KEY VERIFY RESCORE

	(T)	(F)		
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100	A	B	C	D

Delete #55
Post exam
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JSL
8/12/09

C+ #66
Post exam
Comment
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8/12/09

IMPORTANT

USE NO. 2 PENCIL ONLY

- EXAMPLE: ⊏A⊐ ⊏B⊐ ⊏C⊐ ⊏D⊐ ⊏E⊐
- MAKE *DARK* MARKS
- ERASE *COMPLETELY* TO CHANGE
- MAKE NO STRAY MARKS

ID NUMBER

⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐
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⊏4⊐	⊏4⊐	⊏4⊐	⊏4⊐	⊏4⊐	⊏4⊐	⊏4⊐	⊏4⊐	⊏4⊐	⊏4⊐
⊏5⊐	⊏5⊐	⊏5⊐	⊏5⊐	⊏5⊐	⊏5⊐	⊏5⊐	⊏5⊐	⊏5⊐	⊏5⊐
⊏6⊐	⊏6⊐	⊏6⊐	⊏6⊐	⊏6⊐	⊏6⊐	⊏6⊐	⊏6⊐	⊏6⊐	⊏6⊐
⊏7⊐	⊏7⊐	⊏7⊐	⊏7⊐	⊏7⊐	⊏7⊐	⊏7⊐	⊏7⊐	⊏7⊐	⊏7⊐
⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐
⊏9⊐	⊏9⊐	⊏9⊐	⊏9⊐	⊏9⊐	⊏9⊐	⊏9⊐	⊏9⊐	⊏9⊐	⊏9⊐

ILT
TMI 08-1
SRO KEY

RESCORE

KEY ONLY SCORE

KEY VERIFY RESCORE ⊏R⊐

	(T)	(F)		
1	⊏A⊐	⊏B⊐	⊏C⊐	
2	⊏A⊐	⊏B⊐		⊏D⊐
3		⊏B⊐	⊏C⊐	⊏D⊐
4	⊏A⊐	⊏B⊐		⊏D⊐
5	⊏A⊐	⊏B⊐		⊏D⊐
6	⊏A⊐	⊏B⊐		⊏D⊐
7	⊏A⊐	⊏B⊐		⊏D⊐
8	⊏A⊐	⊏B⊐	⊏C⊐	
9		⊏B⊐	⊏C⊐	⊏D⊐
10	⊏A⊐	⊏B⊐	⊏C⊐	
11		⊏B⊐	⊏C⊐	⊏D⊐
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13	⊏A⊐	⊏B⊐		⊏D⊐
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18	⊏A⊐		⊏C⊐	⊏D⊐
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20		⊏B⊐	⊏C⊐	⊏D⊐
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26		⊏B⊐	⊏C⊐	⊏D⊐
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31		⊏B⊐	⊏C⊐	⊏D⊐
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41	⊏A⊐		⊏C⊐	⊏D⊐
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48	⊏A⊐	⊏B⊐	⊏C⊐	
49	⊏A⊐	⊏B⊐	⊏C⊐	
50		⊏B⊐	⊏C⊐	⊏D⊐

	(T)	(F)		
51	⊏A⊐		⊏C⊐	⊏D⊐
52	⊏A⊐	⊏B⊐	⊏C⊐	
53		⊏B⊐	⊏C⊐	⊏D⊐
54	⊏A⊐		⊏C⊐	⊏D⊐
55	⊏A⊐	⊏B⊐		⊏D⊐
56	⊏A⊐	⊏B⊐		⊏D⊐
57	⊏A⊐		⊏C⊐	⊏D⊐
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63	⊏A⊐		⊏C⊐	⊏D⊐
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65	⊏A⊐	⊏B⊐		⊏D⊐
66	⊏A⊐	⊏B⊐		
67	⊏A⊐	⊏B⊐	⊏C⊐	
68		⊏B⊐	⊏C⊐	⊏D⊐
69	⊏A⊐	⊏B⊐		⊏D⊐
70		⊏B⊐	⊏C⊐	⊏D⊐
71		⊏B⊐	⊏C⊐	⊏D⊐
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98	⊏A⊐	⊏B⊐	⊏C⊐	⊏D⊐
99	⊏A⊐	⊏B⊐	⊏C⊐	⊏D⊐
100	⊏A⊐	⊏B⊐	⊏C⊐	⊏D⊐

Deleted #55 Post Exam Comment Resolution JSR 8/12/09

C+D #66 Post Exam Comment Resolution JSR 8/12/09

IMPORTANT

USE NO. 2 PENCIL ONLY

- EXAMPLE: ⊏A⊐ ⊏B⊐ ⊏D⊐ ⊏E⊐
- MAKE *DARK* MARKS
- ERASE *COMPLETELY* TO CHANGE
- MAKE NO STRAY MARKS

ID NUMBER

⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐	⊏0⊐
⊏1⊐	⊏1⊐	⊏1⊐	⊏1⊐	⊏1⊐	⊏1⊐	⊏1⊐	⊏1⊐	⊏1⊐	⊏1⊐
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⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐	⊏8⊐
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ILT

TMI 08-1

RO KEY

RESCORE

SCORE

KEY VERIFY RESCORE

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	(T)	(F)		
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96	A	B	C	D
97	A	B	C	D
98	A	B	C	D
99	A	B	C	D
100	A	B	C	D

RESCORE

SCORE

IMPORTANT

USE NO. 2 PENCIL ONLY

- EXAMPLE: ⊏A⊐ ⊏B⊐ ■ ⊏D⊐
- MAKE *DARK* MARKS
- ERASE *COMPLETELY* TO CHANGE
- MAKE NO STRAY MARKS

ID NUMBER

0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
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4	4	4	4	4	4	4	4	4	4
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6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

ILT
TMI 08-1
SRO ONLY SECTION
KEY

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AK2.01 (008)	
	Importance Rating	2.7*	2.7

(K&A Statement): **Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following:** Valves

Common 1

Plant Conditions:

- The plant is at 60% power following the loss of the A Feedwater Pump
- Highest RCS Pressure during the transient was 2250 psig
- Main Annunciator alarm G-1-7, PZR SAFETY OR PORV OPEN (DP) alarmed and then cleared following the transient
- Main Annunciator alarm G-1-8, PORV OPEN (ACOUSTIC) alarmed and then cleared following the transient
- PPC alarm A0517, RC-RV2 TAILPIPE DELTA TEMPERATURE is in alarm
- RCS pressure continues to lower slowly
- RCDT pressure continues to rise slowly

Which ONE of the following actions will be required?

A. Remove power from the PORV to ensure it is closed.

B. Commence a plant shutdown and cooldown due to the RCS leak.

C. Reduce RCS pressure to 1970-2000 psig for two hours to stop the leakage.

D. Close the PORV Block Valve and quickly cycle the PORV to try and reseat it.

Proposed Answer: D. Close the PORV Block Valve and quickly cycle the PORV to try and reseat it.

Explanation (Optional):

A. Plausible since this is an action to take IAW Tech Specs if the PORV Block Valve is inoperable; however the PORV is leaking and removing power will not have any effect.
B. Plausible since this is an action that must be taken if leakage is greater than Tech Specs and the PORV can not be isolated using the block valve.
C. Plausible since this is an action that would be taken if a Code Safety Valve was leaking; however the indications in this question are the PORV is leaking.
D. Correct answer. OP-TM-PPC-A0517 requires closing the PORV Block Valve and cycling it open and closed in an attempt to reseat the valve.

Technical Reference(s): OP-TM-PPC-A0517, RC-RV2 TAILPIPE DELTA TEMPERATURE (Rev. 1)
OP-TM-MAP-G0106, PZR SAFETY OR PORV OPEN Rev. 2)
OP-TM-MAP-G-1-7, PORV OPEN (ACOUSTIC)(Rev. 2)
OP-TM-PPC-A0518, RC-RV-1A & RC-V-1B TAILPIPE DELTA TEMPERATURE (Rev. 1)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 223-GLO-10 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	EK3.05 (009)	
	Importance Rating	3.4	3.8

(K&A Statement): **Knowledge of the reasons for the following responses as the apply to the small break LOCA:** CCWS radiation alarm

Common 2

Plant conditions:

- The plant is at 100% power with normal system lineups;

Event:

- Pressurizer level and pressure are lowering
- Makeup flow is rising
- Makeup Tank level is lowering at 3 inches per minute
- ICCW surge tank level is 24 inches and rising rapidly
- RM-L-9, Radiation Level Hi ICCW is in alarm

With these conditions _____ IAW MAP C-3-2, IC SURGE TANK LEVEL HI/LO.

A. the reactor and RCPs will be tripped to prevent overheating the motors.

B. letdown will be isolated to prevent overheating of the demineralizer resins.

C. the reactor and RCPs will be tripped due to impending manual ICCW isolation.

D. a plant shutdown will be commenced due to exceeding Tech Spec leakage limits.

Proposed Answer: C. the reactor and RCPs will be tripped due to impending manual ICCW isolation.

Explanation (Optional):

A. Plausible since the RCPs will be shutdown; however ICCW cools only the RCP seals, NSCCW cools the RCP motors.
B. Plausible since the letdown coolers will be isolated if they are the source of the leak; however it is not to protect the demineralizer resin.
C. Correct answer. The reactor will be tripped, RCPs will be tripped and IC-V-2 and IC-V-3 will be closed, IAW MAP C0302 step 4.1.3.
D. Plausible since the leakage is greater than allowed by Tech Specs; however the reactor will be tripped.

Technical Reference(s): OP-TM-MAP-C0302, IC SURGE TANK LEVEL HI/LO (Rev. 3)(Pages 1, 2) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 661-GLO-8 (As available)

Question Source:
Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content:
55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	EA1.17 (011)	
	Importance Rating	3.5*	4.1*

(K&A Statement): **Ability to operate and monitor the following as they apply to a Large Break LOCA:** Safety parameter display system

Common 3

Plant conditions:

- The plant tripped due to a large RCS Leak
- OP-TM-EOP-010, Rule 1 has been completed
- The following indications are available on panel PCL:
  - Both Hot leg temperature are 350 °F
  - Both Subcooling margins are -95 °F
  - RCS pressure is 18 psig
  - All Reactor Building pressures are 22 psig
- The following indications are available on the plant process computer SPDS screen
  - The average of the 5 highest incore thermocouples is 287 °F
  - Subcooling margin is -32 °F

Given these conditions Superheat is _____

A. 0 °F

B. 20 °F

C. 32 °F

D. 95 °F

Proposed Answer: A. 0 °F

Explanation (Optional):

In determination of the correct answer, it is necessary to determine incore temperature, which is available from the SPDS screens on the plant process computer. Combined with the corrected RCS pressure, as directed per OS-24, the answer of "0°F" is obtained.

A. Correct answer (18 psig RCS + 22 PSIG bldg + 15 PSIA/PSIG) = 55 PSIA at spds temperature of 287°F steam table answer 0°F.
B. Plausible if the examinee fails to use atmospheric pressure in the calculation. Wrong because atmospheric pressure correction is required.
C. Plausible since it's as indicated on the SPDS screen. Wrong because OS-24 conditions requiring manual calculation are satisfied.
D. Plausible since it's as indicated on panel PCL. Wrong because OS-24 conditions requiring manual calculation are satisfied.

Technical Reference(s): OS-24, Conduct of Operations During Abnormal and Emergency Events (Rev 17)(Pages 21, 40) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP002-PCO-2 (As available)

Question Source:
- Bank # ____
- Modified Bank # ____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam ____

Question Cognitive Level:
- Memory or Fundamental Knowledge ____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 b.10
- 55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AK1.05 (015/017)	
	Importance Rating	2.7	3.3

(K&A Statement): **Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow):** Effects of unbalanced RCS flow on in-core average temperature, core imbalance, and quadrant power tilt

Common 4

Plant Conditions:

- Reactor power is 74% following the shutdown of RC-P-1A
- Feedwater flow failed to re-ratio following the shutdown of RC-P-1A

With no operator action console ΔTc indication will be _____ and quadrant power tilt will be _____ in the area where RCS enters from RC-P-1B.

A. positive / higher

B. positive / lower

C. negative / higher

D. negative / lower

Proposed Answer: C. negative / higher

Explanation (Optional):

A. Plausible since tilt will be higher; however the console indication will be in the negative direction due to a colder A loop Tc.
B. Plausible if the examinee does not understand the fluid dynamics of the transient and the affect on tilt, incorrect tilt will be higher.
C. Correct answer. The console ΔTc instrument goes positive if A loop Tc is hotter than B loop Tc. Tilt will be higher in the area where the B RCP discharges due to the colder water being admitted to the core in that area.
D. Plausible since the ΔTc indication will be negative; however tilt will be higher.

Technical Reference(s): LP 11.2.01.153, Flux Distribution and Reactor Control (Rev 10)(Pages 11, 12) (Attach if not previously provided)

TQ-TM-104-621 Integrated Control System (Rev. 2)(Pages 41, 42)

Proposed references to be provided to applicants during examination: None

Learning Objective: 621-GLO-11 (As available)

Question Source:
- Bank # ____
- Modified Bank # ____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam ____

Question Cognitive Level:
- Memory or Fundamental Knowledge ____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 b.5
- 55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AK1.04 (022)	
	Importance Rating	2.9	3.0

(K&A Statement): **Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup:** Reason for changing from manual to automatic control of charging flow valve controller

Common 5

Plant conditions:

- Reactor power is at 100% following a loss of the 1E 4160V Bus
- MU-P-1A was started IAW OP-TM-AOP-041, Loss of Seal Injection
- MU-V-17, Normal Makeup Valve, is in Hand
- RCS pressure is 2155 psig
- Pressurizer level is at 220 inches and stable
- Makeup flow and letdown flow are balanced

Event:

- Reactor Trip

Which ONE of the following describes the effect on the plant if MU-V-17 Normal Makeup Valve Controller remains in HAND during and following the reactor trip?

A. Pressurizer level will lower rapidly to zero.

B. Pressurizer level will lower initially then return to 220 inches.

C. Pressurizer level will lower rapidly then slowly rise until RCS pressure returns to 2155 psig.

D. Pressurizer level will lower rapidly then slowly lower until RCS pressure returns to 2155 psig.

Proposed Answer: C. Pressurizer level will lower rapidly then slowly rise until RCS pressure returns to 2155 psig.

Explanation (Optional):

In all cases, the loss of makeup was due to the trip of the "E" 4kv bus, which provides power to MU-P-1B in the normal lineup.

A. Plausible if the examinee does not know the thumb rule for Pressurizer level change per degree F (approximately 6 inches).
B. Plausible if the examinee thinks the Pressurizer will return to the same level as before the trip because letdown and makeup were balanced.
C. Correct answer. Pressurizer level will initially lower rapidly to < 80 inches due to the drop in Tave and the inability of MU-V-17 to open fully. Pressurizer level will then rise slowly until RCS pressure returns to 2155 psig where letdown and makeup will again be balanced. Pressurizer level will not return to 220 inches due to Tave remaining lower following the trip.
D. Plausible if the examinee believes the temporary deficiency in Makeup flow will remain after the cooldown is terminated.

Technical Reference(s): TQ-TM-104-621-C001, Section F, Reactor Trip Response (Rev. 2) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 211-GLO-11 (As available)

Question Source:
Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 b.5
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AK3.03 (025)	
	Importance Rating	3.9	4.1

(K&A Statement): **Knowledge of the reasons for the following responses as they apply to the Loss of Residual Heat Removal System:** Immediate actions contained in EOP for Loss of RHRS

Common 6

The Plant is Shutdown with the following conditions:

- The Reactor has been shutdown for 20 days.
- Reactor Vessel level was lowered to 23 inches above Cold Leg centerline to support in Vessel work.
- The "B" Train of DHR is operating with a flow rate of 1,600 gpm.

