>
Lower	<u> </u>

Question Source:

New	<u> </u>
Modified Bank	<u> </u>
Bank	<u>X</u>

Question History: SQN bank question from SQN 2009 exam (068
AG2.4.7) with procedure title and Tech Spec completion
times changed to make applicable for WBN.

Comments:

85. W/E10 EG2.4.8 185

Given the following:

- The Unit 1 operating crew is performing ES-0.3, "Natural Circulation Cooldown with Steam Void In Vessel (With RVLIS)."
- The Chem Lab reports increasing radiation level in Steam Generator #3.

Which ONE of the following completes the statements below?

Based on the current plant conditions, the operating crew will ____ (1) ____.

In accordance with EPIP-1, "Emergency Plan Classification Logic," the minimum amount of tube leakage that, if exceeded, would exceed the System Degradation EAL criteria is ____ (2) ____.

(Assume the tube leakage is the only RCS leakage present.)

- A. (1) transition to E-3, "Steam Generator Tube Rupture"
(2) 10 gpm
- B. (1) transition to E-3, "Steam Generator Tube Rupture"
(2) 25 gpm
- C. (1) implement AOI-33, "Steam Generator Tube Leak," in parallel with the performance of ES-0.3
(2) 10 gpm
- D✓ (1) implement AOI-33, "Steam Generator Tube Leak," in parallel with the performance of ES-0.3
(2) 25 gpm

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible if the applicant thinks that transitioning to E-3, (which is the correct procedure to address a SGTR), is a correct procedure transition. However, E-3 is not a direct entry EOP. E-3 can only be entered after an SI has been initiated and after completing E-0, "Reactor Trip or Safety Injection." However, 10 gpm is the threshold for unidentified leakage (as defined in Tech Specs). Steam generator tube leakage is identified in Tech Specs as "identified" leakage.*
- B. *Incorrect, Plausible if the applicant thinks that transitioning to E-3, (which is the correct procedure to address a SGTR), is a correct procedure transition. However, E-3 is not a direct entry EOP. E-3 can only be entered after an SI has been initiated and after completing E-0, "Reactor Trip or Safety Injection." Also 25 gpm is the threshold value for an NOUE due to identified leakage.*
- C. *Incorrect, Plausible because using AOI-33 in parallel with ES-0.2 is correct. However 10 gpm is the threshold for unidentified leakage (as defined in Tech Specs). Steam generator tube leakage is identified in Tech Specs as "identified" leakage.*
- D. *Correct, AOIs can be used in parallel with the emergency procedures after ES-0.1 is entered. Also 25 gpm is the threshold value for an NOUE due to identified leakage.*

Question Number: 85

Tier: 1 **Group** 2

K/A: W/E10 G 2.4.8
Natural Circulation with Steam Void in Vessel with/without RVLIS
Knowledge of how abnormal operating procedures are used in conjunction with EOPs.

Importance Rating: 3.8 / 4.5

10 CFR Part 55: N/A

10CFR55.43.b: 5

K/A Match: This question matches the K/A by having the candidate determine the correct use of AOPs and EOPs in conjunction with one another. SRO because it requires 'Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed by having the candidate determine the criteria for an emergency classification' and because it requires knowledge of the criteria which

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K/A Match: This question matches the K/A by having the candidate determine the correct use of AOPs and EOPs in conjunction with one another. SRO because it requires 'Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed by having the candidate determine the criteria for an emergency classification' and because it requires knowledge of the criteria which would result in declaring an emergency classification.

Technical Reference: ES-0.3, Natural Circulation Cooldown With Steam Void in Vessel (with RVLIS), Revision 0011
AOI-33, Steam Generator Tube Leak, Revision 0034
E-3, Steam Generator Tube Rupture, Revision 0023
TI-12.04 User's Guide For Abnormal And Emergency Operating Instructions, Revision 0010
EPIP-1, Emergency Plan Classification Logic, Revision 0035 Attach 2

Proposed references to be provided: None

Learning Objective: 3-OT-PCD-048C
1. Classify emergency events

Cognitive Level:
Higher _____
Lower X

Question Source:
New _____
Modified Bank _____
Bank X

Question History: WBN bank question W/E09 AG2.3.11 modified.

Comments:

86. 003 G2.2.25 286

Given the following:

- All Shutdown Bank Rods are withdrawn to the full out position.

Which ONE of the following identifies the minimum required status of the Reactor Coolant Pumps and the bases for the requirement per Tech Spec 3.4.5 RCS Loops - MODE 3?

Two RCPs operable with...

- A. at least one in operation to ensure adequate decay heat removal capability.
- B. at least one in operation due to the postulation of a power excursion because of an inadvertent control rod withdrawal.
- C. both in operation to ensure adequate decay heat removal capability.
- D✓ both in operation due to the postulation of a power excursion because of an inadvertent control rod withdrawal.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because in Mode 3 if the reactor trip breakers had been open the minimum RCP required status is for two RCPs to be operable with at least one in service and the bases for the current conditions is due to the postulation of a power excursion because of an inadvertent control rod withdrawal.*
- B. *Incorrect, Plausible because in Mode 3 if the reactor trip breakers had been open the minimum RCP required status is for two RCPs to be operable with at least one in service and the bases is to ensure adequate decay heat removal capability. While one RCP can provide the circulation to remove the heat, the second RCP is required to be in operable prior to closing the reactor trip breakers for redundancy.*
- C. *Incorrect, Plausible because in Mode 3, Tech Spec LCO 3.4.5 does require two RCPs to be operable and a bases is to ensure adequate decay heat from removal. But one RCP running can provide the circulation to remove the decay heat. With the Reactor trip breakers closed and the control rod capable of being withdrawn, two operable RCPs are required to be in service due to the postulation of a power excursion because of an inadvertent control rod withdrawal.*
- D. *Correct, The unit is in Mode 3 with the Reactor trip breakers closed and the control rod capable of being withdrawn. Tech Spec LCO 3.4.5 requires two RCPs to be operable with both in service and a bases is due to the postulation of a power excursion because of an inadvertent control rod withdrawal.*

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Question Number: 86

Tier: 2 Group 1

K/A: G2.2.25
Reactor Coolant Pump System
Equipment Control
Knowledge of the bases in Technical Specifications for limiting conditions
for operations and safety limits.

Importance Rating: 3.2 / 4.2

10 CFR Part 55: 41.5 / 41.7 / 43.2

10CFR55.43.b: 2

K/A Match: K/A is matched and is SRO because the question requires
knowledge of the bases in Technical Specifications for the RCPs.