The following indications are noted:

- RCS Cold Leg level is lowering at a rate of 1 inch every 5 minutes.
- LWDS-1-2, AUXILIARY BUILDING SUMP LEVEL HI, annunciates in the Control Room.
- MAP C-1-5, RCS DRAINDOWN LVL HI/LO, annunciates in the Control Room.
- MAP C-1-7, DH PUMP FLOW LO, annunciates in the Control Room.
- Decay Heat Removal Pump, DH-P-1B flow is rapidly varying between 750 gpm and 1,500 gpm.
- Incore thermocouple indications have risen 11.5°F.

What actions will be taken **FIRST** given this situation?

A. Verify RCS water level is adequate IAW OP-TM-212-000, Attachment 7.2 to Start DH-P-1A.

B. Isolate the leak and makeup IAW 1103-11, RCS Water Level Control to stop the RCS inventory loss.

C. Place DH-P-1B in the "pull-to-lock" position IAW OP-TM-EOP-030 to prevent pump damage.

D. Stop/isolate DH-P-1B then start DH-P-1A IAW OP-TM-212-901, Emergency DHR Operations to maintain core cooling.

Proposed Answer: C. Place DH-P-1B in the "pull-to-lock" position IAW OP-TM-EOP-030 to prevent pump damage.

Explanation (Optional):
To answer/understand this question the examinee must evaluate given conditions and determine the appropriate procedure to enter for resolution of the situation. With the conditions described EOP-030 is entered and with DHR flow varying rapidly, IMA 2.1 is invoked and the Pump MUST be placed in the "pull-to-lock" position.

A. Plausible since this is a follow-up action in OP-TM-EOP-030; however it is not the first action taken.
B. Plausible since leak isolation and making up to the RCS will be necessary; however the given conditions require stopping DH-P-1B first to prevent pump damage.
C. Correct Answer - "Immediately place DH-P-1B in the "pull-to-lock" position IAW OP-TM-EOP-030" - See paragraph above.
D. Plausible since starting the standby train is a follow-up action; however it is not the first action taken.

Technical Reference(s): OP-TM-EOP-030, Loss of Decay heat Removal (Rev. 2)(Page 1) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP030-PCO-4 (As available)

Question Source: Bank # QR-EOP030-PCO-4-Q02
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43

Comments:
Modified from bank question by eliminating "immediately" as first word in the correct answer. (MGS 6-8-09) (Minor editorial change. Essentially same as bank.)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AK1.01 (027)	
	Importance Rating	3.1	3.4

(K&A Statement): **Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions:** Definition of saturation temperature

Common 7

The plant is operating at 100% power when the following occurs:

A loss of letdown has occurred due to a power spike on RM-L-1 which has since been placed in defeat.

Current plant conditions:

- Pzr level = 310 inches.
- RCS pressure = 2185 psig.
- Letdown flow restored to 20 gpm, rising at 2.5 GPM/min.
- Pzr temperature = 620F.

Event:

- An ICS transient occurs which causes a rapid 10 °F Tave reduction.

Is a reactor trip more or less likely than if this event had occurred from normal pressurizer conditions? Why?

A. A reactor trip is less likely since the beginning RCS pressure is higher.

B. A reactor trip is less likely since there is much more water available to flash to steam and mitigate the RCS pressure drop.

C. A reactor trip is more likely since there is not enough energy within the PZR water space to mitigate the pressure drop.

D. A reactor trip is more likely since letdown flow is not high enough to compensate for normal insurges and outsurges to the pressurizer.

Proposed Answer: C. A reactor trip is more likely since there is not enough energy within the PZR water space to mitigate the pressure drop

Explanation (Optional):
This question requires the student to understand the concept of saturation temperature as it applies to the Pressure Control Malfunction. Since the PZR temperature is currently below the saturation temperature for 1900 psig (about 630F), none of the water within the pressurizer will flash to steam until pressure drops below 1900 psig, which is below the RCS trip setpoint. The expansion of the pressurizer steam space will be the only compensation for the pressure drop.

A. Distracter - Although starting pressure is higher, there is no mitigation of the pressure drop as the outsurge from the pressurizer occurs. Incorrect answer. Plausible since RCS pressure is currently further away from the Rx Trip setpoint. Also, since the steam volume is smaller (roughly 100" instead of 190") the pressure reduction is faster for the equivalent reduction in pressurizer level. (The Pressurizer has an 84" inner diameter, which gives approximately (PI*(42^2) * 100 / 12^3) ft3 of vapor space, or roughly 321 ft3 above the 310" level. At the given RCS pressure of 2200 psia, this gives about 1972 lbm of steam in the vapor space. At these conditions, a 10" reduction in pressurizer level will expand the vapor space to 353 ft3. This results in the steam expanding to fill the volume, and the density then becomes 1972/353 or 5.59 lbm/ft3. The assumption that the steam remains saturated (vs subcooled) is certainly reasonable. The pressure that corresponds to 5.59 lbm/ft3 is 2070 psia, or 2055 psig. Similar calculations made at initial conditions of 220" and 2155 psig are as follows: 609 ft3 initial, 3660 lbm, 641 ft3 final, 5.71 lbm/ft3, and 2100 psia, or 2085 psig.) Note that this second set of calculations does not include any addition to steam space vapor mass as a result of water space flashing during pressure reduction. It is therefore conservative.

B. Distracter - Although it is correct that there is much more water in the PZR, the temperature is too low to keep RCS pressure high enough to avoid a reactor trip. Plausible since this would be true of PZR temperature was close to normal temperature of 648F.

C. Correct Answer - The pressurizer temperature is less than saturation temperature of the RCS trip setpoint. As such, no water will flash to steam during the transient to mitigate the pressure drop.

D. Distracter - Letdown flow would only mitigate a pressurizer insurge. In this case, there will be a pressurizer outsurge. Plausible since higher letdown flow rates do help with pressurizer pressure control in some circumstances.

Technical Reference(s): TQ-TM-104-220-C001, Reactor Coolant System (Rev. 4)(Page 35)
11.2.01.273 Pressurizer Thermodynamics (Rev. 2)(Pages 4-6)
TQ-TM-104-621-C001,

(Attach if not previously provided)

Integrated Control System (Rev. 2)(Pages 176, 177)

Proposed references to be provided to applicants during examination: None

Learning Objective: 223-GLO-5 (As available)

Question Source: Bank # IR-223-GLO-10-Q03

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.5

55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	EK2.06 (029)	
	Importance Rating	2.9*	3.1*

(K&A Statement): **Knowledge of the interrelations between the and the following an ATWS:** Breakers, relays, and disconnects

Common 8

Which one of the following describes how the Diverse Scram System is actuated and its response following the actuation?

D. One Safety Grade RCS Pressure Wide Range detector senses > 2500 psig and the shunt trips for 1G and 1L breakers are energized from 120 VAC.

E. One Safety Grade RCS Pressure Wide Range detector senses > 2500 psig and the shunt trips for 1G and 1L breakers are energized from 125 VDC.

F. Both Safety Grade RCS Pressure Wide Range detectors sense > 2500 psig and the shunt trips for 1G and 1L breakers are energized from 125 VDC.

G. Both Safety Grade RCS Pressure Wide Range detectors sense > 2500 psig and the shunt trips for 1G and 1L breakers are energized from 120 VAC.

Proposed Answer: D. Both Safety Grade RCS Pressure Wide Range detectors sense > 2500 psig and the shunt trips for 1G and 1L breakers are energized from 120 VAC.

Explanation (Optional):

A. Distracter - Distracter is plausible except that BOTH safety grade pressure detectors are required to sense > 2500 psig
B. Distracter - Distracter is plausible except that BOTH safety grade pressure detectors are required to sense > 2500 psig and the shunt trips for 1G and 1L breakers are powered from 120 VAC
C. Distracter - Distracter is plausible except that the shunt trips for 1G and 1L breakers are powered from 120 VAC. The shunt trips for all other CRD breakers are powered from 125 VDC.
D. Correct Answer - Both Safety grade are required and power is from Balance of Plant 120 volt AC.

Technical Reference(s): OP-TM-MAP-G0207, DSS ACTUATION (Rev. 0)(Page 1)
TQ-TM-104-641- C001, Reactor (Attach if not previously provided)

Protections System (Rev. 1)(Page 7)

Proposed references to be provided to applicants during examination: None

Learning Objective: 641-GLO-2 (As available)

Question Source: Bank # IR-641-GLO-2-Q04

Modified Bank # (Note changes or attach parent)

New

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 b.7

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	G2.4.21 (038)	
	Importance Rating	4.0	4.6

(K&A Statement): **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.** (Steam Gen. Tube Rupture)

Common 9

Plant Conditions:

- A reactor shutdown is in progress due to an OTSG Tube leak
- OP-TM-EOP-005, OTSG Tube Leakage has been implemented by the CRS
- Reactor power is currently at 18% and lowering at 0.5% per minute
- Pressurizer level is 145 inches and slowly lowering

Event:

- Turbine Trip

With the above conditions _____.

A. the reactor must be tripped

B. reactor power must be reduced to <15%

C. the Turbine Bypass Valves must be throttled open in Hand

D. the reactor will trip and HPI will be manually initiated

Proposed Answer: A. the reactor must be tripped

Explanation (Optional):.

A. Correct answer. The reactor must be tripped if the turbine trips while power is >15% during a tube leak shutdown IAW EOP-005 to minimize the duration of the MSSV actuation and direct release to atmosphere.
B. Plausible since lowering reactor power will limit the lift time of the MSSVs; however EOP-005 requires tripping the reactor.
C. Plausible since this is an action that is taken before tripping the reactor if the normal shutdown had continued; however it is not required when the IAAT Statement for the turbine trip is implemented.
D. Plausible since the reactor would trip if power was above 45% and HPI would be initiated; however at the current power level the reactor will be tripped , but HPI initiation is not required.

Technical Reference(s): OP-TM-EOP-005, OTSG Tube Leakage (Rev 6)(Steps 3.7 and 3.31)
OP-TM-EOP-0051, OTSG Tube Leakage Basis Document (Rev. 1)(Page 6)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP005-PCO-4 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AK2.02 (040)	
	Importance Rating	2.6*	2.5

(K&A Statement): **Knowledge of the interrelations between the Steam Line Rupture and the following:** Sensors and detectors

Common 10

Plant conditions:

- Steam leak in reactor building impinging on OTSG full range reference leg.

Based on the conditions above, what will be the effect on level instrumentation?

A. Full range indication ONLY will be affected.

B. All modes of operating range level and startup range levels ONLY will be affected.

C. Operating range level Type 1 compensated only and startup range levels will be affected.

D. Full range level, all modes of operating range level and startup range levels will be affected.

Proposed Answer: D. Full range level, all modes of operating range level and startup range levels will be affected.

Explanation (Optional):

In all cases, the examinee must know the following information to answer this question:

- The temperature compensation for reference leg density is located on the full range level reference leg.
- The full range instrument is NOT temperature compensated. Therefore, all three instruments are affected but for different reasons, two due to inaccurate calibration, and one due to uncompensated density changes.

A. Plausible since full range will be affected; however operating and startup range will also be affected due to their temperature compensations being located on the full range leg.
B. Plausible since operating and startup ranges will be affected; however the full range will also be affected.
C. Plausible since operating range Type 1 and startup ranges will be affected; however Type 2 and full range will also be affected.
D. Correct answer. Full range will be directly affected by density change of reference leg, operating and startup range are affected by the temperature compensations being located on the full range leg.

Technical Reference(s): TQ-TM-104-644-C001, Heat Sink Protection System (Rev. 1)(Section XIII.C.2.1) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-051-PCO-5 (As available)

Question Source: Bank # IR-AOP051-PCO-5-Q01
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 b.7
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AA1.01 (054)	
	Importance Rating	4.5	4.4

(K&A Statement): **Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW):** AFW controls, including the use of alternate AFW sources

Common 11

Plant conditions:

- Reactor was tripped due to low Main Condenser vacuum conditions.
- Both Main Feedwater Pumps are tripped.
- All three Emergency Feedwater Pumps are operating.
- CO-T-1A/B Condensate Storage Tank levels are both lowering, approaching 5 feet.
- Main Condenser is at atmospheric pressure.

Based on these conditions, identify the ONE selection below that describes the remaining sources of supply water for the Emergency Feedwater System.

A. (1) Main Condenser Hotwell
(2) DW-T-2 Million Gallon Tank
(3) Reactor River Water System

B. (1) Main Condenser Hotwell
(2) Pretreatment Building Clearwell
(3) Reactor River Water System

C. (1) DW-T-2 Million Gallon Tank
(2) FS-T-1 Fire Service Altitude Tank
(3) Reactor River Water System

D. (1) Main Condenser Hotwell
(2) DW-T-2 Million Gallon Tank
(3) FS-T-1 Fire Service Altitude Tank

Proposed Answer: A. (1) Main Condenser Hotwell
(2) DW-T-2 Million Gallon Tank
(3) Reactor River Water System

Explanation (Optional):

A. CORRECT. Correct sources/sequence are found in OP-TM-424-902 Hotwell is the first source attempted with Million filling Hotwell, then RR-P-1A or 1B discharge.
B. NOT CORRECT. Pretreatment clearwell is not used, though it could be used to supply the "normal makeup to hotwell system ecolochem"
C. NOT CORRECT. Correct sources/sequence are found in OP-TM-424-902. Distracter is plausible because it includes 3 viable sources of water, including the Fire Service Altitude Tank (An extensive mitigation supply).
D. NOT CORRECT. Correct sources/sequence are found in OP-TM-424-902. Distracter is plausible because it includes 3 viable sources of water, including the Fire Service Altitude Tank (An extensive mitigation supply).

Technical Reference(s): OP-TM-424-902, EFW Alternate Inventory (Rev2)(Sections 1.0, 4.5, 4.6, 4.7) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOPG17-PCO-01 (As available)

Question Source: Bank # IR-EOPG17-PCO-1-Q01
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 b.10
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	EA1.06 (055)	
	Importance Rating	4.1	4.5

(K&A Statement): **Ability to operate and monitor the following as they apply to a Station Blackout:** Restoration of power with one ED/G

Common 12

Plant Conditions:

- The reactor tripped due to Loss of Offsite Power (LOOP)
- EG-Y-1A and EG-Y-1B did not start
- OP-TM-AOP-020, Loss of Station Power has been initiated
- The SBO Diesel has just been started and is powering the 1D 4160V ES bus
- Voltage control is in manual due to an auto voltage control problem
- No components have been started as yet
- An RCS leak has resulted in RCS Pressure falling to 1500 psig resulting in an ESAS actuation

Which ONE of the following actions must be taken?

A. Reset the 1P 480V ES Bus lockout and close N1-02.

B. Verify ALL ESAS components on the 1D 4160V Bus have actuated.

C. Defeat the ESAS signal, start MU-P-1A manually and verify bus voltage is >4100V.

D. Press the Manual 1600 psig ESAS pushbutton for the A Train of ESAS and verify ALL components actuate.

Proposed Answer: C. Defeat the ESAS signal, start MU-P-1A manually and verify bus voltage is >4100V.

Explanation (Optional):

A. Plausible since one action is to reset the 1P 480V Bus lockout; however N1-02 will be opened in this situation not closed.
B. Plausible since the ESAS components will be verified to be operating; however the 1D 4160V Bus pumps will have to be started manually, since they are in PTL.
C. Correct answer. MU-P-1A is in pull to lock and the ESAS signal will have to be defeated and MU-P-1A started IAW OP-TM-864-901. Bus voltage must be verified >4100V before starting the next motor. When the SBO diesel is loaded on to the 1D 4160V all large load pump switches are placed in PTL. If an ES signal is received after the bus is energized the ES pumps have to be manually started one at a time verifying that bus voltage recovers before starting the next pump.
D. Plausible since this would back up the Automatic ESAS signal; however it will not start the 1D 4160V Bus pumps because they are in PTL.

Technical Reference(s): OP-TM-864-901, SBO Diesel Generator (EG-Y-4) Operations (Rev. 8)(Pages 5, 6) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-020-PCO-4 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	G2.2.36 (056)	
	Importance Rating	3.1	4.2

(K&A Statement): **Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.** (Loss of Offsite Power)

Common 13

Plant Conditions:

- The plant is at 100% power
- MU-P-1B is OOS due to an oil leak
- MU-P-1A is running and selected for ES
- EG-Y-1B is OOS for a scheduled inspection
- All other equipment lineups are normal

Event:

- 230KV Bus 4 trips due to a fault on the Grid
- EG-Y-1A automatically starts and loads on the 1D 4160V Bus
- The 1C 4160V Bus automatically transferred to the A aux transformer

Which ONE of the following events would require declaration of a ONE HOUR Tech Spec timeclock?

A. Loss of NR-P-1C.

B. Loss of the 1C 4160V bus.

C. Failure of MU-P-1A to restart.

D. Failure of NS-P-1B to auto start.

Proposed Answer: C. Failure of MU-P-1A to restart.

Explanation (Optional):

A. Plausible since this is a normally selected ES component; however it is supplied by EG-Y-1B in an emergency and is only a 72 hour timeclock.
B. Plausible since this bus is initially lost during the event; however it does not affect any Tech Spec equipment.
C. Correct answer. TS 3.7.2.c requires "With one diesel generator inoperable, in addition to the above, verify that: All required systems, subsystems, trains, components and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power are also OPERABLE or follow specifications 3.0.1."
   TS 3.0.1 "When a limiting Condition for Operation is not met, except as provided in action called for in the specification, within one hour action shall be initiated to place the unit in a condition in which the specification does not apply by placing it, as applicable, in:
   1, At least HOT STANBY within the next 6 hours.
   2. At least HOT SHUTDOWN within the following 6 hours, and
   3. At least COLD SHUTDOWN within the subsequent 24 hours.
D. Plausible since this pump should have auto started during the event; however it would only be a one hour timeclock if it was selected for ES on the 1P 480V bus, which is not the normal equipment lineup.

Technical Reference(s): TS 3.7.2 Offsite Sources (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 211-GLO-14 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AA2.04 (057)	
	Importance Rating	3.7	4.0

(K&A Statement): **Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus:** ESF system panel alarm annunciators and channel status indicators.

Common 14

Plant conditions:

- The plant is at 100% power
- Normal plant equipment lineups exist

Event:

- MAP Alarm A-1-6 INVERTER FAILED is in alarm
- MAP Alarm A-3-6 INVERTER ON BATT 1B is in alarm
- MAP Alarm A-3-8 INVERTER 1B/1D/1F TROUBLE is in alarm
- MAP Alarm E-3-6 ES ACT B TROUBLE is in alarm
- HSPS Channel 4 is actuated
- RPS Cabinet D is deenergized

With the above conditions the status of the ESAS system is _____.

A. Channel 3 of Train B is actuated

B. Channel 3 of Trains A and B are actuated

C. the manual actuation pushbuttons of Train B are inoperable

D. the manual actuation pushbuttons of Both trains are inoperable

Proposed Answer: A. Channel 3 of Train B is actuated

Explanation (Optional):

A. Correct answer. Loss of VBD causes one channel of each ESAS actuation in Train B to actuate.
B. Plausible since this would occur on loss of VBC; however loss of VBD only actuates Train B.
C. Plausible since the B Train is the only train affected; however the manual pushbuttons are power by 'B' DC.
D. Plausible if the examinee does not know the manual pushbuttons are powered by DC.

Technical Reference(s): OP-TM-AOP-018, Loss of VBD (Rev. 1)(Page 15) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-018-PCO-5 (As available)

Question Source:
Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 b.7
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	AA2.01 (058)	
	Importance Rating	3.7	4.1

(K&A Statement): **Ability to determine and interpret the following as they apply to the Loss of DC Power:** That a loss of dc power has occurred; verification that substitute power sources have come on line

Common 15

Plant Conditions:

- The plant is at 100% power
- Normal equipment lineups exist

Event:

- A-3-7, INVERTER 1A/1C/1E TROUBLE
- L-1-3, VOLTAGE REGULATOR DC LOSS
- PRF1-1-1, CRD BREAKER TEST TROUBLE
- MU-V-18, Normal Makeup Isolation valve, and MU-V-20, Seal Injection Isolation valve, console position indicators are OFF

The above alarms indicate a loss of the_____.

A. 1A Inverter and VBA is de-energized

B. 1C Inverter and CRD Breakers 1 and 2 are open

C. 'A' DC Distribution Panel and 1M DC is de-energized

D. 'A' ES MCC has occurred and the 'A' Battery is not supplying the 1A Inverter

Proposed Answer: C. 'A' DC Distribution Panel and 1M DC is de-energized

Explanation (Optional):

K/A is tested at a higher level the examinee must use the indications to determine that the loss of power is due to a loss of DC and that the only panel with backup power "M" DC did not transfer to the backup power supply (light indications for component valves).

A. Plausible since the A-3-7 would be received for an inverter failure; however A-1-6 Inverter Failed alarm would also be received and the other indications provided would not be in.
B. Plausible since the A-3-7 would be received for an 1C Inverter failure and the CRD breakers 1 and 2 would trip; however A-1-6 Inverter Failed alarm would also be received and the other indications provided would not be in.
C. Correct answer. The indications given are for a loss of A DC Distribution panel in the Entry Conditions for AOP-023 and the status of the indicating lights for MU-V-18 and MU-V-20 are used to determine if 1M DC Distribution Panel transferred to the B DC Distribution Panel.
D. Plausible since the A Battery supplies DC power to the 1A Inverter; however the indications given do not support loss of the 1A ES MCC.

Technical Reference(s): OP-TM-AOP-023, "A" DC System Failure (Rev. 1)(Pages 1, 15)
1107-2C, Vital DC Electrical System (Rev. 7)(Page 3 L&P D)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-023-PCO-5 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	G2.2.42 (077)	
	Importance Rating	3.9	4.6

(K&A Statement): **Ability to recognize system parameters that are entry-level conditions for Technical Specifications.** (Generator Voltage and Electric Grid Disturbances)

Common 16

With the 1A Auxiliary Transformer Load Tap Changer (LTC) in _____ a First Energy Transmission System Operator report of a calculated TMI-1 Post Contingency voltage at TMI substation of_____ kV would require entry into Tech Specs?

A. auto / 213

B. auto / 217

C. manual / 221

D. manual / 225

Proposed Answer: C. manual / 221

Explanation (Optional):

A. Plausible since this would be the correct voltage if the Load Tap Change was in manual; however in auto the setpoint is <212 kV.
B. Plausible since this would be the correct voltage if the Load Tap Change was in manual; however in auto the setpoint is <212 kV.
C. Correct answer. For the above conditions 1107-11 requires entry into TS 3.7.2.h if a First Energy Transmission System Operator report of a calculated TMI-1 Post Contingency voltage at TMI <223 kV is reported with the LTC in manual.
D. Plausible since this is the below the Low Grid voltage alarm setpoint; however in manual the setpoint for entering Tech Specs is <223 kV.

Technical Reference(s): 1107-11, TMI Grid Operations (Rev. IC 27224)(Section 3.4.6) TS 3.7.2.h (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 701-GLO-10 (As available)

Question Source:	Bank #		
	Modified Bank #		(Note changes or attach parent)
	New	X	
Question History:	Last NRC Exam	None	
Question Cognitive Level:	Memory or Fundamental Knowledge		
	Comprehension or Analysis	X	
10 CFR Part 55 Content:	55.41	b.10	
	55.43		

Comments: Question changed due to recent plant procedure change.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	EK3.2 (BW/E02)	
	Importance Rating	3.0	4.0

(K&A Statement): **Knowledge of the reasons for the following responses as they apply to the (Vital System Status Verification) :** Normal, abnormal and emergency operating procedures associated with (Vital System Status Verification).

Common 17

Plant Conditions:

- The plant is at 100% power
- Normal equipment lineups exist

Event:

- Loss of the "8" 230kv bus, with a concurrent reactor trip.

Plant conditions after sixty (60) seconds are:

- RCS pressure is 1720 psig and relatively steady.
- RCS T_{ave} is 562°F and lowering slowly.
- Pzr level is 60 inches and lowering slowly.
- MU tank level is 85 inches and rising approximately 2 inches / minute.

In accordance with Guide 9 the CRO will _____.

A. throttle open MU-V-217.

B. initiate HPI IAW OP-TM-211-901, "Emergency Injection HPI/LPI."

C. close MU-V-3 and perform OP-TM-AOP-041, "Loss of Seal Injection."

D. ensure MU-V-17 is opening in automatic and initiate OP-TM-211-462, "Lowering RCS/ MU Volume – Bleed."

Proposed Answer: C. close MU-V-3 and perform OP-TM-AOP-041, "Loss of Seal Injection."

Explanation (Optional):

In this question, the loss of the "8" bus causes a loss of the "E" 4KV bus, until it is powered from the emergency diesel generator. MU-P-1B is normally running, but is not ES selected, which results in a trip of MU-P-1B. With a loss of make-up, the required actions of guide 9 are to close MU-V-3 to isolate letdown and to initiate AOP-041 to restore seal injection. Information in the stem is given to show that letdown is still in service, since MU-T-1 level is rising at 2" / min, consistent with 50 GPM letdown and 10 GPM seal return.

A. Distractor - "throttle open MU-V-217." Plausible if the examinee does not realize that MU-P-1B is tripped on the loss of the 8 230kv bus. Incorrect since with MU-P-1B tripped, guide 9 first requires securing letdown and restoring seal injection.
B. Distracter - "initiate HPI IAW OP-TM-211-901, "Emergency Injection HPI/LPI " - Plausible since the action to initiate HPI is included in guide 9, but incorrect since the action to secure letdown and restore seal injection is earlier in the procedure.
C. Correct answer – see above.
D. Distracter - "ensure MU-V-17 in opening in automatic and initiate OP-TM-211-462, "Lowering RCS/ MU Volume – Bleed " - Plausible since the first action could be taken if MU-P-1B was still running, and the second action is required per guide 8 if the makeup tank level is greater than 96". Incorrect since opening MU-V-17 does nothing to correct the low pzr level, and the action to terminate letdown by closing MU-V-3 will prevent the Makeup tank from rising to 96".

Technical Reference(s): OP-TM-EOP-001, Reactor Trip (Rev. 10)(Page 7) (Attach if not previously provided)
OP-TM-EOP-010, Emergency Procedure Rules, Guides and Graphs (rev. 10) (page 21)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP001-PCO-1 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	EA2.1 (BW/E04)	
	Importance Rating	3.2	4.4

(K&A Statement): **Ability to determine and interpret the following as they apply to the (Inadequate Heat Transfer)** Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Common 18

Plant conditions:

- The plant tripped from 100% due to a large steam leak in containment
- OP-TM-EOP-003 has been initiated
- OP-TM-EOP-010, Rule 3, Excessive Heat Transfer, Phase 1 and 2 isolation of BOTH OTSGs has been completed
- Both OTSGs are depressurizing toward ambient pressure

When the OTSGs are empty the next action operators will take would be _____.

A. GO TO OP-TM-EOP-009, HPI Cooling

B. GO TO OP-TM EOP-004, Lack of Primary to Secondary Heat Transfer

C. adjust OTSG Pressure per OP-TM-EOP-010, Guide 12, RCS Stabilization

D. re-open valves closed per OP-TM-EOP-010, Rule 3 on the least affected OTSG

Proposed Answer: B. GO TO OP-TM EOP-004, Lack of Primary to Secondary Heat Transfer

Explanation (Optional):

A. Plausible since EOP-009 will be entered to provide HPI Cooling; however the procedure transition is from EOP-003 to EOP-004 and then to EOP-009.
B. Correct answer. EOP-004, step 3.3 requires verifying primary to secondary heat transfer is being established. Since neither OTSG has water level nor pressure control, primary to secondary heat transfer can not be established an the operator will GO TO OP-TM-EOP-004.
C. Plausible since this is the procedure that will be used when RCS temperature reduction is terminated; however the OTSGs will not have any pressure control or level due to being isolated.
D. Plausible since Guide 12 does allow re-opening valves closed by Rule 3 if the steam leak will remain isolated; however the conditions given indicate both OTSGs are affected.

Technical Reference(s): OP-TM-EOP-003, Excessive Primary to Secondary heat Transfer (Rev. 6)(Page 3)
OP-TM-EOP-010 Guide 12, RCS Stabilization (Rev. 10)(Page 24)
OS-24, Conduct of Operations During Abnormal and Emergency Events (Rev. 17)(Page 5)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP004-PCO-4 (As available)

Question Source: Bank # QS-EOP-004-PCO-4-Q01
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	AK2.02 (005)	
	Importance Rating	2.5	2.6

(K&A Statement): **Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following:** Breakers, relays, disconnects, and control room switches

Common 19

Plant Conditions:

- The plant is at 58% power following a runback due to a dropped rod in Group 2
- MAP Alarm G-2-1 CRD PATTERN ASYMETRIC is actuated
- The OUTLIMIT indication for Group 2 on the Diamond panel is OFF
- The OUT INHIBIT lamp on the Diamond panel is ON
- The Diamond control panel is in AUTO
- Tave is 577°F

With the above conditions Group 7 control rods can be WITHDRAWN with the Diamond in _____.

A. AUTO if reactor power is reduced to <55%

B. MANUAL if reactor power is reduced to <55%

C. AUTO if SAFETY RODS OUT BYPASS switch is placed in BYPASS

D. MANUAL if the S-2 SWITCH for the dropped rod is in BYPASS

Proposed Answer: C. AUTO if SAFETY RODS OUT BYPASS switch is placed in BYPASS

Explanation (Optional):

A. Plausible since this condition would allow control of group 7 if the safety rod outlimit had not been lost and the power level for control is <60%.
B. Plausible since this condition would allow control of group 7 if the safety rod outlimit had not been lost and the power level for control is <60%.
C. Correct answer. Control rods will not move in the out direction unless the SAFETY RODS OUT BYPASS switch is placed in BYPASS.
D. Plausible since this switch does allow out motion of Group 7; however it only removed the 91.4% limit, the SAFETY RODS OUT BYPASS switch must be placed in BYPASS to allow out motion with the above conditions.

Technical Reference(s): OP-TM-AOP-062, Inoperable Rod (Rev. 2)(Step 3.7)
OP-TM-AOP-0621, Inoperable Rod Basis Document (Rev. 2)(Page 5)
OP-TM-622-000, Control Rod Drive System (Rev. 2)(Pages 7, 11)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-062-PCO-4 (As available)

Question Source:
Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 b.6
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	AA1.01 (033)	
	Importance Rating	2.9	3.1

(K&A Statement): **Ability to operate and / or monitor the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation:** Power-available indicators in cabinets or equipment drawers.

Common 20

Which ONE of the following would indicate a loss of Compensating voltage to Intermediate Range instrument NI-4 during normal 100% power operation?