Technical Reference: Tech Spec LCO 3.4.5 RCS Loops - MODE 3,
Amendment 61
Tech Spec B 3.4.5 RCS Loops - MODE 3, Revision 82

Proposed references
to be provided: None

Learning Objective: 3-OT-T/S0304
1. Demonstrate the ability to extract specific
information from the Technical Specifications and
Technical Requirements, as they pertain to RCS.
2. Determine the bases for each specification, as
applicable, to the RCS.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

87. 006 A2.12 187

Given the following:

- The crew is currently performing ECA-3.1, "SGTR and LOCA Subcooled Recovery," with safety injection termination in progress.
- Maximum containment pressure reached during the event is 2.3 psid.
- After stopping the first charging pump, RCS subcooling drops and stabilizes at 64°F.

Which ONE of the following completes the statement below?

Based on the current plant conditions, the SRO will direct the crew to (1)
and then (2).

- A✓ (1) restart the charging pump
(2) continue with ECA-3.1
- B. (1) leave the charging pump off
(2) continue with ECA-3.1
- C. (1) restart the charging pump
(2) transition to ECA-3.2, "SGTR and LOCA Saturated Recovery"
- D. (1) leave the charging pump off
(2) transition to ECA-3.2, "SGTR and LOCA Saturated Recovery"

DISTRACTOR ANALYSIS:

- A. *Correct, With RCS subcooling less than 85°F, ECA-3.1, via the foldout page, will direct the charging pump to be restarted and the procedure will be continued.*
- B. *Incorrect, Plausible because the next actions in the procedure are to determine if an SI pump can be stopped. But to stop the pump, at least 85°F subcooling is required.*
- C. *Incorrect, Plausible because restarting the charging pump is correct and the transition to ECA-3.2 is plausible because there are conditions that if encountered while performing ECA-3.1 that will result in a transition to ECA-3.2.*
- D. *Incorrect, Plausible because the next actions in the procedure are to determine if an SI pump can be stopped. But to continue, at least 85°F subcooling is required. The transition to ECA-3.2 is plausible because there are conditions that if encountered while performing ECA-3.1 that will result in a transition to ECA-3.2.*

Question Number: 87

Tier: 2 **Group** 1

K/A: 006 A2.12
Emergency Core Cooling System
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:
Conditions requiring actuation of ECCS

Importance Rating: 4.5 / 4.8

10 CFR Part 55: 41.5 / 45.5

10CFR55.43.b: 5

K/A Match: K/A is matched because the question requires the ability to recognize action requiring actuation of the ECCS as directed on the emergency instruction fold out page and is SRO because it requires knowledge of the requirements for selecting the procedure with which to proceed or implement.

Technical Reference: ECA-3.1, SGTR and LOCA Subcooled Recovery,
Revision 0012

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**Proposed references
to be provided:** None

Learning Objective: 3-OT-ECA0301
2. Given a set of plant conditions, use procedures
ECA-3.1, 3.2, and 3.3 to identify any required
procedure transition.

Cognitive Level:

Higher X
Lower

Question Source:

New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam.

Comments:

88. 010 A2.01 188

Given the following:

- Unit 1 is operating at 100% power.
- Control Heater Bank 'D' is out of service and its breaker is tagged.
- The following annunciators alarm:
 - 90-B - PZR PRESS LO-DEVIN BACKUP HTRS ON
 - 14-E - M-1 THRU M-6 MOTOR TRIPOUT
- Backup Heater Bank 'C' 6.9kv breaker is determined to be tripped.

Which ONE of the following completes the statement below?

Assuming no operator action is taken, the heater failure will cause pressurizer pressure to be (1) .

The bases of the Tech Spec LCO required to be entered is (2) .

- A. (1) controlled less than 2235 psig
(2) to maintain RCS subcooling following a loss of offsite power for an extended period of time
- B✓ (1) controlled less than 2235 psig.
(2) to ensure the core operates within the limits assumed in the safety analyses
- C. (1) returned to and controlled at 2235 psig.
(2) to maintain RCS subcooling following a loss of offsite power for an extended period of time
- D. (1) returned to and controlled at 2235 psig.
(2) to ensure the core operates within the limits assumed in the safety analyses

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the pressurizer pressure being controlled by the other 2 sets of backup heaters cycling on and off at a nominal pressure of 2210-2118 psig is correct. The Bases stated is plausible because it is the bases for the pressure heater Tech Spec which can be improperly determined to be the LCO entered for the conditions.*
- B. *Correct, The pressurizer pressure will be controlled by the other 2 sets of backup heaters cycling on and off at a nominal pressure of 2210- 2118 psig (as controlled by the output of the master controller). This will result is an entry into the RCS DNB Tech Spec due to the pressure being less than minimum and the basis for the Tech Spec minimum pressure is to ensure the core operates within the limits assumed in the safety analyses.*
- C. *Incorrect, Plausible because the pressurizer pressure would be controlled 2235 psig if the heater failures had involved the failure of any other 2 sets of heaters. Those conditions would have left either C or D banks in service. D heaters are the variable heaters which would be controlled by the master controller to maintain pressure at 2235 psig and the C bank would have remained energized causing the master controller to open the pressurizer sprays to maintain pressure at 2235 psig. Also plausible because the Bases stated is the bases for the pressure heater Tech Spec which can be improperly determined to be the LCO entered for the conditions.*
- D. *Incorrect, Plausible because the pressurizer pressure would be controlled 2235 psig if the heater failures had involved the failure of any other 2 sets of heaters. Those conditions would have left either C or D banks in service. D heaters are the variable heaters which would be controlled by the master controller to maintain pressure at 2235 psig and the C bank would have remained energized causing the master controller to open the pressurizer sprays to maintain pressure at 2235 psig. Second part plausible because the bases stated is correct as the DNB Tech Spec is the LCO that will be entered.*

Question Number: 88

Tier: 2 **Group** 1

K/A: 010 A2.01
Pressurizer Pressure Control System (PZR PCS)
Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:
Heater failures

Importance Rating: 3.3 / 3.6

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

10CFR55.43.b: 2

K/A Match: K/A is matched because the question requires the ability predict the impact on the Pressurizer Pressure Control System due to a pressurizer heater failure as well as the Tech Spec that would be required to be entered. The question is SRO because it requires knowledge of Tech Spec Bases that is required to be entered because of the pressurizer heater failure.

Technical Reference: AOI-18, Malfunction of Pressurizer Pressure Control System, Revision 0023
SOI-68.03, Pressurizer Pressure and Spray Control System, Revision 0021
Tech Spec 3.4.1 Bases
Tech Spec 3.4.9 Bases

Proposed references to be provided: None

Learning Objective: 3-OT-068C
5. Identify each setpoint and resulting automatic action for the Pressurizer Pressure Program.
3-OT-T/S0304
3. Given plant conditions/parameters correctly determine the OPERABILITY of components associated with RCS.

Cognitive Level:
Higher X
Lower

Question Source:
New X
Modified Bank
Bank

Question History: New question for the WBN 10/2011 NRC exam

Comments:

89. 025 G2.1.28 289

Given the following:

- Unit 1 is in Mode 3 preparing for a reactor startup when Tech Spec LCO 3.6.12, Ice Condenser Doors, is entered due to the following:

0600 - Annunciator window 144-A, ICE COND INLET DOOR OPEN, alarms.