A. "P. S. NI-4 Auxiliary Power Supply" at 0 Volts and Log Amplifier indication at 10^{-4} Amps.

B. NI-4 Detector Power supply indicates <600 Volts and Log Amplifier indication at 10^{-11} Amps.

C. SUR ROD/WD INHIBIT Bistable OUTPUT STATE Light DIM and OUTPUT MEMORY Light BRIGHT in RPS Cabinet D.

D. Flux >10% Bistable OUTPUT STATE and OUTPUT MEMORY and ROD WITHDRAWAL INHIBIT Lights BRIGHT in RPS Cabinet D.

Proposed Answer: A. "P. S. NI-4 Auxiliary Power Supply" at 0 Volts and Log Amplifier indication at 10^{-4} Amps.

Explanation (Optional):

A. Correct answer. The Aux. Power Supply at zero volts will have very little affect on log level at 100% power so it will continue to read approximately 10^{-4} Amps.
B. Plausible if the examinee thinks the NI-4 Detector Power supply provides the compensating voltage; however the Aux Power Supply provides the compensating voltage and will have very little affect on NI-4 at 100%power.
C. Plausible since this light configuration could result from a loss of Compensating Voltage with power in the Intermediate Range, but would not occur with power above 10%.
D. Plausible since these lights are bright at 100% power; however the bistable is not in effect above 10% power.

Technical Reference(s): TQ-TM-104-623-C001, (Rev.1)(Section V.C)
OP-TM-MAP-G0204 (Rev. 0)(Step 4.1)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 641-GLO-11 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 b.7
- 55.43 _____

Comments: Made clarification during exam by adding "" around, P.S. NI-4 Auxiliary Power Supply, in the "A" choice.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	AK3.08 (037)	
	Importance Rating	4.1	4.3

(K&A Statement): **Knowledge of the reasons for the following responses as they apply to the Steam Generator Tube Leak:** Criteria for securing RCP.

Common 21

Plant conditions:

- Plant shutdown and cooldown IAW EOP-005, "OTSG TUBE LEAKAGE" in progress.
- RC-P-1B tripped on overload after the reactor was verified shutdown.
- Subcooled Margin (SCM) has just been minimized.

Identify the correct RCP operating strategy and reason.

A. RC-P-1C and RC-P-1D will be secured to reduce heat load.

B. Either RC-P-1C or RC-P-1D will be secured to maintain uniform boron concentration.

C. RC-P-1A will be secured to leave two RCPs operating while minimizing RCP vibration.

D. No RCPs will be secured because core lift concerns are already addressed with only three RCPs operating.

Proposed Answer: D. No RCPs will be secured because core lift concerns are already addressed with only three RCPs operating.

Explanation (Optional):

A. Plausible since this would reduce the heat load; however EOP-005 requires shutting down RC-P-1C and RC-P-1D only if 4 reactor coolant pumps are running when the step is reached.

B. Plausible since this would maintain mixing in the RCS; however EOP-005 requires shutting down RC-P-1C and RC-P-1D only if 4 reactor coolant pumps are running.

C. Plausible since this would reduce RCP vibration, however, EOP-005 requires shutting down reactor coolant pumps only if 4 pumps are running when the step is reached.

D. CORRECT answer. EOP-005 step 3.42 requires shutting down RC-P-1C and RC-P-1D only if 4 RCPs are running when the step is reached.

Technical Reference(s): OP-TM-EOP-005, OTSG Tube Leakage (Rev 6)(Step 3.42) (Attach if not previously provided)

OP-TM-EOP-0051, OTSG Tube Leak Basis Document (Rev. 1)(Page 17)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP005-PCO-4 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments: Modified question to include the reason for securing the RCPs to meet the K/A (RLP 3/12/09)
Modified question due to NRC comments regarding "true/false" with the original question. (MGS 6/8/09)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	AA2.05 (059)	
	Importance Rating	3.6	3.9

(K&A Statement): **Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release:** The occurrence of automatic safety actions as a result of a high PRM system signal.

Common 22

Plant Conditions:

- OP-TM-232-551, "Liquid Release of 'A' WECST with WDL-P-14A" is in progress
- MAP Alarm C-1-1 Radiation Level High is received
- RM-L-7, Plant Discharge Rad Monitor is in alarm

What automatic action mitigates the potential radioactive release to the environment?

A. WDL-V-124, WDL-P-14A Outlet to MDCT, closes and WDL-P-14A WECST Recirc Pump will remain running

B. WDL-V-124, WDL-P-14A Outlet to MDCT, closes and WDL-P-14A WECST Recirc Pump trips.

C. WDL-V-257, WDL-P-14A/B Discharge to MDCT/River, closes and WDL-P-14A WECST Recirc Pump will remain running.

D. WDL-V-257, WDL-P-14A/B Discharge to MDCT/River, closes and WDL-P-14A WECST Recirc Pump trips.

Proposed Answer: C. WDL-V-257, WDL-P-14A/B Discharge to MDCT/River, closes and WDL-P-14A WECST Recirc Pump will remain running.

Explanation (Optional):

A. Plausible since WDL-V-124 is the release flow control valve and the pump will remain running; however WDL-V-124 does not close on high radiation.
B. Plausible since WDL-V-124 is the release flow control valve and WDL-P-14A is the discharge pump; however they do not change condition on high radiation.
C. Correct answer. High alarm on RM-L-7 will close WDL-V-257 and the tank Recirc pump remains running.
D. Plausible since WDL-V-257 will close on the high alarm signal from RM-L-7; however WDL-P-14A will not trip.

Technical Reference(s): OP-TM-MAP-C0101, Radiation level Hi (Rev. 0)(RM-L-7 Section) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 661-GLO-2 (As available)

Question Source: Bank # X
Modified Bank # ____ (Note changes or attach parent)
New ____

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 b.11
55.43 ____

Comments: Similar to question on 5/30/2003 Seabrook Exam

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	AA2.2 (BW/A05)	
	Importance Rating	3.5	3.8

(K&A Statement): **Ability to operate and / or monitor the following as they apply to the (Emergency Diesel Actuation)**: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

Common 23

Plant conditions:

- The plant is at 100% power
- Surveillance procedure 1303-4.16 Emergency Power System has been initiated to run EG-Y-1A for the monthly surveillance

To prevent Load Tap changer from adversely affecting diesel generator VAR loading, ___(1)___ Auxiliary Transformer Load Tap Changer(s) will be placed in manual prior to paralleling the diesel to the grid _____(2)_____. EG-Y-1A load will be controlled at ___(3)___.

A. (1) the B
(2) and remain there during the entire run
(3) 2.9 ± 0.1 MWe and 0.5 to 1.0 MVAR

B. (1) the B
(2) and be returned to auto after closing the diesel breaker
(3) 3.0 ± 0.1 MWe and 0.5 to 1.0 MVAR

C. (1) both
(2) and remain there during the entire run
(3) 2.9 ± 0.1 MWe and 0.5 to 1.0 MVAR

D. (1) both
(2) and be returned to auto after closing the diesel breaker
(3) 3.0 ± 0.1 MWe and 0.5 to 1.0 MVAR

Proposed Answer: A. (1) the B
(2) and remain there during the entire run
(3) 2.9 ± 0.1 MWe and 0.5 to 1.0 MVAR

Explanation (Optional):

A. Correct answer. SP-1303-4.16 Limit and Precaution 5.9 states "The applicable LTC must be placed in manual prior to paralleling the diesel generator to the grid. This prevents LTC movement from adversely affecting the diesel generator VAR loading." Load limits given ensure compliance with section 4.6.1.A of Technical specifications.

B. Plausible since the B Auxiliary Transformer Load Tap Changer will be placed in manual prior to paralleling the diesel to the grid; however it will remain there for the duration of the run. 3.0 MWe ± 0.1 is plausible as 3.0 is the load the diesel must be able to accept, and it is rated to 3.3 MWe for short duration.

C. Plausible since the B LTC will be placed in manual prior to paralleling to the grid and will remain there the entire run and multiple busses could be affected by the diesel if the LTC remained in auto; however the other Aux Transformer LTC does not have to be in manual. Load limit given is T.S limit.

A. D. Plausible since the B LTC will be placed in manual prior to paralleling to the grid and multiple busses could be affected by the diesel if the LTC remained in auto; however it will remain there the entire run and the other Aux Transformer LTC does not have to be in manual. Load Limit given is short term limit not T.S. 4.6.2 limit.

Technical Reference(s): SP 1303-4.16, Emergency Power System (Rev. 119)(Page 6) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: none

Learning Objective: 861-GLO-10 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments: Modified 6/28/09 to address Limits of Facility License comment

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	EK1.05 (074)	
	Importance Rating	2.8	3.2

(K&A Statement): **Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling:** Definition of saturated liquid.

Common 24

Plant Conditions:

- The plant tripped from 100% due to a large RCS leak
- RC-P-1C was not secured within one minute of the loss of SCM and is still running
- Failures of equipment in the HPI system resulted in the RCS becoming superheated by 47°F
- OP-TM-EOP-010, Figure 2 RCS Superheat Curve B (Tclad >1400) was never exceeded
- HPI has been recovered

Current Plant Conditions:

- One HPI train is in service
- Incore thermocouple temperatures are 605°F
- RCS Pressure is 1543 psig
- Reactor Building pressure is 0.9 psig

Given the above conditions the RCS is _____ and the crew will _____.

A. Subcooled / throttle HPI flow to minimize SCM

B. Subcooled / reduce the OTSG level to 50% of the Operating Range

C. Saturated / continue running RC-P-1C until SCM is restored

D. Saturated / initiate HPI Cooling to perform a rapid RCS cooldown

Proposed Answer: C. Saturated / continue running RC-P-1C until SCM is restored

Explanation (Optional):

A. Plausible since HPI could be throttled if SCM were restored; however RCS is saturated.
B. Plausible since OTSG level could be reduced if SCM was restored; however RCS is saturated.
C. Correct answer. The RCS is saturated and RC-P-1C must remain running until SCM is restored.
D. Plausible since the RCS is saturated and a rapid RCS cooldown will be performed; however HPI Cooling is only used if RCS pressure approaches 2450 psig.

Technical Reference(s): OP-TM-EOP-008, RCS Superheated (Rev. 7)(Step 3.6)
OP-TM-EOP-010, Rule 1 (Rev 10)
OP-TM-EOP-0101, Emergency Procedure Rules, Guides and Graphs Basis Document (Rev. 2)(Page 6)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: EOP008-PCO-4 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	G2.4.21 (076)	
	Importance Rating	4.0	4.6

(K&A Statement): **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.** High Reactor Coolant Activity.

Common 25

Which ONE of the following detectors will be the **FIRST** to alarm if a SMALL amount of failed fuel were to occur during normal Operation?

A. Letdown Radiation Monitor RM-L-1 Lo due to the increase in particulate activity.

B. Letdown Radiation Monitor RM-L-1 due to the increase in N-16-gamma activity.

C. Condenser Vacuum Pump Exhaust Radiation Monitor RM-A-5 due to the gas activity released from the clad gap.

D. Condenser Vacuum Pump Exhaust Radiation Monitor RM-G-25 due to the increase in Xe-133 activity.

Proposed Answer: C. Condenser Vacuum Pump Exhaust Radiation Monitor RM-A-5 due to the gas activity released from the clad gap.

Explanation (Optional):

A. Plausible since RM-L-1 Lo is the RCS Failed Fuel detector; however there is a 30-60 minute time delay in detecting failed fuel due to the delay.
B. Plausible since RM-L-1 is the RCS Failed Fuel detector; however there is a 30-60 minute time delay in detecting failed fuel due to the delay and the delay is to screen out N-16 gamma activity.
C. Correct answer. RM-A-5 is a gas detector and the activity initially release for the gap is gas activity which makes its way through any baseline tube leak to the secondary side.
D. Plausible since RM-G-25 is designed to detect tube leakage; however it is a high range accident monitor detector that is heavily shielded and has lower sensitivity than RM-A-5.

Technical Reference(s): OP-TM-MAP-C0101, Radiation Level High RM-A-5 (Rev. 0)(Pages 8, 44)
TQ-TM-104-661-C001, Radiation Monitoring System (Rev. 3)(Pages

(Attach if not previously provided)

22,23,29,30,38,39)

Proposed references to be provided to applicants during examination: None

Learning Objective: 120211001 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.11
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	EA1.3 (BW/E08)	
	Importance Rating	3.3	3.8

(K&A Statement): **Ability to operate and / or monitor the following as they apply to the (LOCA Cooldown)** Desired operating results during abnormal and emergency situations.

Common 26

Plant conditions:

- Small Break LOCA cooldown in progress.
- Cooldown rate is 30°F per hour.
- Incore thermocouple temperature is 477°F.

CRS direct you to "Maintain OTSG pressure so that secondary T-sat is 40 to 60°F lower than incore thermocouple temperature."

Which of the following would be the correct indicated OTSG pressure to accomplish this step?

A. 322 psig

B. 375 psig

C. 417 psig

D. 447 psig

Proposed Answer: A. 322 psig

Explanation (Optional):.

A. Correct answer. The range of pressure for Tsat being 40-60°F lower than incore thermocouples is 285-360 psig.
B. Plausible if the examinee forgets to subtract 14.7 psig for the meter indication vs. absolute pressure.
C. Plausible if the examinee misreads the steam table. This number is 60°F below the incore temperature.
D. Plausible if the examinee misreads the steam table. This number is 40°F below the incore temperature.

Technical Reference(s): OP-TM-EOP-006, LOCA (Attach if not previously provided)

Cooldown (Rev. 7)(Step 4.3)
Steam Tables

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: EOP006-PCO-4 (As available)

Question Source: Bank #
Modified Bank # QR5E18-01-Q01 (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43

Comments: Modified question by changing the temperature value in the stem, the answer and all three distracters.
Validation comment removed EOP-006 requires, changed to CRS directs. (Avoids give away potentials)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	EK2.1 (BW/E09)	
	Importance Rating	3.7	4.0

(K&A Statement): **Knowledge of the interrelations between the (Natural Circulation Cooldown) and the following:** Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Common 27

Plant conditions:

- The reactor tripped from 100% power due to a loss of offsite power (LOOP) 5 minutes ago
- An RCS leak developed when the reactor tripped
- RCS pressure is 1700 psig
- 'A' loop Thot indicates 591°F on PCL
- 'B' loop Thot indicates 539°F on PCL
- 'A' loop Tcold indicates 538°F on PCL
- 'B' loop Tcold indicates 536°F on PCL
- 'A' loop SCM indicates 22°F
- 'B' loop SCM indicates 74°F
- Computer Point C4006 indicates the average of the five highest Incore Thermocouple temperatures is 582°F
- Computer Point C4008 indicates 31°F SCM
- All three Emergency Feedwater Pumps are running and feeding both OTSGs

The above conditions indicate natural circulation flow _____ exist and subcooling margin is _____.

A. does / low

B. does / adequate

C. does not / low

D. does not / adequate

Proposed Answer: D. does not / adequate

Explanation (Optional):

A. Plausible if the examinee misinterprets the data and believes natural circulation flow exists.
B. Plausible since SCM is adequate based on computer point C4008 indication; however natural circulation flow does not exist
C. Plausible since natural circulation flow does not exist; however SCM is adequate based on computer point C4008 indication.
D. Correct answer. OS-24 requires using computer point C4008 to determine SCM when forced or verified natural circulation flow does not exist. Natural circulation does not exist due to the failure of Thot to track incore temperature.

Technical Reference(s): OS-24, Conduct of Operations During Abnormal and Emergency Events (Rev. 17)(Page 21)
OP-TM-EOP-010, Guide 10, Natural Circulation (Rev. 10)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP-G10-PCO-5 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A4.04 (003)	
	Importance Rating	3.1	3.0

(K&A Statement): **Ability to manually operate and/or monitor in the control room:** RCP seal differential pressure instrumentation

Common 28

Which ONE of the following will cause RCP #1 Seal differential pressure to be lower?

A. High RCS pressure.

B. Loss of ICS Hand power.

C. Failure of the #2 RCP seal.

D. Seal Return Valve MU-V-26 Closed.

Proposed Answer: D. Seal Return Valve MU-V-26 Closed.

Explanation (Optional):

A. Plausible since RCS pressure can affect seal injection ΔP; however low RCS pressure can cause the ΔP to be low.
B. Plausible since loss of ICS power can affect ΔP; however it is a loss of Auto power.
C. Plausible since failure of the #1 seal can cause ΔP to be low.
D. Correct answer. Closure of a valve in the seal return line will cause a high pressure in the Seal #1 outlet resulting in a low ΔP across the seal.

Technical Reference(s): OP-TM-MAP-F0104, RCP SEAL INJECTION ΔP LO (Rev. 1)(Page 1) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 226-GLO-10 (As available)

Question Source: Bank #

Modified Bank # (Note changes or attach parent)

New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K4.04 (003)	
	Importance Rating	2.8	3.1

(K&A Statement): **Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following:** Adequate cooling of RCP motor and seals

Common 29

RC-P-1A is being prepared for start following a refueling outage. This will be the first RCP started.

The following indications are available:

- RC-P-1A lower oil level is -1.5"
- RC-P-1A #1 seal dP is 225 psid.
- Total seal injection flow is 20 gpm.
- Total ICCW flow is 600 gpm.

Which parameter must be corrected in order to satisfy a RCP start interlock?

A. RC-P-1A lower oil level

B. RC-P-1A #1 seal dP

C. Total seal injection flow

D. Total ICCW flow

Proposed Answer: C. Total seal injection flow

Explanation (Optional):

A. INCORRECT because the lower oil level interlock is at -2". Plausible because the given value is lower than the normal control band.
B. INCORRECT because the #1 seal dP interlock is 210 psid. Plausible because the given value is much lower than the normal value at full RCS pressure.
C. CORRECT. The interlock is at 22 gpm.
D. INCORRECT because the interlock is at 550 gpm. Plausible because the given value is lower than normal ICCW flow.

Technical Reference(s): OP-TM-226-101, step 4.5 and attachment 7.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination None

Learning Objective: 226-GLO-10 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.7
55.43 _____

Comments: new question.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K3.07 (004)	
	Importance Rating	3.8	4.1

(K&A Statement): **Knowledge of the effect that a loss or malfunction of the CVCS will have on the following:** PZR level and pressure

Common 30

Plant Conditions:

- The plant is at 100% power
- An inadvertent ESAS actuation has occurred on the B Train.

Thirty seconds later, normal letdown will be _____ and with NO additional operator action, Pressurizer level will be _____ and Pressurizer pressure will be _____.

A. isolated / rising / rising

B. isolated / stable / rising

C. in service / rising / rising

D. in service / stable / rising

Proposed Answer: A. isolated / rising /rising

Explanation (Optional):

TMI CVCS system Makeup pumps and HPI pumps are the same pumps. Malfunction of the CVCS is created two ways by the ESAS, the isolation of letdown, and the opening of HPI valves in the CVCS system while isolating the normal makeup line. (the inadvertent ES will cause loss of letdown, and opening of HPI valves.)

A. Correct answer. An inadvertent B Train ESAS will cause MU-V-3 to close resulting in a loss of letdown flow and with no operator action HPI will cause Pressurizer level and pressure to rise.
B. Plausible since letdown will be isolated and Pressurizer pressure will be rising; however Pressurizer level will be rising also
C. Plausible since Pressurizer pressure and level will be rising; however letdown will be isolated.
D. Plausible since Pressurizer pressure will be rising; however letdown will be isolated and Pressurizer level will be rising.

Technical Reference(s): OP-TM-AOP-0461, Inadvertent ESAS Actuation Basis Document (Rev. 0)(Page 2) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 642-GLO-11 (As available)

Question Source: Bank #

Modified Bank # BWLC3CCV6016 (Note changes or attach parent)

New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 b.7

55.43

Comments: Modified from a question in the Braidwood exam bank.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K1.04 (005)	
	Importance Rating	2.9	3.1

(K&A Statement): **Knowledge of the physical connections and/or cause effect relationships between the RHRS and the following systems:** CVCS

Common 31

To prevent Makeup Pump damage from OVERHEATING _____.

A. MU-V-36 and MU-V-37 (MU Pump Recirc isolation valves) must be Open when MU pump flow is reduced to less than 115 GPM/pump with DH-V-7A and DH-V-7B (DH-C-1 out to MU-P Suction valve) Closed.

B. MU-V-36 and MU-V-37 (MU Pump Recirc isolation valves) must remain Closed when MU pump flow is reduced to less than 115 GPM/pump while in "piggyback" mode DH-V-7A or DH-V-7B Open (DH-C-1 out to MU-P Suction valve).

C. RC-V-2 and RC-RV-2 (PORV and PORV block) must be Closed when MU pump flow is reduced to less than 115 GPM/pump with DH-V-7A or DH-V-7B Open (DH-C-1 out to MU-P Suction valve).

D. RC-V-2 and RC-RV-2 (PORV and PORV block) must be Open when MU pump flow is reduced to less than 115 GPM/pump with DH-V-7A or DH-V-7B Closed (DH-C-1 out to MU-P Suction valve).

Proposed Answer: A. MU-V-36 and MU-V-37 (MU Pump Recirc isolation valves) must be Open when MU pump flow is reduced to less than 115 GPM/pump with DH-V-7A and DH-V-7B (DH-C-1 out to MU-P Suction valve) Closed.

Explanation (Optional):

DH-V-7A/B are the interfacing valves for TMIs Decay Heat Removal (RHRs) to Makeup and Purification (CVCS) system. They allow the low pressure Decay Heat pumps to take a suction from the Reactor Building Sump and provide a suction source to the High Pressure makeup pumps when RCS pressure is still above shutoff head of the LPI pumps and Borate Water Storage Tank is nearly empty.

A. Correct answer. OP-TM-211-901 Limits and Precautions State "To prevent MU pump damage from overheating, MU-V-36 and MU-V-37 must be Open when MU pump flow is reduced to less than 115 GPM/pump with DH-V-7A and DH-V-7B Closed."
B. Plausible since MU-V-36 and 37 must remain Closed in the Piggyback mode; however it is to protect the Makeup Tank from rupture not to protect the Makeup Pumps and Makeup Pump flow is not a consideration.
C. Plausible since RC-V-2 and RC-RV-2 do have to be controlled in this situation; however they must be opened, not closed.
D. Plausible since RC-V-2 and RC-RV-2 do have to be open when MU pump flow is reduced to less than 115 GPM/pump; however it is with DH-V-7A or DH-V-7B open.

Technical Reference(s): OP-TM-211-901, Emergency Injection (HPI/LPI)(Rev. 3)(Page 1) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 211-GLO-9 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A3.01 (006)	
	Importance Rating	4.0*	3.9

(K&A Statement): **Ability to monitor automatic operation of the ECCS, including:** Accumulators

Common 32

Plant conditions:

- A cooldown to COLD SHUTDOWN is in progress
- RCS Tavg is 365°F
- RCS pressure is 725 psig

Event:

- An RCS leak occurs
- RCS pressure is 300 psig and lowering
- MAP Alarm D-3-8 CF-V-1A/1B POSITION ABNORMAL is actuated

With the above conditions CF-V-1A and CF-V-1B, Core Flood Tank Isolation valves, _____.

A. indicate open and the CF tanks are discharging to the RCS

B. indicate closed and will have to be opened to discharge the CF tanks

C. breakers indicate open and the valves will have to be closed

D. breakers indicate closed and the valves will have to be opened

Proposed Answer: A. indicate open and the CF tanks are discharging to the RCS

Explanation (Optional):

A. Correct answer. With RCS pressure ≤650 psig and CF-V-1A/1B open the MAP Alarm D-3-8 CF-V-1A/1B POSITION ABNORMAL alarm will be actuated.
B. Plausible if the examinee does not understand the position abnormal alarm works in the pressure rising condition and the pressure lower condition, wrong because valves are open.
C. Plausible since the CF-V-1A/1B breakers do have to be closed to close the valves when cooling down; however they do not have any bearing on the alarm, wrong because valves must remain open under these conditions.
D. Plausible since the CF-V-1A/1B breakers do have to be closed to close the valves when cooling down; however they do not have any bearing on the alarm and the valves indicate open.

Technical Reference(s): OP-TM-MAP-D0308, CF-V-1A/1B open the MAP Alarm D-3-8 CF-V-1A/1B POSITION ABNORMAL (Rev. 3) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 213-GLO-10 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 B.7
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K5.05 (006)	
	Importance Rating	3.4	3.8

(K&A Statement): **Knowledge of the operational implications of the following concepts as they apply to ECCS:** Effects of pressure on a solid system.

Common 33

Plant conditions:

- All pressurizer heaters are inoperable.
- Solid plant cooldown is in progress per AOP-043.
- Current RCS conditions:
  - RCS pressure is 400 psig.
  - RCS temperature is 310 °F

Event:

- MS-V-8A failed closed, resulting in a heatup rate of 15 °F / hr.
- RCS pressure is 410 psig and rising slowly.

To counter the rise in RCS pressure, the CRO will _____.

A. open the PORV

B. throttle open MU-V-5.

C. open the hot leg vents.

D. throttle open the spray valve.

Proposed Answer: B. throttle open MU-V-5

Explanation (Optional):
For this question, the candidate is told that a solid plant cooldown is being performed. The basic procedure for a solid plant cooldown is to take the plant solid, cooldown to approximately 350F / 600 psig, secure makeup, letdown, and the four RCPs, and then "float" down on the core flood tank pressure (an ECCS system) to provide stable pressure / inventory control. A step within that procedure describes actions to take if RCS pressure begins to rise, which is to throttle open MU-V-5, thereby relieving some extra inventory (and hence pressure) from the solid system.

A. Plausible since this would in fact lower RCS pressure. Incorrect since this action is not the procedurally directed action, and the setpoint for automatic lift is not being approached.
B. Correct answer. See above.
C. Plausible since this would in fact lower RCS pressure. Incorrect since this action is not the procedurally directed action.
D. Plausible since this is the normal method of lowering RCS pressure. Incorrect since this action has no effect without a steam bubble in the pressurizer and since the RCPs are not running at this stage of the cooldown.

Technical Reference(s): AOP-043 page 11 step 5.21 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 211-GLO-9 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A4.08 (059)	
	Importance Rating	3.0	2.9

(K&A Statement): **Ability to manually operate and monitor in the control room:** Feed regulating valve controller

Common 34

Plant conditions:

- The plant is at 100% power
- All plant equipment is in the normal configuration

Event:

- MAP Alarm H-1-3 OTSG B BTU LIMIT is in alarm
- MAP Alarm H-1-4 NEUTRON X-LIMIT TO FW is in alarm
- MAP Alarm H-1-5 FW X-LIMIT TO RX is in alarm
- MAP Alarm H-2-1 ICS IN TRACK is in alarm
- OTSG B pressure indicates 1200 psig

Which ONE of the following actions will have to be taken to gain control of feedwater flow and allow selection of the alternate OTSG B pressure instrument?

A. Place Both FW Loop Masters in HAND, ONLY.

B. Place FW-V-16B and FW-V-17B in HAND, ONLY.

C. Place Both Feedwater Pumps, and Both FW Loop Masters in HAND.

D. Place Both Feedwater Pumps, and FW-V16B and FW-V-17B in HAND.

Proposed Answer: D. Place Both Feedwater Pumps, and FW-V16B and FW-V-17B in HAND

Explanation (Optional):

A. Plausible if the examinee does not know the BTU Limiter is downstream of the Feedwater Loop Masters, incorrect valves would still go closed.
B. Plausible since these valves will have to be placed in HAND; however both FW Pumps will also have to be placed in HAND due to the BTU limit causing them to be run down in speed.
C. Plausible since both FW Pumps will have to be placed in HAND; however the valves will also have to be placed in HAND due to the BTU Limiter being downstream of the Loop Masters, valves will close in this condition.
D. Correct answer. The B side BTU Limiter affects both FW Pumps and the B Train Feedwater Valves.

Technical Reference(s): TQ-TM-104-621-C001, Integrated Control System (Rev. 2)(Page 160 and Slide of FW Control)
OP-TM-MAP-H0103, OTSG B BTU LIMIT (Rev. 2)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 621-GLO-10 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K3.01 (007)	
	Importance Rating	3.3	3.6

(K&A Statement): **Knowledge of the effect that a loss or malfunction of the PRTS will have on the following:** Containment

Common 35

Plant conditions:

- Reactor Coolant System fill in progress
- The Pressurizer is vented to the Reactor Coolant Drain Tank
- All Reactor Coolant Drain Tank manual vent valves are closed
- The Reactor Vessel is vented to the Reactor Building via the CRDM vents
- Hot Legs are vented to the Reactor Building via high point vents

Event:

- WDG-V-4, Containment Isolation RB Vent Header, fails closed

If the fill evolution were to continue, which ONE of the following would occur?

A. RCDT pressure would rise resulting in the rupture disk relieving.

B. RCDT level would rise due to increased leakage from the RCP Seals.

C. The CRDM vents would overflow to the containment sump at a lower than expected Pressurizer level.

D. The Hot Leg Vents would overflow to the containment sump at a higher than expected Pressurizer level.

Proposed Answer: C. The CRDM vents would overflow to the containment sump at a lower than expected Pressurizer level.

Explanation (Optional):

A. Plausible since RCDT pressure will rise as Pressurizer level rises; however the RCS is vented to the RB atmosphere so the rupture disc will not relieve (70±6 psig).
B. Plausible since RCDT level will be rising; however there will not be increased leakage from the RCP seals.
C. Correct answer. The Pressurizer and RC Drain Tank will be hydraulically locked which will cause the Reactor Vessel to overflow at a lower indicated pressurizer level than expected.
D. Plausible since the Hot Leg Vents could overflow if RCS fill rate was fast enough; however it would occur at a lower than expected Pressurizer level.

Technical Reference(s): 308-946 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: GOP-012-PCO-5 (As available)

Question Source: Bank #
Modified Bank # IR-XXX-GLO-X-Q05 (Note changes or attach parent)
New

Question History: Last NRC Exam ILT 05-1 NRC Q05

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.3
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A1.02 (008)	
	Importance Rating	2.9	3.1

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

Common 36

Plant conditions:

- Plant cooldown in progress
- Train A Decay Heat Removal is in service
- RC-P-1B is the last operating RCP

To prevent exceeding allowable RCS cooldown rate when shutting down RC-P-1B the operator must throttle DC-V-2A, DH-C-1A Shell Inlet Control Valve ____(1)____ and DC-V-65A, DH-C-1A Shell Bypass Control Valve _____(2)____ to ____(3)____.

A. (1)OPEN
(2)CLOSED
(3)raise DH cooler ΔT to >15°F

B. (1)OPEN
(2)CLOSED
(3)lower DH cooler ΔT to <15°F

C. (1)CLOSED
(2)OPEN
(3)raise DH cooler ΔT to >15°F

D. (1)CLOSED
(2)OPEN
(3)lower DH cooler ΔT to <15°F

Proposed Answer: D. (1)CLOSED
(2)OPEN
(3)lower DH cooler ΔT to <15°F

Explanation (Optional):

Decay Closed valves 2 and 65 are used to control the Closed cooling water flow through the Decay heat removal cooler shell side. With the removal of the heat load provided by the RCP the inlet flow must be reduced, and the bypass flow raised to control total flow while maintaining cooler ΔT within design limits.