0620 - An AUO reports one lower inlet door is cracked just off the closed position, is free to open, but will not close completely.

1010 - Maximum ice bed temperature verified to be 24.6°F.

1345 - Maximum ice bed temperature verified to be 24.8°F.

1850 - Maximum ice bed temperature verified to be 25.2°F.

2050 - Inlet door is repaired, closed, and testing completed.

Which ONE of the following completes the statement below?

The purpose of the Ice Condenser lower inlet doors flow proportioning springs is to (1).

The earliest of the listed times a Tech Spec violation has occurred was at (2).

REFERENCE PROVIDED

- A. (1) limit the radiation at the inlet door to 5 rad/hr during normal operation
(2) 1010
- B. (1) limit the radiation at the inlet door to 5 rad/hr during normal operation
(2) 1850
- C✓ (1) ensures flow proportioning through the ice beds during an accident
(2) 1010
- D. (1) ensure a balanced flow through the ice beds during an accident
(2) 1850

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the maximum radiation at the inlet door is 5 rad/hr gamma during normal operation but this is not a design function of the springs. Also because 1010 is correct for the earliest listed time when tech spec had been violated.*
- B. *Incorrect, Plausible because the maximum radiation at the inlet door is 5 rad/hr gamma during normal operation but this is not a design function of the springs. Also because a Tech Spec violation did occur between 1345 and 1850.*
- C. *Correct, The purpose of the flow proportioning springs is to assure the doors close in the event they are inadvertently opened and they are adjusted such that only one pound per square foot will cause door opening to be initiated. Also, the Tech Spec LCO action time was not met for the first 4 hrs. Since the doors were declared inoperable at 0600, the first verification of ice bed temp should have happened by 1000. The 25% grace period for surveillances does not apply to the first surveillance.*
- D. *Incorrect, Plausible since the first part is correct, and the Tech Spec requirements were not met at 1850. However, 1850 was not the first time a violation occurred. The Tech Spec LCO times were not met for the first surveillance.*

Question Number: 89

Tier: 2 **Group** 1

K/A: 025 G2.1.28
Ice Condenser System
Knowledge of the purpose and function of major system components and controls

Importance Rating: 4.1 / 4.1

10 CFR Part 55: 41.7 /

10CFR55.43.b: 2

K/A Match: This question matches the K/A by having the candidate recall the purpose of a major component of the Ice Condenser System (Ice Condenser lower inlet doors) and SRO by having candidate determine if the Tech Spec required action for inoperable equipment was performed within the required time frames. (Application of generic LCO requirements (SR 4.0.1 thru 4.0.4)).

Technical Reference: Tech Spec 3.6.12, Ice Condenser Doors, Amendment 3

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Technical Reference: Tech Spec 3.6.12, Ice Condenser Doors, Amendment 3
and 3.6.12 Bases
N3-61-4001, Ice Condenser System, Revision 0018

**Proposed references
to be provided:** Tech Spec 3.6.12 (5 pages)

Learning Objective: 3-OT-SYS061A
6. Describe the ice condenser doors and state at what pressures they open.
24. Regarding Technical Specifications and Technical Requirements for this system:
a. Identify the conditions and required actions with completion time of one hour or less.
b. Explain the Limiting Conditions for Operation, Applicability, and Bases.
c. Given a status/set of plant conditions, apply the appropriate Technical Specifications and Technical Requirements.

Cognitive Level:

Higher	<u> X </u>
Lower	<u> </u>

Question Source:

New	<u> </u>
Modified Bank	<u> X </u>
Bank	<u> </u>

Question History: WBN bank question T/S3612 001 modified for use on the WBN 10/2010 exam.

Comments:

90. 026 G2.2.37 390

Given the following:

- Unit 1 RCS temperature is 325°F with a heatup in progress following a refueling outage.
- During a board walkdown both indicating lights on 1-HS-72-40, RHR SPRAY HDR A, are discovered to be DARK.
- The AUO sent to investigate reports back:
 - the valve is closed.
 - the 480v breaker for the valve is tripped and cannot be reset.

Which ONE of the following completes the statements below?

Based on current plant conditions, LCO 3.6.6 Containment Spray System
____(1)____ met.

The next Mode change as the heatup continues ____ (2) ____ be made using the provisions of LCO 3.0.4.b.

- A. (1) is **NOT**
(2) may
- B. (1) is **NOT**
(2) may **NOT**
- C✓ (1) is
(2) may
- D. (1) is
(2) may **NOT**

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because Tech Spec LCO 3.6.6 entry would have been required if the RCS temperature had been at least 350°F (Mode 3) and since the valve status will prevent meeting the LCO after the mode change. The required actions of LCO 3.6.6 do not permit continued operation in the Mode, thus 3.0.4.a would prevent the Mode change and there are LCOs that will not allow the use of 3.0.4.b. to allow the mode change.*
- B. *Incorrect, Plausible because Tech Spec LCO 3.6.6 entry would have been required if the RCS temperature had been at least 350°F (Mode 3) and since the valve status will prevent meeting the LCO after the mode change. The required actions of LCO 3.6.6 do not permit continued operation in the Mode, thus 3.0.4.a will prevent the Mode change unless the requirements of 3.0.4.b are met and there are LCOs that will not allow the use of 3.0.4.b.*
- C. *Correct, RHR spray is not required with the plant currently in Mode 4. Tech Spec LCO 3.6.6 entry would have been required if the RCS temperature had been at least 350°F (Mode 3) and implementing the provisions of LCO 3.0.4.b to allow the Mode change is correct.*
- D. *Incorrect, Plausible because no Tech Spec LCO being required while in Mode 4 is correct and since the valve status will prevent meeting the LCO after the mode change. The required actions of LCO 3.6.6 do not permit continued operation in the Mode, thus 3.0.4.a will prevent the Mode change and there are LCOs that will not allow the use of 3.0.4.b.*

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Question Number: 90

Tier: 2 **Group** 1

K/A: 026 G2.2.37
026 Containment Spray System
2.2 Equipment Control
2.2.37 Ability to determine operability and/or availability of safety related equipment.

Importance Rating: 3.6 / 4.6

10 CFR Part 55: 41.7 / 43.5 / 45.12

10CFR55.43.b: 2

K/A Match: K/A is matched because the questions requires knowledge of the containment spray system Tech Spec and is SRO because the questions requires knowledge of the provision of LCO 3.0.4

Technical Reference: Tech Spec LCO 3.0, Amendment 55
Tech Spec LCO 3.6.6, Containment Spray System

Proposed references to be provided: None

Learning Objective: 3-OT-T/S0306
4. Given plant conditions and parameters correctly, determine the applicable LIMITING CONDITION FOR OPERATION, OR TECHNICAL REQUIREMENTS for the various components of the Containment System.