A. Plausible if the examinee does not understand the operation of DC-V-2A/65A; however the ΔT required is <15°F.
B. Plausible since the required ΔT required is <15°F; however DC-V-2A will be closed and DC-V-65A will be opened.
C. Plausible since DC-V-2A will be closed and DC-V-65A will be opened; however the required ΔT required is <15°F.
D. Correct answer. To prevent exceeding the allowable cooldown rate when securing the last RCP DC-V-2A will be closed and DC-V-65A will be opened to lower cooler ΔT to <15°F.

Technical Reference(s): 1102-11, Plant Cooldown (Rev. 138)(Step 3.2.9.3) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 543-GLO-10 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 b.10
55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K1.05 (010)	
	Importance Rating	3.4 3.6	

(K&A Statement): **Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems:** PRTS.

Common 37

Plant conditions:

- The plant is operating at full power when RC-V-1A, Pressurizer Code Safety Valve, fails open.
- Reactor Coolant Drain Tank initial pressure was 5 psig.
- Containment pressure is 2 psig when pressurizer pressure reaches 985 psig.

AT 985 psig in the RCS, the FINAL expected conditions downstream of the Code Safety Valve will be _____ and the temperature will be _____°F.

A. saturated / 220

B. saturated / 228

C. superheated / 305

D. superheated / 544

Proposed Answer: C. superheated / 305

Explanation (Optional):

A. Plausible if the examinee does not understand the process and uses the steam table to find saturation pressure for 2 psig (220°F).
B. Plausible if the examinee does not understand the process and uses the steam table to find saturation pressure for 5 psig (228°F).
C. Correct answer. This is a constant enthalpy process and the steam will be superheated downstream of the valve.
D. Plausible if the examinee does not understand the process and uses the steam table to find saturation pressure for 985 psig.

Technical Reference(s): Mollier Diagram (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 220-GLO-10 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.5
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K5.01 (012)	
	Importance Rating	3.3*	3.8

(K&A Statement): **Knowledge of the operational implications of the following concepts as they apply to the RPS:** DNB

Common 38

The Reactor Protection System high _____ trip protects against DNB accidents?

A. RCS Pressure

B. Flux to Pumps

C. RCS Temperature

D. Reactor Building Pressure

Proposed Answer: B. Flux to Pumps

Explanation (Optional):

A. Plausible if the examinee does not understand high pressure moves away from the DNBR concern and is to prevent exceeding the RCS pressure safety limit.
B. Correct answer. Tech Specs and the RPS lesson plan discuss DNBR as the basis for the high power trip based on pump monitors.
C. Plausible if the examinee does not know the high temperature trip is not taken credit for in the safety analysis.
D. Plausible since low RCS pressure can be a DNB concern, and the high RB pressure trip is a back-up for the low RCS pressure trip; however this trip is not taken credit for in the safety analysis.

Technical Reference(s): TQ-TM-104-641-C001, Reactor Protection System (Rev. 1)(Section VII.B)
T.S. 2.3, Limiting Safety System Settings Bases
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 641-GLO-14 (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 B.10
55.43 _____

Comments: Similar to a question on a previous Braidwood exam 10/20/2000.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A1.02 (013)	
	Importance Rating	3.9	4.2

(K&A Statement): **Ability to predict and/or monitor changes in parameters (to Prevent exceeding design limits) associated with operating the ESFAS controls including:** Containment pressure, temperature and humidity

Common 39

Plant conditions:

- Plant cool down in progress
- RCS pressure 1700, the Train B 1600 psig signal is BYPASSED
- The plant experienced an inadvertent 4 psig ESAS Train B actuation 3 minutes ago
- The 4 psig signal is in DEFEAT
- All Train B ESAS equipment is still in the ESAS position except Makeup pump MU-P-1C

Event:

- A large Steam leak suddenly occurs in the Reactor Building
- RCS pressure drops to 1256 psig
- Reactor Building pressure rises to 32 psig

To ensure all non running ESAS equipment is started the operator must manually _____.

A. start Makeup Pump MU-P-1C

B. start Building Spray Pump BS-P-1B

C. initiate the B Train 4 psig ESAS actuation

D. initiate the B Train 30 psig ESAS actuation

Proposed Answer: C. initiate the B Train 4 psig ESAS actuation

Explanation:

A. Plausible since this pump needs to be started; however BS-P-1B also must be started.
B. Plausible since BS-P-1B needs to be started; however it will auto start when Block 4 actuates following manual initiation of the 4 psig actuation and MU-P-1C will start on Block 1.
C. Correct answer. Manually initiating the B Train ESAS will start MU-P-1C and BS-P-1B will start when the Block 4 permissive is present.
D. Plausible if the examinee thinks BS-P-1B starts on the manual 30 psig pushbutton.

Technical Reference(s): TQ-TM-104-642-C001, Engineered Safeguards Actuation System (Rev. 4)(Page 31) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 642-GLO-10 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A1.01 (022)	
	Importance Rating	3.6	3.7

(K&A Statement): **Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including:** Containment temperature

Common 40

Plant conditions:

- The plant is in refueling shutdown

While containment integrity is NOT required the RB Heating and Ventilation Systems must be operated to maintain temperature _____ the 320' elevation _____.

A. below / ≥55°F while a RB Purge is in progress

B. below / ≥90°F to ensure minimum Core Flood Tank temperature limits are satisfied

C. above / >70°F to minimize the probability of OTSG TSDT problems

D. above / >120°F to allow the RB Purge Valves to be opened >30°

Proposed Answer: A. below / ≥55°F while a RB Purge is in progress

Explanation:

A. Correct answer. OP-TM-823-000 Step 2.2.2 states that while purging when containment integrity is not required temperature below the 320' elevation must be maintained ≥55°F.
B. Plausible since minimum Core Flood Tank temperature is a concern; however it must be maintained >70°F.
C. Plausible since OTSG TSDT problems during a plant heatup is a concern; however the temperature must be maintained above >70°F below the 320' elevation.
D. Plausible since the purge valves do have a 30° opening limit if RCS temperature is >200°F, incorrect as Refueling shutdown is < 200°F stops removed.

Technical Reference(s): OP-TM-823-000, Reactor Building Heating and Ventilation (Rev. 4)(Page 4) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 823-GLO-9 (As available)

Question Source: Bank #

Modified Bank # (Note changes or attach parent)

New X

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 b.10

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	G2.1.25 (062)	
	Importance Rating	3.9	4.2

(K&A Statement): **Ability to interpret reference materials, such as graphs, curves, tables, etc.**

Common 41

Plant Conditions:

- Plant operating at 100% power
- Main Generator H2 leak has occurred
- Generator machine gas pressure is 30 psig and H2 leak secured
- Plant MVAR loading is +180 MVAR

From the list of values below, choose the MAXIMUM generator megawatt output allowed for these plant conditions:

A. 725 MW

B. 800 MW

C. 825 MW

D. 875 MW

Proposed Answer: B. 800 MW

Explanation:

A. Plausible if the examinee misinterprets the graph.
B. Correct answer. The 30 psig line intersects the 180 MVAR line at 800 MW.
C. Plausible if the examinee misinterprets the graph.
D. Plausible if the examinee misinterprets the graph.

Technical Reference(s): OP-TM-301-472, Generator Reactive Load Control (Rev. 3) ATTACHMENT 7.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: OP-TM-301-472,

Attachment 7.1
Generator Reactive
Capability Curve

Learning Objective: 711-GLO-010 (As available)

Question Source: Bank # QR-711-GLO-10-Q01

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10

55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K2.01 (026)	
	Importance Rating	3.4*	3.6

(K&A Statement): **Knowledge of bus power supplies to the following:** Containment spray pumps.

Common 42

Building Spray pump BS-P-1B is running for surveillance.

Which condition would result in automatic trip of the BS-P-1B breaker?

A. 1A Aux Transformer fault with Auto Transfer of loads to 1B Aux Transformer.

B. 1B Aux Transformer fault with Auto Transfer of loads to 1A Aux Transformer.

C. Fault downstream of 1P 480v Bus low side feeder breaker.

D. Fault downstream of 1S 480v Bus low side feeder breaker.

Proposed Answer: A. 1A Aux Transformer fault with Auto Transfer of loads to 1B Aux Transformer.

Explanation:

A. Correct answer. When the 1E 4160V bus deenergizes the BS-P-1B breaker will open, since it is not a block one load.
B. Plausible misconception that automatic transfer occurs on 4KV ES Switchgear, coupled with incorrect power supply. The ES bus does not transfer to alternate Auxiliary Transformer, but rather to the backup emergency Diesel.
C. Plausible misconception that 480V Bus fault results in loss of 4KV feeder bus coupled with incorrect power supply for BS-P-1B.
D. Plausible misconception that 480V Bus fault results in loss of 4KV feeder bus.

Technical Reference(s): TQ-TM-104-642-C001, Engineered safeguards Actuation System (Rev. 4)(Page 40) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 214-GLO-4 (As available)

Question Source: Bank # IR-214-GLO-4-Q01

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam June 2000

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.7
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A2.05 (039)	
	Importance Rating	3.3	3.6

(K&A Statement): **Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** Increasing steam demand, its relationship to increases in reactor power.

Common 43

Plant conditions:

- A reactor startup at End of Core Life (EOL) per 1103-8, Approach to Criticality
- Initial Tave is 534°F
- Reactor power is stable at 1E -8 Amps on NI-3 and NI-4 while taking critical data
- The selected OTSG A Pressure Transmitter (SP6A-PT2) fails HIGH without a SASS actuation
- Tave has lowered to 523°F

With the above conditions reactor power will _____ and the board operator is required to _____.

A. lower / pull rods to restore Tave to 532°F

B. lower / close the Turbine Bypass Valves to stop the cooldown

C. rise / borate to compensate for the change in Tave

D. rise / insert control rods until the reactor is 1% ΔK/K shutdown

Proposed Answer: D. rise / insert control rods until the reactor is 1% ΔK/K shutdown

Explanation:

The failure of the OTSG pressure instrument causes the associated Turbine Bypass Valves to fail open, resulting in a lowering of RCS temperature, and a rise in Reactor Power.

A. Plausible since this action would raise RCS Temperature; however the reactor is not allowed to be critical below 525°F so rods will be inserted.
B. Plausible since the Turbine Bypass Valves will need to be closed; however reactor power will rise in this situation.
C. Plausible since reactor power will rise and the operator can borate to mitigate the event; however the reactor would have to be borated to the 1% ΔK/K shutdown condition.
D. Correct answer. 1103-8 states "If at any time the most conservative valid wide range cold leg temperature indication shows a RCS temperature less than 525°F, ensure [insert control rods or borate] the reactor is at least 1% ΔK/K shutdown."

Technical Reference(s): 1103-8, Approach to Criticality (Rev. 52)(Page 3) (Attach if not previously provided)
TS 3.1.3.1, Minimum Condition for Criticality

Proposed references to be provided to applicants during examination: None

Learning Objective: GOP003-PCO-3 (As available)

Question Source: Bank # ____
Modified Bank # X (Note changes or attach parent)
New ____

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 b.10
55.43 ____

Comments: Similar to ILT question on a previous Byron Exam 12/10/03.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K4.05 (039)	
	Importance Rating	3.7	3.7

(K&A Statement): **Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following:** Automatic isolation of steam line.

Common 44

A plant startup is in progress with the following conditions existing:

- Reactor Power 25% and rising

The following sequence of events occur:

- Annunciator N-1-6, MN COND VACUUM LO is received
- PPC Alarm A0033 indicates Condenser Backpressure is 7.4 " HgA

What is the expected automatic plant response to these events?

A. The Main Turbine and the Reactor will trip, the TBV's open to control OTSG pressure.

B. The Main Turbine will trip, the Reactor remains on line, the TBV's open to control OTSG pressure.

C. The Main Turbine and Reactor will trip, the TBV's close and latch, ADVs open to control OTSG pressure.

D. The Main Turbine will trip, the Reactor remains on line, the TBVs close and latch, ADVs open to control OTSG pressure.

Proposed Answer: D. The Main Turbine will trip, the Reactor will remain on line, the TBV's close and latch, ADVs open to control OTSG pressure.

Explanation:
Basis: ICS and condenser protective functions are designed to cause the TBV to close and latch if condenser vacuum is lost or if an insufficient number of Circulating Water Pumps are operating. In this question, the student is expected to recognize that the actuation of the N-1-6 annunciator and high backpressure in the Condenser have initiated the protective function to close and latch the TBVs and trip the Turbine. Since the ADVs receive the same control signal (from ICS) as the TBV, they will open in response and control at the ICS setpoint. Other foils are plausible if the examinee believes that N-1-6 causes the turbine trip function or if ICS/DTCS result in actions to close CV/SV. At this power level a reactor trip is not part of the protective scheme.

A. Distracter – "The Main Turbine and the Reactor will trip, the TBV's open to control OTSG pressure" - Plausible if the examinee does not consider the effect of low condenser pressure on the TBVs. The reactor will not trip.
B. Distracter - "The Main Turbine will trip, the Reactor will remain on line, the TBV's open to control OTSG pressure." - the examinee may select this distracter if it is not recognized that TBVs will close and latch because the condenser backpressure of 7.4 " Hg A (inches mercury absolute pressure) exceed the trip setpoint of 6.0 " HgA at the given power level.
C. Distracter – "The Main Turbine and Reactor will trip, the TBVs close and latch, ADVs open to control OTSG pressure."- The examinee may select this distracter if it is not recognized that a Reactor trip does not occur.
D. Correct answer - "The Main Turbine will trip, the Reactor will remain on line, the TBV's close and latch, ADVs open to control OTSG pressure.." – Correct answer since a turbine trip does occur, but will not cause a reactor trip from this power. ADVs will control at the normal ICS setpoint.

Technical Reference(s): OP-TM-411-000, Main Steam/OTSG (Rev. 9)(Page 7); OP-TM-MAP-N0106, MN COND VACUUM LO (Rev. 8) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 411-GLO-8 (As available)

Question Source: Bank # QR-411-GLO-8-Q02
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43

Comments:
Minor changes to bank question, not sufficient to have it designated as "modified."
(MGS 6-27-09)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A2.06 (059)	
	Importance Rating	2.7*	2.9*

(K&A Statement): **Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** Loss of steam flow to MFW system.

Common 45

Plant conditions:

- The plant was originally at 100% power with the ICS in full automatic except for the ULD being in Manual
- MAP Alarm OP-TM-MAP-N0105 FW HEATER LEVEL HI is in alarm
- Computer alarm point L2294 10TH STG HTR A LEVEL – HI is in alarm
- Computer alarm point L2346 FW HEATER EXT STEAM VLV(1/4/5/6) closed is in alarm

The above conditions will cause plant efficiency to _____ and reactor power will have to be _____ IAW 1102-4 Power Operations.

A. rise / raised

B. rise / reduced

C. lower / raised

D. lower / reduced

Proposed Answer: D. lower / reduced

Explanation:

A. Plausible if the examinee does not understand that cutting off steam to the FW Heater causes a loss of efficiency causing reactor power to raise not efficiency.
B. Plausible since power will have to be reduced; however efficiency will be lower.
C. Plausible since efficiency will be lower; however reactor power will have to be lowered.
D. Correct answer. Plant efficiency will be lowered due to the lower Feedwater temperature entering the OTSG requiring more power to produce the same number of MWe. This will cause power to rise above 100% requiring the operator to lower on the ULD.

Technical Reference(s): 1102-4, Power Operation (Rev. 115)(Pages 5, 7) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 421-GLO-8 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43

Comments: Similar to question used on Kewaunee ILT exam on 12/11/2000.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K6.02 (061)	
	Importance Rating	2.6	2.7

(K&A Statement): **Knowledge of the effect of a loss or malfunction of the following will have on the AFW components:** Pumps.

Common 46

Plant conditions:

- The plant tripped from 100% power due to a loss of offsite power (LOOP)
- Motor driven Emergency Feedpumps
  - EF-P-2A failed to start
  - and EF-P-2B tripped following the LOOP
- Turbine driven EF-P-1 is running supplying both OTSGs

With the above conditions _____.

A. EFW flow must be throttled to <515 gpm to protect EF-P-1 from runout

B. EFW flow must be throttled to <435 gpm due to tube to shell ΔT concerns

C. OTSG pressure must be maintained ≥150 psig to prevent loss of EF-P-1

D. OTSG pressure must be maintained above 600 psig to maintain Main Feedwater capability

Proposed Answer: C. OTSG pressure must be maintained ≥150 psig to prevent loss of EF-P-1

Explanation:

A. Plausible since 515 gpm limit is an EFW pump concern; however it is for single motor driven pump operation.

B. Plausible since 435 gpm is an EFW flow limit for tube to shell ΔT limit being exceeded; however it is the limit for the condition where an RCP is operating.

C. Correct answer. OP-TM-EOP-004 CAUTION states "If EF-P-2A and EF-P-2B and auxiliary steam to EF-P-1 are unavailable, then to prevent loss of EFW, do not lower steam pressure below 150 psig." Auxiliary Steam is not available due to the LOOP.

D. Plausible since this is the pressure at which feedwater isolation would occur; however Main Feedwater is not available due to the tripped Main Feedwater Pumps.

Technical Reference(s): OP-TM-EOP-004, Lack of Primary To Secondary Heat Transfer (Rev. 6)(Page 6) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP004-PCO-4 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 b.10
- 55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K4.05 (062)	
	Importance Rating	2.7*	3.2

(K&A Statement): **Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following:** Paralleling of ac sources (synchroscope)

Common 47

Plant conditions:

- The plant is at 14% power.
- The Main Generator is being synchronized to the grid, IAW OP-TM-301-102 Generator Standby to Operating Mode.
- The Synchroscope is in the AUTO SYNC position.

With the synchroscope in the AUTO Sync position _____.

A. the first generator breaker will automatically close in when the synchroscope is within ±10° of the 12 o'clock position; however the scope must be in the SCOPE ON position to close the second breaker

B. the first generator breaker will be closed manually when the synchrosope is within ±10° of the 12 o'clock position; however the scope must be in the SCOPE ON position to close the second breaker

C. both generator breakers will be closed manually when the synchrosope is within ±10° of the 12 o'clock position

D. both generator breakers will be closed automatically when the synchrosope is within ±10° of the 12 o'clock position

Proposed Answer: B. the first generator breaker can be closed manually when the synchrosope is within ±10° of the 12 o'clock position; however the scope must be in the SCOPE ON position to close the second breaker

Explanation (Optional):

The breaker interlock scheme uses two positions Auto Sync and Scope on, all breaker manipulations are manual to close, despite the name no auto closure is available. The Auto sync position is required for the first breaker because it uses a tighter sync check band. The second breaker must be closed in the Scope on position due to the manner in which the sync check is wired.

A. Plausible since the breaker will not close until the scope is within ±10° of the 12 o'clock position. Also the sync switch must be in the SCOPE ON position to close the second breaker; however the first breaker control switch must be manually moved to the close position.
B. Correct answer. OP-TM-301-102 states that either mode can be used to close the first breaker; however the sync switch must be in the SCOPE ON position to close the second breaker.
C. Plausible since the first breaker can be closed and this is the correct range; however the sync switch must be in the SCOPE ON position for the second breaker.
D. Plausible since this is the correct sync check range; however neither breaker will close in automatically.

Technical Reference(s): OP-TM-301-102, Main Turbine Generator Standby to Operating Mode (Rev. 15)(Page 20 Note before step 4.23.6) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 711-GLO-6 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.7
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K1.03 (063)	
	Importance Rating	2.9	3.5

(K&A Statement): **Knowledge of the physical connections and/or cause effect relationships between the DC electrical system and the following systems:** Battery charger and battery

Common 48

Plant conditions:

- Reactor power is 100%.
- "A" Battery Charger has been taken out of service.
- "E" Battery Charger has been placed in service

It is desired to accomplish an equalizing battery charge on both banks of the "A" battery.

Which of the following choices is done per 1107-2C "Vital DC Electrical System" to accomplish this equalizing charge?

A. Place ONLY "E" battery charger equalize timer to HOLD.

B. Place "C" and "E" battery charger equalize timers to HOLD.

C. Place ONLY "E" battery charger equalize timer to 24 hours.

D. Place "C" and "E" battery charger equalize timers to 24 hours.

Proposed Answer: D. Place "C" and "E" battery charger equalize timers to 24 hours.

Explanation:

A. Incorrect. Plausible distracter since "E" battery charger can charge either half of the battery however it only charges one half at a time, HOLD would work but is procedurally not allowed.
B. Incorrect. Plausible since this would result in an equalize charge on both halves of the battery, however it is not procedurally allowed.
C. Incorrect. Plausible distracter since "E" battery charger can charge either half of the battery however it only charges one half at a time, second part is correct.
D. Correct. Placing both battery chargers equalizer timers at 24 hours causes each half of the battery to charge to 135 volts.

Technical Reference(s): 1107-2C, Vital DC Electrical System (Rev. 8)(Page 11) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 734-GLO-5 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.7
55.43 _____

Comments:
6/28/09

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K6.07 (064)	
	Importance Rating	2.7	2.9

(K&A Statement): **Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system:** Air receivers

Common 49

Plant conditions:

- The plant is at 100% power
- MAP Annunciator A-1-2 DIESEL GEN 1A TROUBLE is in alarm
- MAP Annunciator A-2-1 DIESEL GEN 1A BLOCKED is in alarm
- Diesel Gen 1A Local Alarm 3-1 STARTING AIR PRESSURE LOW is in alarm
- Starting air pressure reads 100 psig locally and the air compressor will not start

With the above conditions EG-Y-1A is _____.

A. operable and will start and load normally

B. operable but is in a reduced availability because it may not start/load in 10 seconds

C. inoperable and will not start

D. inoperable but is in a reduced availability because it may not start/load in 10 seconds

Proposed Answer: D. inoperable but is in a reduced availability because it may not start/load in 10 seconds

Explanation:

A. Plausible since the diesel will start; however it is inoperable with Starting Air Pressure <175 psig.

B. Plausible since the diesel can be considered in a reduced availability and may not meet 10 second start/load criteria.

C. Plausible since the diesel is considered inoperable; however the diesel will start and the can be considered in a reduced availability because it may not meet 10 second start/load criteria.

D. Correct answer. With Starting Air Pressure <175 psig the diesel is inoperable; however the diesel can be considered in a reduced availability and may not meet 10 second start/load criteria IAW 1107-3.

Technical Reference(s): 1107-3 Diesel Generator (Rev. (Attach if not previously provided)

123)(Page 17 Step 2.1.5)

Proposed references to be provided to applicants during examination: None

Learning Objective: 861-GLO-5 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A2.01 (073)	
	Importance Rating	2.5	2.9*

(K&A Statement): **Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** Erratic or failed power supply.

Common 50

Plant conditions:

- The plant is at 100% power
- Normal equipment lineups exist
- Spent Fuel is being moved in the Spent Fuel Pool

Event:

- Vital Bus C trips
- RM-A-2, RB Radiation Monitor de-energizes
- RM-A-8, Aux and Fuel Handling Building Radiation Monitor de-energizes
- RM-A-14, Fuel handling Building ESF Ventilation Monitor de-energizes

With the above conditions OP-TM-AOP-017, Loss of VBC _____.

A. requires terminating Fuel Handling Operations due to the Loss of RM-A-14

B. requires terminating Fuel Handling Operations due to the loss of the running AH-E-14s, Aux and FH Building Exhaust Fans

C. allows Fuel Handling Operations to continue for 2 hours to allow restart of AH-E-10, Fuel Handling Building Supply Fan

D. allows Fuel Handling Operations to continue for 2 hours to allow restart of AH-E-137A or B, Fuel Handling ESF Ventilation System Fan

Proposed Answer: A. requires terminating Fuel Handling Operations due to the Loss of RM-A-14

Explanation:

A. Correct answer. OP-TM-AOP-0171 states "This step provides guidance to stop fuel movement if VBC deenergizes. Loss of VBC deenergizes the RM-A-14 Remote Digital Readout in the Control Room.
B. Plausible since fuel handling must be terminated; however the AH-E-14 fans do not trip on interlock from RM-A-8G.
C. Plausible since AH-E-10 does trip on interlock from RM-A-8 and fuel handling operations can continue on loss of Control Building Ventilation for up to 2 hours; however fuel handling operations must be terminated.
D. Plausible if the examinee thinks the ESF Air Treatment System fans de-energize when RM-A-14 loses power fuel handling operations can continue on loss of Control Building Ventilation for up to 2 hours; however fuel handling operations must be terminated.

Technical Reference(s): OP-TM-AOP-017, Loss of VBC (Rev. 2)(Step 3.2) (Attach if not previously provided)
OP-TM-AOP-0171, Loss of VBC Basis Document (Rev. 2)(Page 4)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-017-PCO-4 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.11
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	G2.4.31 (076)	
	Importance Rating	4.2	4.1

(K&A Statement): **Knowledge of annunciator alarms, indications, or response procedures.** Service Water.

Common 51

Plant conditions:

- The plant is at 100% power
- Normal equipment lineups exist

Event:

- The control room is notified that the York Haven Dam has failed and river water level in the ISPH pump bay is reported at 270 feet by the Auxiliary Operator

These conditions will require _____, IAW OP-TM-AOP-005, River Water Systems Failures.

A. a plant shutdown to be commenced

B. the Reactor and all four RCPs to be tripped

C. cross-connecting the Nuclear River Water System with the Secondary River Water System

D. using the Fire Service Water System to cool Secondary Services Closed Cooling Water System

Proposed Answer: B. the Reactor and all four RCPs to be tripped

Explanation:

A. Plausible since this is an action that would be taken for river water level <274'; however it is superseded by the required action of tripping the Reactor and RCPs due to being <271'.
B. Correct answer. AOP-005 requires tripping the reactor and all four RCPs if ISPH pump bay water level is <271 feet.
C. Plausible since this is an action that would be taken for high NS Cooler outlet temperature in AOP-031, Loss of Nuclear Services Component Cooling; however AOP-005 actions supersede those of AOP-031.
D. Plausible since the Fire Service Water system will be lined up to provide cooling; however it will be to the Nuclear Services Closed Cooling Water System not Secondary Closed.

Technical Reference(s): OP-TM-AOP-005, River Water System Failures (Rev. 7)(Pages 1, 11) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP005-PCO-2 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 b.10
55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K2.04 (076)	
	Importance Rating	2.5*	2.6*

(K&A Statement): **Knowledge of bus power supplies to the following:** Reactor building closed cooling water.

Common 52

Plant conditions:

- The plant is at 100% power
- Nuclear Services Closed Cooling Water Pumps NS-P-1A and NS-P-1B are running and selected for ES
- NS-P-1C is in standby

Event:

- The 'A' Auxiliary Transformer trips
- All 4160V busses re-energize as expected

The Nuclear Services Closed Cooling Water Pump response to the event will be _____.

A. NS-P-1A trips and then restarts when EG-Y-1A reenergizes the 1D 4160V bus

B. NS-P-1B trips and then restarts when EG-Y-1B reenergizes the 1E 4160V bus

C. NS-P-1A trips and NS-P-1C will auto start when EG-Y-1A reenergizes the 1D 4160V bus

D. NS-P-1B trips and NS-P-1C will auto start when EG-Y-1B reenergizes the 1E 4160V bus

Proposed Answer: D. NS-P-1B trips and NS-P-1C will auto start when EG-Y-1B reenergizes the 1E 4160V bus

Explanation:

A. Plausible if the examinee does not know which transformer normally supplies the 1E 4160V bus or does not recognize from the initial conditions that NS-P-1B is being powered from the 1S 48V bus.

B. Plausible since NS-P-1B will trip; however it does not auto restart when the diesel reenergizes the bus.

C. Plausible since NS-P-1C does auto start; however NS-P-1A does not trip.

D. Correct answer. NS-P-1B does trip when the 1E 4160V bus trips because it is running on the 1S 480V bus and NS-P-1C will auto start when the diesel reenergized the bus.

Technical Reference(s): TQ-TM-104-531-C001, Primary Cooling Systems (Rev. 4)(Page 38 NSCCW Interlocks) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 541-GLO-4 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43 ____

Comments: Similar to a Service Water question on the 2/28/06 exam.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A3.01 (078)	
	Importance Rating	3.1	3.2

(K&A Statement): **Ability to monitor automatic operation of the IAS, including:** Air pressure.

Common 53

The following plant conditions exist:

- A rupture occurs in the 1 1/2 to 3/4 inch reducer on the air header supplying MS-V-3D.
- IA-P-4 trips on overload.
- IA-P-1A/B and SA-P-1A/B are started successfully.
- Instrument air primary (PI-222) and secondary (PI-1403) pressure indicators on PL are tracking together and continue to lower.

Which ONE of the following indications would be observed on PL when IA-V-26 closes?

When header pressure drops below:

A. 60 psig, PI-222 starts to RISE and PI-1403 continues to LOWER.

B. 60 psig, PI-1403 starts to RISE and PI-222 continues to LOWER.

C. 80 psig, PI-222 starts to RISE and PI-1403 continues to LOWER.

D. 80 psig, PI-1403 starts to RISE and PI-222 continues to LOWER.

Proposed Answer: A. 60 psig, PI-222 starts to RISE and PI-1403 continues to LOWER.

Explanation:

A. Correct Answer. MS-V-3D is in the Turbine Building, which will be isolated by the closing of IA-V-26 and therefore isolating the leak from the primary side. PI-1403 continues to LOWER as secondary side pressure bleeds off and the primary side pressure will recover. See Drawings 302-271 & 302-268.
B. Distracter - Plausible if location of air leak is misunderstood, wrong because instrument header responses would be opposite.
C. Distracter - Plausible if wrong setpoint is interpreted, wrong because of setpoint.
D. Distracter - Plausible if wrong setpoint is interpreted and location of air leak is misunderstood, wrong for header response.

Technical Reference(s): OP-TM-AOP-0281, Loss of Instrument Air Basis Document (Attach if not previously provided)

(Rev. 3)(Page 9)

302-271 & 302-268

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP028-PCO-5 (As available)

Question Source: Bank # QR-AOP028-PCO-5-Q01

Modified Bank # (Note changes or attach parent)

New

Question History: Last NRC Exam June 2000 #78

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	A4.05 (008)	
	Importance Rating	2.7*	2.5*

(K&A Statement): **Ability to manually operate and/or monitor in the control room:** Normal CCW-header total flow rate and the flow rates to the components cooled by the CCWS

Common 54

Plant conditions:

- The plant is at 10^{-8} Amps in the Intermediate Range during a reactor startup
- Normal equipment lineups exist

Event:

- MAP Annunciator C-1-2 IC CRD CLG FLOW LO is in alarm
- MAP Annunciator C-1-4 IC CRD FILTER DP HI is in alarm
- MAP Annunciator C-1-3 IC CRD CLG OUTLET TEMP HI is in alarm
- CRD cooler outlet temperature is 162°F

The above conditions indicate _____ and the operator should _____.