Cognitive Level:
Higher X
Lower _____

Question Source:
New X
Modified Bank _____
Bank _____

Question History: New question of the WBN 10/2011 NRC exam

Comments:

91. 034 G2.4.30 191

Given the following:

- Unit 1 is defueled with fuel shuffles in progress in the spent fuel pool.
- Personnel report that a leak has developed and level is dropping in the spent fuel pool.
- The irradiated fuel assembly on the hoist is dropped from the Spent fuel Handling Tool while restoring it to a cell location in the storage rack.
- Gas bubbles are reported to be rising in the Spent Fuel Pool.
- Fuel Pool Rad Monitors 0-RM-90-102 and 0-RM-90-103 both increase to the alarm setpoint.
- The spent fuel pool level stabilized one foot above the siphon breaker.

Which ONE of the following identifies the event declaration to be made and the external notification having the shortest allowed time?

REFERENCE PROVIDED

	<u>Declaration</u>	<u>Notification</u>
A.	NOUE	NRC
B.	NOUE	TEMA
C.	ALERT	NRC
D✓	ALERT	TEMA

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the conditions for NOUE declaration do exist for EAL 7.4, "Fuel Handling," but the conditions for an Alert also exist. The SFP level stabilizing above the fuel can result in an error in the classification. Also plausible because an NRC notification is required for the event, but it is a one hour notification of the declaration.*
- B. *Incorrect, Plausible because the conditions for NOUE declaration do exist for EAL 7.4, "Fuel Handling." Also plausible because the maximum allowed time for the TEMA notification is would be 30 minutes (15 minutes to declare and 15 minutes to notify of the declaration).*
- C. *Incorrect. Plausible because based on EAL 7.4, "Fuel Handling," the conditions for an Alert exist: alarms on 0-RM-90-102 and 103 AND reports of damage to irradiated fuel resulting in rupture of the fuel rods. Also plausible because an NRC notification is required for the event, but it is a one hour notification of the declaration.*
- D. *Correct, Based on EAL 7.4, "Fuel Handling," the conditions for an Alert exist: alarms on 0-RM-90-102 and 103 AND reports of damage to irradiated fuel resulting in rupture of the fuel rods. Also, the TEMA notification having the shortest time is correct. (15 minutes to declare the event and 15 minutes to make the notification.)*

Question Number: 91

Tier: 2 **Group** 2

K/A: 034 G2.4.30
Fuel Handling
Emergency Procedures / Plan
Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator

Importance Rating: 2.7 / 4.1

10 CFR Part 55: 41.10 / 43.5 / 45.11

10CFR55.43.b: 7

K/A Match: K/A is matched because the question requires knowledge of the reporting requirements for an event that is declared for a dropped fuel assembly. SRO because the question requires knowledge of reporting requirements and Emergency Classifications associated with fuel handling facilities and procedures.

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Technical Reference: EPIP-1, "Emergency Plan Classification Logic,"
Revision 0035
EPIP-3, Alert, Revision 0033

Proposed references to be provided: EPIP-1, "Emergency Plan Classification Logic." Rev 0035, Page 49 of 51

Learning Objective: 3-OT-PCD-048C
01. Classify emergency events.
26. Understand the critical times associated with:
- Event Declaration
- Offsite Notification
- Facility Staffing
- Printed EPS Report

Cognitive Level:
Higher
Lower X

Question Source:
New X
Modified Bank
Bank

Question History: Question written for 10/2011 Watts Bar NRC exam

Comments:

92. 072 A2.02 192

Given the following:

- Unit 1 operating at 100% power.
- An internal electrical failure causes the output of 0-RM-90-103, "Spent Fuel Pit Area Radiation Monitor," to fail above the HI RAD setpoint.
- The operating crew is performing SOI-30.05, "Auxiliary Bldg HVAC Systems," Section 8.8, "Recovery from Aux Bldg Isolation (ABI)," to restore the system.

Which ONE of the following completes the statements below?

During performance of SOI-30.05 to recover from the ABI, a section of _____ (1) _____ will be required to be implemented.

The ABI actuation _____ (2) _____ required to be reported to the NRC as an Immediate Notification.

- A. (1) SOI-30.06, "Auxiliary Building Gas Treatment System"
(2) is
- B. (1) SOI-31.02, "Post Accident Sampling Facility Ventilation System"
(2) is
- C✓ (1) SOI-30.06, "Auxiliary Building Gas Treatment System"
(2) is **NOT**
- D. (1) SOI-31.02, "Post Accident Sampling Facility Ventilation System"
(2) is **NOT**

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because SOI-30.06 being required is correct and ESF actuations are normally reportable.*
- B. *Incorrect, Plausible because performance of a section of SOI-31.02 would be required if the Auxiliary Building isolation had been caused by any of the signals (other than SFP rad monitor) and ESF actuations are normally reportable.*
- C. *Correct, SOI-30.06, "Auxiliary Building Gas Treatment System" would be required to restore the ABGTS fan to a standby alignment and the actuation would be an invalid actuation, thus no 8-hour notification would be required.*
- D. *Incorrect, Plausible because performance of a section of SOI-31.02 would be required if the Auxiliary Building isolation had been caused by any of the signals (other than SFP rad monitor) and ESF actuation not being reportable is correct because the actuation was invalid.*

Question Number: 92

Tier: 2 **Group** 2

K/A: 072 A2.02

Area Radiation Monitoring System

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

Detector failure

Importance Rating: 2.8 / 2.9

10 CFR Part 55: 41.5 / 43.5 / 43.3 / 45.13

10CFR55.43.b: 5, 7

K/A Match: K/A is matched and the question is SRO because the question requires the ability to predict the impact (ventilation system changes & NRC reportability) and use of procedures to mitigate the consequences of the failure.

Technical Reference: SOI-30.05, Auxiliary Bldg HVAC Systems, Rev. 0051
NPG-SPP-03.5, Regulatory Reporting Requirements,
Revision 0003

Proposed references None

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to be provided:

Learning Objective: 3-OT-SYS030A
6. List the ABI initiation signals.
7. Explain what events take place on an ABI and why.
3-OT-SSP0305
10. Given a set of normal or abnormal plant conditions,
determine whether the event requires reporting to the
NRC, the FAA, or TEMA.

Cognitive Level:

Higher	<u> X </u>
Lower	<u> </u>

Question Source:

New	<u> </u>
Modified Bank	<u> X </u>
Bank	<u> </u>

Question History: Sequoyah bank question 072 A2.02 modified for use on
the WBN 10/2011 NRC exam. SQN question used on
the SQN 01/09 NRC exam.

Comments:

93. 086 G2.2.22 193

Given the following:

- Unit 1 is at 4% power after being restarted from a refueling outage.
- An Appendix R valve is determined to be out of its required Fire Safe Shutdown (FSSD) condition.

Which ONE of the following completes the statements below?

A maximum time of (1) is allowed by OR 14.10 to restore the valve to the proper FSSD condition before additional action is required.

The planned entry into Mode 1 is (2) .

(1)

(2)

- | | |
|---|--|
| A. 14 days | NOT restricted by the action statement |
| B. 14 days | prohibited until the action statement is cleared |
| <input checked="" type="radio"/> C. 30 days | NOT restricted by the action statement |
| D. 30 days | prohibited until the action statement is cleared |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because 14 days is the maximum time allowed for other 14.10 actions and being in an action not restricting Mode changes is correct. Restricting the entry if a required valve is not in the proper position (similar to Tech Spec) is plausible because there are restrictions associated with OR 14.10 and there are mode reduction requirements similar to Tech Spec 3.0.3.*
- B. *Incorrect, Plausible because 14 days is the maximum time allowed for other 14.10 actions and because there are Tech Spec Conditions and Required Actions that do restrict mode changes. Restricting the entry if a required valve is not in the proper position (similar to Tech Spec) is plausible because there are restrictions associated with OR 14.10 and there are mode reduction requirements similar to Tech Spec 3.0.3.*
- C. *Correct, Section 14.10.2 states "With one or more of the breakers and/or valves specified in design output documents not in the noted position or condition, return the breakers and/or valve to the required position within 30 days." Section 14.0 has a statement identifying 'The Fire Protection Report does not have a requirement similar to Technical Specifications 3.0.4 preventing mode changes while in an action statement.'*
- D. *Incorrect, Plausible because 30 days being the maximum time allowed is correct and because there are Tech Spec Conditions and Required Actions that do restrict mode changes. Restricting the entry if a required valve is not in the proper position (similar to Tech Spec) is plausible because there are restrictions associated with OR 14.10 and there are mode reduction requirements similar to Tech Spec 3.0.3.*

Question Number: 93

Tier: 2 **Group** 2

K/A: 086 G2.2.22
Fire Protection System
Equipment Control
Knowledge of limiting conditions for operations and safety limits.

Importance Rating: 4.0 / 4.7

10 CFR Part 55: 41.5 / 43.2 / 45.2

10CFR55.43.b: 2

K/A Match: K/A is matched and is SRO because the question requires knowledge of the limiting conditions for operations for components identified in OR 14.10 because it requires knowledge of how a

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K/A Match: K/A is matched and is SRO because the question requires knowledge of the limiting conditions for operations for components identified in OR 14.10 because it requires knowledge of how a limiting conditions for operations will affect a planned Mode change.

Technical Reference: WBN Fire Protection Report, Revision 46
Part II - Fire Protection Report,
14.0 Fire Protection Systems and Features Operating
Requirements (OR) page revision 19
14.2 Water Supply, page revisions 34 and 28

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SYS26A
26. Given the condition/status of the HPFP system/
component and the appropriate sections of Fire
Protection Plan, determine if operability
requirements are met and what actions, if any, are
required.

Cognitive Level:

Higher
Lower

X

Question Source:

New
Modified Bank
Bank

X

Question History: WBN bank question MSC0047 001modified for the
WBN 10/2011 exam

Comments:

94. G 2.1.18 194

Given the following:

- Unit 1 is in Mode 3 following a reactor trip on the previous shift.
- Auxiliary Air Compressor B is tagged for maintenance.
- A failed temperature switch results in an Auxiliary Building Isolation (ABI).
- ABGTS fan A-A trips due to motor failure when it attempts to start.

Which ONE of the following completes the statements below?

The OPDP-8, "Limiting Conditions for Operation Tracking," LCO Tracking Log entry for the ABGTS Train A failure will be designated as an ____ (1) ____.

The 'Loss of Safety Function' evaluation will identify that a loss of safety function ____ (2) ____.

(1)

(2)

- | | |
|---------------------------|-------------------------|
| A. 'Active' LCO | has occurred |
| B. 'Information Only' LCO | has occurred |
| C. 'Active' LCO | has NOT occurred |
| D. 'Information Only' LCO | has NOT occurred |

DISTRACTOR ANALYSIS:

- A. *Correct, The ABGTS is required in Mode 3, thus the fan failure resulting in Train A being inoperable would be entered in the LCO Tracking Log as an Active LCO and with the Train B auxiliary air compressor already out of service a Loss of Safety Function would exist because the qualified air supply to ABGTS Train B is not available. The auxiliary air is a support system for several systems, including ABGTS.*
- B. *Incorrect, Plausible because Mode applicability changes as the plant enters different operating modes which result in Information Only entries into the Tech Spec Tracking Log and because a Loss of Safety Function occurring as a result of the ABGTS fan failure is correct since the Train B does not have its essential air supply auxiliary air compressor available.*
- C. *Incorrect. Plausible because the ABGTS Train A failure being entered into the LCO Tracking Log as an Active LCO is correct and because there is control air available for the other Train of ABGTS.*
- D. *Incorrect, Plausible because Mode applicability changes as the plant enters different operating modes which result in Information Only entries into the Tech Spec Tracking Log and because there is control air available for the Train B of ABGTS from the plant control air system.*

Question Number: 94

Tier: 3 **Group** N/A

K/A: G 2.1.18
Conduct of Operations
Ability to make accurate, clear, and concise logs, records, status boards, and reports.

Importance Rating: 3.6 / 3.8

10 CFR Part 55: 41.10 / 45.12 / 45.13

10CFR55.43.b: 2

K/A Match: K/A is matched because the question requires knowledge of the LCO Tracking Log entry that is required to be made for the given mode and condition. The question is SRO because the SRO is responsible for completing the Tech Spec Tracking log and also for performing the Safety Function Determinations when SSC are made inoperable.

Technical Reference: Tech Spec LCO 3.7.12, "Auxiliary Building Gas

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Technical Reference: Tech Spec LCO 3.7.12, "Auxiliary Building Gas Treatment System (ABGTS)"
Tech Spec 5.7.2.18, Safety Function Determination Program
OPDP-8 Limiting Conditions for Operation Tracking, Revision 0005

Proposed references to be provided: None

Learning Objective: 3-OT-OPDP-8
03. Identify the responsibilities of the Unit Supervisor described in OPDP-8, Limiting Condition for Operation Tracking.

Cognitive Level:

Higher	<u> X </u>
Lower	<u> </u>

Question Source:

New	<u> </u>
Modified Bank	<u> X </u>
Bank	<u> </u>

Question History: Watts Bar question T/S0331 096 modified for use on the 10/2011 NRC exam.

Comments:

95. G 2.1.29 395

Given the following:

- Unit 1 is in Mode 1.
- To facilitate on-going work, 'Status Control' was relaxed on a section of safety related piping inside an existing clearance boundary.
- While the operators are re-establishing Status Control following release of the clearance, a valve that is required to be open by the valve checklist is found to be closed and documented in an open work order.

Which ONE of the following completes the statements below?

The (1) is the lowest position in the Operations Organization that can authorize the relaxing of 'Status Control' inside the clearance boundary.

With the valve in the closed position, the valve checklist to re-establish status control (2).

(1)

(2)

- | | |
|------------------------------|---|
| A. Shift Manager or designee | must remain open until the valve can be restored to the required position |
| B✓ Shift Manager or designee | can be documented as complete and closed |
| C. Operations Superintendent | must remain open until the valve can be restored to the required position |
| D. Operations Superintendent | can be documented as complete and closed |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the Shift Manager/designee being authorized for relaxing status control on equipment inside a clearance boundary is correct and because with the valve is not in the position required by the checklist the checklist would not be closed unless another approved process was controlling the valve.*
- B. *Correct, NPG-SPP-10.1 identifies that the Shift Manager/designee is authorized to approve relaxing status control within a clearance boundary and with the valve position controlled in the work control, the valve checklist can be annotated as such and the checklist closed because the work order (which is an approved process for controlling status) will reposition the valve to its correct position.*
- C. *Incorrect, Plausible because the Operations Sup't is the individual normally authorized for relaxing status control on systems and because with the valve not in the position required by the checklist, the checklist would not be closed unless another approved process was controlling the valve.*
- D. *Incorrect, Plausible because the Operations Sup't is the individual normally authorized for relaxing status control on systems and the document being closed with the valve out of position is correct.*

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Question Number: 95

Tier: 3 **Group** n/a

K/A: G 2.1.29
Conduct of Operations
Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.

Importance Rating: 4.1 / 4.0

10 CFR Part 55: 41.10 / 45.1 / 45.12

10CFR55.43.b: Plant Specific Exemption - SRO objective

K/A Match: Applicant must know the requirements for relaxing Status Control within a clearance boundary and the requirements for restoring Status control when the work is finished. SRO because the process for relaxing status control is an SRO function (supported by the procedure and the SRO only objective in the lesson plan)

Technical Reference: NPG-SPP-10.1, System Status Control, Revision 0001
NPG-SPP-10.3, Verification Program, Revision 0000

Proposed references to be provided: None

Learning Objective: 3-OT-SSP1001
SRO Only Objective
03. Explain the responsibilities of the SM/ designee as directed by SPP-10.1, System Status Control.

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question for the WBN 10/2011 NRC exam

Comments:

96. G 2.2.1 296

Which ONE of the following completes the statements below?

To be in compliance with Tech Spec LCO 3.1.5 - Rod Group Alignment Limits, the performance of 1-SI-85-10, "Rod Drop Time Measurement Using CERPI Rod Drop Test Computer," is required prior to a reactor criticality following (1).

The performance of 1-SI-85-10 requires a minimum of (2) Reactor Coolant Pumps to be in service.

- | <u>(1)</u> | <u>(2)</u> |
|-------------------------|------------|
| A. a Mode 5 entry | 4 |
| B. a Mode 5 entry | 3 |
| C. reactor head removal | 4 |
| D. reactor head removal | 3 |

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because there are additional SIs that are required to be performed after each Mode 5 entry and all RCPs being required to be running is correct.*
- B. *Incorrect, Plausible because there are additional SIs that are required to be performed after each Mode 5 entry and there are Tech Spec conditions allowed with three RCPs running. (6 hours to be in Mode 3 with 3 RCPs running)*
- C. *Correct, In accordance with the surveillance requirement SR-3.1.5.3 (see below) the SI is required prior to reactor criticality after initial fuel loading and each removal of the reactor head and all Reactor Coolant pumps are required to be in service.*
- D. *Incorrect, Plausible because being required prior to reactor criticality after each removal of the reactor head is correct and there are Tech Spec conditions allowed with three RCPs running. (6 hours to be in Mode 3 with 3 RCPs running)*

Rod Group Alignment Limits
3.1.5

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.1.5.3 Verify rod drop time of each rod, from the fully withdrawn position, is ≤ 2.7 seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with: <ul style="list-style-type: none"> a. $T_{avg} \geq 551^{\circ}\text{F}$; and b. All reactor coolant pumps operating. 	Prior to reactor criticality after initial fuel loading and each removal of the reactor head

Question Number: 96

Tier: 3 Group n/a

K/A: G 2.2.1
Equipment Control
Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.

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Importance Rating: 4.5 / 4.4

10 CFR Part 55: 41.5 / 41.10 / 43.5 / 43.6 / 45.1

10CFR55.43.b: 6, 2

K/A Match: K/A is matched because the question requires the knowledge of a test of a plant equipment that affects reactivity and how plant equipment must be aligned for the test. The question is SRO because it requires knowledge of Tech Spec that is below the line and is associated with surveillance requirements and well as being a procedure involved in alterations in core configuration, control rod programming, and determination of various internal and external effects on core reactivity.

Technical Reference: Tech Spec LCO 3.1.5, Rod Group Alignment Limits
1-SI-85-10, Rod Drop Time Measurement Using CERPI
Rod Drop Test Computer, Revision 0002

Proposed references to be provided: None

Learning Objective: 3-OT-T/S0301
3. Given plant parameters/conditions, correctly determine the compliance with the LCOs or TRs in the Reactivity Control sections of T/S and T/R manuals.

Cognitive Level:

Higher	_____
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	_____
Bank	_____

Question History: New question for the WBN 10/2011 NRC exam.

Comments:

97. G 2.2.7 297

Given the following:

- Unit 1 reactor is critical below the 'Point of Adding Heat' in accordance with GO-2, "Reactor Startup," during startup following a refueling outage.
- Physics Testing has been declared, and PET-201, "Initial Criticality and Low Power Physics Testing," is in progress.
- The Plant Manager designates the Site Engineering Director to exercise continuous responsibility for the oversight of PET-201.

Which ONE of the following completes the statements below?

The ____ (1) ____ the responsibility for control of PET-201.

The ____ (2) ____ is responsible for covering the items contained on the CIPTE PRE-TEST BRIEFING CHECKLIST for the test.

- A. (1) Shift Manager retains
(2) Test Director
- B✓ (1) Shift Manager retains
(2) Site Engineering Director
- C. (1) Site Engineering Director assumes
(2) Test Director
- D. (1) Site Engineering Director assumes
(2) Site Engineering Director

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the Shift Manager retaining the responsibility for controlling the performance is correct and the Test Director is responsible for conducting the briefings required by the SPP for the test except for the Management Expectations Briefing.*
- B. *Correct, PET 201 is a CIPTE (Complex or Infrequently Performed Test or Evolution) and NPG-SPP-06.9.1, Conduct of Testing, requires the Plant Manager or designee to determine the need to assign a Senior Manager to provide continuous oversight of the test. However, the Shift Manager retains the responsibility for the control of the test. The SPP identifies that the assigned manager does not reduce the Shift Managers authority/responsibility. Briefing requirements change when a procedure is a CIPTE. The Plant Manager or his designee (the Site Engineering Director as identified in the stem) is required to conduct the Management Expectation Briefings Checklist using the Table in the SPP.*
- C. *Incorrect, Plausible because the manager assigned as the CIPTE manager does have responsibility for controlling the pace of the test and the resolution (or escalation) of problems encountered during the test and the Test Director is responsible for conducting the briefings required by the SPP for the test except for the Management Expectations Briefing.*
- D. *Incorrect, Plausible because the manager assigned as the CIPTE manager does have responsibility for controlling the pace of the test and the resolution (or escalation) of problems encountered during the test and the Plant Manager or designee (the Site Engineering Director) is responsible for conducting the briefings the Management Expectations Briefing.*

3.8 Complex Infrequently Performed Tests or Evolutions

- E. For CIPTEs, the test director will conduct pre-test formal briefings as required [i.e., one before the test crew assumes shift duties (a general test overview), usually at the Operations Shift Turnover Meeting, and a second before commencing the test (a detailed briefing)].
- F. At the Test Director's pre-test formal briefing, the Plant Manager or designee for the test shall conduct a briefing for Operations and testing personnel on management expectations for the test utilizing Form NPG-SPP-06.9.1-3.
- G. The Plant Manager or his designee shall determine the need to designate a senior line manager to advise the Shift Manager or Unit Supervisor, who has the authority and experience to exercise continuous responsibility for the oversight of a particular test or evolution. This authority includes control of the pace of the CIPTE and the resolution (or escalation) of problems encountered.

NOTE

This is an oversight position and shall not interfere with or reduce the Shift Manager's responsibility for control of the test.

- H. For CIPTEs, the test director will conduct a post test briefing, as required by CIPTE Manager, to discuss lessons learned to include as a minimum potential procedure changes and training.

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Question Number: 97

Tier: 3 **Group** n/a

K/A: G 2.2.7
Equipment Control
Knowledge of the process for conducting special or infrequent tests.

Importance Rating: 2.9 / 3.6

10 CFR Part 55: 41.10 / 43.3 / 45.13

10CFR55.43.b: 6

K/A Match: K/A is matched because the question requires knowledge of the process for conducting special or infrequent tests including recognizing that an evaluation is a special test and the additional management responsibilities during the test. The question is SRO because it involves administrative requirements associated with low power physics testing processes.

Technical Reference: PET-201, Initial Criticality and Low Power Physics
Testing, Revision 0024
NPG-SPP-06.9.1, Conduct of Testing, Revision 0002

**Proposed references
to be provided:** None

Learning Objective: 3-OT-SPP0801A
3. Describe the responsibilities of the supervisor, test director, and senior manager assigned to a Complex, Infrequently Performed Test or Evolution (CIPTE).

Cognitive Level:

Higher	<u> </u>
Lower	<u> X </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: WBN bank question SPP0305 010 modified for the 10/2011 NRC exam

Comments:

98. G 2.3.11 298

Given the following:

- Unit 1 is in Mode 3 with RCS at normal operating temperature and pressure awaiting secondary plant equipment repair to continue the startup.
- RCS Activity was determined to be 0.28 microcuries/gram DOSE EQUIVALENT I-131 and Technical Specification LCO 3.4.16, RCS Specific Activity, is entered.
- The DOSE EQUIVALENT I-131 was unable to be restored to within the LCO limit in the required action time.

Which ONE of the following completes the statement below?

Technical Specification LCO 3.4.16 states the RCS Tavg must be reduced to less than 500°F within a maximum of (1) hours and the bases is to limit doses at the site boundary in the event of a (2).

(1)

(2)

- A. 8 LOCA in conjunction with the La value of 0.25%/day leakage from containment.
- B. 6 LOCA in conjunction with the La value of 0.25%/day leakage from containment.
- C. 8 Main Steam Line Break in conjunction with an existing SG tube leakage of 150 gpd.
- D✓ 6 Main Steam Line Break in conjunction with an existing SG tube leakage of 150 gpd.

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the action time stated is a time allowed in other Tech Specs and a LOCA with leakage from containment could cause elevated doses at the site boundary. The distractor for a LOCA in conjunction with 0.25%/day leakage from containment is from wording in the Bases for Tech Spec 3.6.1, Containment, and 3.6.2, Containment Air Locks.*
- B. *Incorrect, Plausible because the action time stated is correct and a LOCA with leakage from containment could cause elevated doses at the site boundary. The distractor for a LOCA in conjunction with 0.25%/day leakage from containment is from wording in the Bases for Tech Spec 3.6.1, Containment, and 3.6.2, Containment Air Locks.*
- C. *Incorrect, Plausible because 8 hours is an allowed time for action completion in some Tech Specs and the basis the limit on activity is based on the resulting 2-hour doses at the site boundary not exceeding a small fraction of the 10 CFR 100 limits following a SGTR or a Main Steam Line Break in conjunction with an assumed steady state SG tube leak of 150 gpd.*
- D. *Correct, with the activity above the 0.265 microcuries/gram limit in the Tech Spec 3.4.16 for 48 continuous hours, Tavg is required to be reduced to less than 500°F within 6 hours in accordance with the Tech Spec. The T/S bases indicate that reducing Tavg below 500°F prevents the release of activity should a steam line break occur since the saturation pressure of the primary coolant is below the lift pressure of the atmospheric steam relief valves. The limit on activity is based on the resulting 2-hour doses at the site boundary not exceeding a small fraction of the 10 CFR 100 limits following a SGTR or a Main Steam Line Break in conjunction with an assumed steady state SG tube leak of 150 gpd.*

Question Number: 98

Tier: 3 **Group** n/a

K/A: G 2.3.11
Radiation Control
Ability to control radiation releases.

Importance Rating: 3.8 / 4.3

10 CFR Part 55: 41.11 / 43.4 / 45.10

10CFR55.43.b: 2

K/A Match: K/A is matched and the question is SRO because the question requires knowledge of actions required by Tech Specs to

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K/A Match: K/A is matched and the question is SRO because the question requires knowledge of actions required by Tech Specs to control/prevent a radiation release and the Tech Spec bases for the actions.

Technical Reference: Tech Spec LCO 3.4.16, RCS Specific Activity, Amendment 55
Tech Spec 3.4.16 Bases, Revision 68
Tech Spec Bases for 3.6.1 and 3.6.2, Revision 10

Proposed references to be provided: None

Learning Objective: 3-OT-T/S0304
2. Determine the bases for each specification, as applicable, to the RCS.
4. Given plant conditions and parameters correctly determine the applicable Limiting Conditions for Operations or Technical Requirements for the various components of the RCS.

Cognitive Level:

Higher
Lower

 X

Question Source:

New
Modified Bank
Bank

 X

Question History: WBN Bank question 2.3.11 098 with choices rearranged to relocate the correct answer and the wording changed in C and D to reflect the words in the Tech Spec Bases.

Comments:

99. G 2.4.27 299

Given the following:

- Unit 1 was operating at 100% power when a fire occurred outside of the 125v Vital Battery I and II rooms.
- AOI-30.2, "Fire Safe Shutdown," has been entered.
- Using AOI-30.2, Appendix B, "Fire Safe Shutdown Elevation Diagrams," the determination is made that the fire involves both of the following rooms:
 - 480v Rx MOV Bd Rm 1B (East)
 - 480v Rx MOV Bd Rm 1B (West)
- While the fire is in progress, a Safety Injection signal is generated.

Which ONE of the following completes the statements below?

In accordance with AOI-30.2, Appendix B, "Fire Safe Shutdown Elevation Diagrams," the minimum required action by the operating crew is the performance of ____ (1) ____.

AOI-30.2 actions ____ (2) ____ precedence over the Emergency Operating Procedures.

REFERENCE PROVIDED

- A. (1) both AOI-30.2 C.3 and C.4
(2) take
- B. (1) both AOI-30.2 C.3 and C.4
(2) do **NOT** take
- C✓ (1) either AOI-30.2 C.3 or C.4
(2) take
- D. (1) either AOI-30.2 C.3 or C.4
(2) do **NOT** take

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because the procedure directs "IF fire spreads from one room to an adjacent room, THEN REFER to AOI-30.2 APP B again, AND PERFORM applicable AOI-30.2 C.Series procedure associated with the newly involved room" and the AOI taking precedence over the Emergency Operating Procedures is correct.*
- B. *Incorrect, Plausible because the procedure directs "IF fire spreads from one room to an adjacent room, THEN REFER to AOI-30.2 APP B again, AND PERFORM applicable AOI-30.2 C.Series procedure associated with the newly involved room" and normally the Emergency Procedures take precedence over Abnormal Operating Procedures.*
- C. *Correct, AOI-30.2 identifies that "For a fire that touches a soft interface (no physical wall or barrier), as indicated by heavy dashed lines in AOI-30.2 APP B, the actions of either room are sufficient" and that "For an Appendix R fire, this procedure takes precedence over the Emergency Operating Procedures" in notes in the procedure. The soft interface can be determined using the reference provided.*
- D. *Incorrect, Plausible because while there is a separate AOI-30.2 C.series procedure for each of the rooms the note identifies that performance of either procedure is sufficient due to the soft interface between the areas and normally the Emergency Procedures take precedence over Abnormal Operating Procedures.*

Question Number: 99

Tier: 3 **Group** n/a

K/A: G 2.4.27
Emergency Procedures / Plan
Knowledge of "fire in the plant" procedures.

Importance Rating: 3.4 / 3.9

10 CFR Part 55: 41.10 / 43.5 / 45.13

10CFR55.43.b: 5

K/A Match: K/A is matched because the question requires knowledge of "fire in the plant" procedures and is SRO because it requires knowledge of assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed and the knowledge of hierarchy, implementation, and/or coordination of plant normal, abnormal, and

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K/A Match: K/A is matched because the question requires knowledge of "fire in the plant" procedures and is SRO because it requires knowledge of assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed and the knowledge of hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures

Technical Reference: AOI-30.2, Fire Safe Shutdown, Revision 0031
AOI-30.2 APP B, Fire Safe Shutdown Elevation
Diagrams, Revision 0000

Proposed references to be provided: AOI-30.2 APP B, Fire Safe Shutdown Elevation
Diagrams 2.0 AB EL 772.0, 776.0 & 763.5 ELEVATION
DIAGRAM page 5 (1 page)

Learning Objective: 3-OT-AOI3000
12. Demonstrate Ability/knowledge of AOI-30.1 and 30.2
by:
a. Recognizing entry conditions
b. Responding to required actions of the AOI
c. Responding to contingencies (RNO)
d. Responding to Notes/Cautions

Cognitive Level:

Higher	<u> X </u>
Lower	<u> </u>

Question Source:

New	<u> X </u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question for the WBN 10/2011 NRC exam.

Comments:

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100. G 2.4.42 200

Given the following:

0825 - Shift Manager/SED declares a Site Area Emergency and initiates the Emergency Paging System to staff the TSC and OSC.

0830 - The Assembly and Accountability process is initiated.

Which ONE of the following completes the statements below in accordance with the Radiological Emergency Plan?

A report from Security on the results of accountability will be provided to the Shift Manager/SED no later than (1).

The Shift Manager will be relieved of the SED status and the Technical Support Center activated no later than (2).

- | | <u>(1)</u> | <u>(2)</u> |
|----|------------|------------|
| A. | 0900 | 0925 |
| B✓ | 0900 | 0955 |
| C. | 0915 | 0925 |
| D. | 0915 | 0955 |

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Question Number: 100

Tier: 3 **Group** n/a

K/A: G 2.4.42
Emergency Procedures / Plan
2.4.42 Knowledge of emergency response facilities.

Importance Rating: 2.6 / 3.8

10 CFR Part 55: 41.10 / 45.11

10CFR55.43.b: 7

K/A Match: K/A is matched and is SRO because the question requires knowledge of the time periods following implementation of the emergency plan when an emergency response facility would be expected to be activated and when a report on the status of actions taken by the Shift Manager/SED to establish accountability is expected to be available.

Technical Reference: EPIP-6, Activation and Operation of the Technical Support Center (TSC), Revision 0039
EPIP-8, Personnel Accountability and Evacuation, Revision 0025

Proposed references to be provided: None

Learning Objective: 3-OT-PCD0048C
3. Identify the functions of the onsite emergency response facilities.

Cognitive Level:

Higher	
Lower	<u>X</u>

Question Source:

New	<u>X</u>
Modified Bank	<u> </u>
Bank	<u> </u>

Question History: New question written for the WBN 10/2011 NRC exam.

Comments:

DISTRACTOR ANALYSIS:

- A. *Incorrect, Plausible because within 30 minutes is the time expected to receive the report and 60 minutes the activation time for the CECC.*
- B. *Correct, EPIP-6 identifies "Target activation time for the TSC is approximately 90 minutes." and EPIP-8, Appendix E (Nuclear Security Actions) states "**REPORT** the results of accountability to the SM/SED within 30 minutes after the assembly and accountability sirens have sounded."*
- C. *Incorrect, Plausible because 45 minutes is the time that search teams would be assembled for locating individuals unaccounted for and to 60 minutes the activation time for the CECC.*
- D. *Incorrect, Plausible because 45 minutes is the time that search teams would be assembled for locating individuals unaccounted for and the 90 minutes for the TSC activation time is correct.*