A. CRD cooling flow is <100 gpm / trip the reactor

B. CRD cooling flow is <100 gpm / ensure MU-V-1A and MU-V-1B are closed

C. ICCW flow is <550 gpm / start a second ICCW pump

D. ICCW flow is <550 gpm / maximize seal injection flow

Proposed Answer: B. CRD cooling flow is <100 gpm / ensure MU-V-1A and MU-V-1B are closed

Explanation:

A. Plausible since flowrate is <100 gpm; however the reactor would not have to be tripped until CRD Temps were above 180°F.

B. Correct answer. Flowrate is <100gpm as evidenced by the CRD Low Flow alarm and MU-V-1A and MU-V-1B should automatically close when CRD outlet temperature is >160°F.

C. Plausible since ICCW flow would be less than normal due to the high CRD filter DP and starting a second ICCW Pump may help with CRD flow; however the low ICCW total flow alarm is not in.

D. Plausible since Seal Injection flow will be adjusted by procedure; however it will be lowered not raised.

Technical Reference(s): OP-TM-MAP-C0103, IC CRD CLG OUTLET TEMP HI (Rev. 3)
OP-TM-MAP-C0102, IC CRD CLG FLOW LO (Rev. 4)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 542-GLO-10 (As available)

Question Source:
Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History: Last NRC Exam

Question Cognitive Level:
Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43

Comments:

Question Deleted Based on Post Exam Comment Resolution

No Correct answer
JHL Cann 8/12/09

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	K3.01 (103)	
	Importance Rating	3.3*	3.7*

(K&A Statement): **Knowledge of the effect that a loss or malfunction of the containment system will have on the following:** Loss of containment integrity under shutdown conditions.

Common 55

Which ONE of the following conditions would challenge containment integrity and require initiating immediate action IAW Tech specs?

A. One door in each of the Personnel and Equipment Hatches is failed open during power operation.

B. Both Reactor Building Equipment Hatch doors in the open position with the interlock defeated while in cold shutdown.

C. FW-V-12A "A OTSG inlet check valve" valve body disassembled with internals removed and MS-V-1A "Main Steam Isol of 'A' OTSG 'A' line" disassembled with internals removed during core re-load.

D. MU-V-155 "Letdown Line Vent Inside RB" (located between the RB wall and MU-V-2A/B) and MU-V-239 "Penetration 309 Test Isolation Valve" (located between the RB wall and MU-V-3) information tagged open during core off-load.

Proposed Answer: C. FW-V-12A "A OTSG inlet check valve" valve body disassembled with internals removed and MS-V-1A "Main Steam Isol of 'A' OTSG 'A' line" disassembled during core re-load.

Explanation:

A. Plausible since one door failed open in each hatch could be a challenge to containment integrity; however it is allowed by Tech Specs without any immediate action necessary. Within one hour the other door must be verified closed.
B. Plausible since this is a loss of containment integrity; however containment integrity is not required in cold shutdown because we are <200°F and <300 psig in cold shutdown.
C. Correct answer. With the valves disassembled, neither is capable of being closed, and low pressure containment integrity is required during handling of irradiated fuel.
D. Plausible since this is a bypass of containment; however each valve is capable of being closed, and is thus allowed by technical specifications.

Technical Reference(s): TS 3.8.7 and 3.8.8 Fuel Loading (Attach if not previously provided)

and Refueling
Procedure 1101-3 pages 12, 38 and 44.

Proposed references to be provided to applicants during examination: None

Learning Objective: 240-GLO-14 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	K2.03 (001)	
	Importance Rating	2.7*	3.1

(K&A Statement): **Knowledge of bus power supplies to the following:** One-line diagram of power supplies to logic circuits.

Common 56

Plant conditions:

- The plant is at 100% power
- The Trip Confirm #1 light above CRD Breaker #11 is OFF

The above conditions indicate the ____(1)____ power supply is deenergized and the turbine will ____(2)____.

A. (1) 24V
(2) trip if the Trip Confirm #2 is actuated

B. (1) 24V
(2) not trip if the Trip Confirm #2 is actuated

C. (1)120V
(2) trip if the Trip Confirm #2 is actuated

D. (1) 120V
(2) will not trip if the Trip Confirm #2 is actuated

Proposed Answer: C. (1)120V
(2) trip if the Trip Confirm #2 is actuated

Explanation:

A. Plausible since there is a 24V trip confirm circuit and the turbine will trip if Trip Confirm 2 actuates; however Trip Confirm #1 and 2 are 120V.
B. Plausible since there is a 24V trip confirm circuit; however the turbine will trip if Trip Confirm 2 actuates.
C. Correct answer. With trip confirm #1 already deenergized the turbine will trip if Trip Confirm #2 deenergizes. It takes both circuits actuated to trip the turbine.
D. Plausible since the circuit is 120V; however the turbine will trip if Trip Confirm #2 is actuated.

Technical Reference(s): TQ-TM-104-622-C001, Control Rod Drive System (Rev. 3)(Pages 49,50)(PowerPoint (Attach if not previously provided)

Slides 49, 52,53,54)

Proposed references to be provided to applicants during examination: None

Learning Objective: 622-GLO-5 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.6
55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	K6.02 (002)	
	Importance Rating	3.6	3.8

(K&A Statement): **Knowledge of the effect or a loss or malfunction on the following RCS components:** RCP.

Common 57

Event Occurrence:

- Reactor Trip due to loss of offsite power (LOOP).
- 1D 4KV has been re-energized.

Current Plant Conditions following this Event:

- Pressurizer level is 100 inches and steady.
- RCS subcooled margin is 50°F and steady.
- OTSG levels at 50% and steady.
- OTSG pressure 450 psig and lowering slowly.

Which one of the following identifies the Plant cooldown limit for this situation?

A. 30°F/hr.

B. 50°F/hr.

C. 84°F/hr.

D. 100°F/hr.

Proposed Answer: B. 50°F/hr.

Explanation:

A. Plausible since 30°F/hr is the cooldown rate limit below 255°F; however above 255°F with no RCPs the limit is 50°F/hr.
B. Correct answer - " 50°F/hr" - OP-TM-EOP-010 Guide 11 requirement due to the loss of the RCP's and natural circulation flow requirements.
C. Plausible since 84°F/hr is the target cooldown rate of 1102-11 with RCPs on - If the candidate misses the fact that all the RCP's are lost, the initial target rate is this rate.
D. Plausible since 100°F/hr is a Tech Spec. limit; however with no RCPs the limit is 50°F/hr.

Technical Reference(s): OP-TM-EOP-010 Guide 11 (Rev. 10) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 220-GLO-10 (As available)

Question Source: Bank # QR-220-GLO-10-Q01
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	K1.01 (014)	
	Importance Rating	3.2	3.6

(K&A Statement): **Knowledge of the physical connections and/or cause effect relationships between the RPIS and the following systems:** CRDS

Common 58

Plant conditions:

- A reactor startup is in progress IAW 1102-2, Plant Startup
- Control rod Relative Position Indications are as follows:
  - Groups 1-5 are 100% withdrawn
  - Group 6 is at 93% withdrawn
  - Group 7 is at 24% withdrawn
  - Group 8 is 100% withdrawn

With the above conditions rod group overlap is _____.

A. 18%, the SEQUENCE INHIBIT and MOTOR FAULT lamps on the Diamond Panel will be LIT.

B. 18%, the SEQUENCE INHIBIT and MOTOR FAULT lamps on the Diamond Panel will be OFF.

C. 31%, the SEQUENCE INHIBIT lamp will be LIT on the Diamond Panel and a map Annunciator G-2-2 CRD SEQUENCE FAULT will be in ALARM.

D. 31%, the SEQUENCE INHIBIT lamp will be OFF on the Diamond Panel and a map Annunciator G-2-2 CRD SEQUENCE FAULT will be in OFF.

Proposed Answer: C. 31%, the SEQUENCE INHIBIT lamp will be LIT on the Diamond Panel and a map Annunciator G-2-2 CRD SEQUENCE FAULT will be in ALARM

Explanation:

A. Plausible since the SEQUENCE INHIBIT lamp will be lit and the MOTOR FAULT lamp would be lit if the problem was caused by a motor fault; however the overlap is 31%.
B. Plausible since the SEQUENCE INHIBIT lamp and the MOTOR FAULT lamp would not be lit for 18% overlap (overlap can be miscalculated if the examinee just uses the travel of Group 6 from 74 to 93%); however the overlap is 31%.
C. Correct answer. One of the triggers for MAP Annunciator G-2-2 is GP 6 < 95% and GP 7 > 20%. The calculated overlap is [100-(93-24)=31] IAW OP-TM-622-000, Control Rod Drive System. The SEQUENCE INHIBIT lamp lights with overlap >25%.
D. Plausible since overlap is 31%; however the SEQUENCE INHIBIT lamp will be LIT on the Diamond Panel and a map Annunciator G-2-2 CRD SEQUENCE FAULT will be in ALARM.

Technical Reference(s): OP-TM-MAP-G0202, CRD SEQUENCE FAULT, (Rev. 1)(Page 1)
OP-TM-622-000, Control Rod Drive System (Rev. 2)(Pages 12,13)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 622-GLO-6 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	K3.09 (016)	
	Importance Rating	3.5*	3.7*

(K&A Statement): **Knowledge of the effect that a loss or malfunction of the NNIS will have on the following:** ESFAS

Common 59

Plant conditions:

- The plant is at 100% power
- One RB 30 psig pressure channel (RB4B) has actuated and is being investigated by the I&C department

Event:

- The 4 psig ESAS pressure transmitter PT-282, fails HIGH

With the above conditions _____ will actuate.

A. the 30 psig RB Spray System

B. the 30 psig ESAS RB Isolation

C. one Train of 1600 psig and 4 psig ESAS

D. one Channel of 1600 psig and 4 psig ESAS

Proposed Answer: D. one Channel of 1600 psig and 4 psig ESAS

Explanation:

A. Plausible if the examinee does not know the RB 30 psig pressure channels are actuated by pressure switches and not the transmitters.
B. Plausible if the examinee does not know the RB Spray Pumps are started by pressure switches and not the transmitters.
C. Plausible if the examinee does not know the RB 30 psig pressure channels are actuated by pressure switches and not the transmitters.
D. Correct answer. The pressure transmitter failing high will actuate the 4 psig RB Pressure Channel and the 1600 psig Actuation Channel.

Technical Reference(s): TQ-TM-104-624, Non Nuclear Instrumentation System (Rev. 2)(Page 8) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 642-GLO-5 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	A2.01 (027)	
	Importance Rating	3.0*	3.3*

(K&A Statement): **Ability to (a) predict the impacts of the following malfunctions or operations on the CIRS; and (b) based on those predictions, use Procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** High temperature in the filter system.

Common 60

Plant conditions:

- Reactor is operating at 100% power, with ICS in full automatic.
- High RCS activity due to fuel pin failure.
- High Containment Building activity.
- Kidney Filter Fan AH-E-101 is operating to reduce activity in preparation for personnel entry.
- RB Clean-up System Water Spray Pumps FS-P-5A/B control switches are both in Normal position.

Event:

- Kidney Filter charcoal RTD temperature indications at TR-858 are 200 degrees F on multiple channels, rising at 20 degrees per minute due to adsorption of iodine.

Choose the one response below which describes any automatic actions and the required operator actions:

AH-E-101 will _____(1)_____.

FS-P-5A/B will _____(2)_____.

A. (1) continue to run. The operator must ensure the fan is running.
   (2) remain shutdown. The operator must start at least one pump.

B. (1) continue to run. The operator must ensure the fan is running.
   (2) automatically start. The operator must verify the auto-start.

C. (1) trip. The operator must place the fan in normal after stop.
   (2) automatically start. The operator must verify the auto-start.

D. (1) trip. The operator must place the fan in normal after stop.
   (2) remain shutdown. The operator must start at least one pump.

Proposed Answer: C. (1) trip. The operator must place the fan in normal after stop.
(2) automatically start. The operator must verify the auto-start.

Explanation:
For all answers, the controlling procedure is OP-TM-HVB-0609, and the actions applicable to the CRO is to ensure the automatic actions in response to this condition have occurred. The automatic actions are that AH-E-101 trips, and FS-P-5A/B auto start.

A. NOT CORRECT. The fan does not continue to run, and the pumps auto-start. Plausible since iodine removal can only occur if air flow is maintained. FS-P-5A/B start is required.
B. NOT CORRECT. The fan does not continue to run. Plausible since iodine removal can only occur if air flow is maintained.
C. CORRECT. See above.
D. NOT CORRECT. The FS-P-5A/B pumps will auto-start. Plausible if the examinee does not recall the automatic start of the FS pumps.

Technical Reference(s): OP-TM-HVB-0609 Rev 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 824-GLO-010 (As available)

Question Source: Bank # IR-824-GLO-10-Q02
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	K5.16(015)	
	Importance Rating	2.9	3.4

(K&A Statement): **Knowledge of the operational implications of the following concepts as they apply to the NIS:** Definition and calculation of quadrant tilt ratio.

Common 61

Plant conditions:

- The plant is at reduced power, with the following NI readings:
  - NI-5: 49.0%
  - NI-6: 50.0%
  - NI-7: 50.0%
  - NI-8: 51.0%
- The PPC failed 2 hours ago.
- Per OP-TM-300-202, the OCD to ICD conversion factor is 1.23
- All Full Incore System and Out of Core Detector tilt values were 0% on the last hourly log before the PPC failure.

With the above conditions Quadrant Power Tilt must be monitored once every __(1)__ and the most limiting tilt is ____(2)____.

A. (1) hour
(2) 1.23%

B. (1) 12 hours
(2) 1.23%

C. (1) hour
(2) 2.46%

D. (1) 12 hours
(2) 2.46%

Proposed Answer: D. (1) 12 hours
(2) 2.46%

Explanation:

A. Plausible since one hour is the frequency for power Imbalance Monitoring with the computer alarm disabled and the Minimum Incore System (MIS) Tilt limit is less than the Full Incore System (FIS); however the operational impact of frequency is every 12 hours. Furthermore, the tilt is calculated incorrectly by failing to divide by 50%.
B. Plausible since the monitoring frequency is 12 hours; the tilt is calculated incorrectly by failing to divide by 50%.
C. Plausible since one hour is the frequency for power Imbalance Monitoring with the computer alarm disabled and the Minimum Incore System (MIS) Tilt limit is less than the Full Incore System (FIS); however the operational impact of frequency is every 12 hours.
D. Correct answer. OP-TM-300-202, Quadrant Power Tilt and Axial Power Imbalance Using the Out-of-Core Detector System requires monitoring tilt on a minimum frequency of once every 12 hours when the tilt alarm is inoperable. Tilt is correctly calculated per OP-TM-300-202.

Technical Reference(s): OP-TM-300-202, Quadrant Power Tilt and Axial Power Imbalance Using the Out-of-Core Detector System (Rev. 0)(Page 1 and page 5) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 623-GLO-14 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A	A3.01 (035)	
	Importance Rating	4.0	3.9

(K&A Statement): **Ability to monitor automatic operation of the S/G including:** S/G water level control

Common 62

Plant conditions:

- The plant is at 100% power
- The following stations are in HAND to troubleshoot an ICS problem
  - SG/RX Master
  - Both SG Feedwater Demand Stations
  - Both Main Feedwater Pumps
  - Diamond Rod control
  - Reactor Demand Station

Event:

- The 'A' loop RC Flow Instrument Fails to mid-scale (45×10^6 lbm/hr)
- SASS fails to actuate

With no operator action _____.

A. both OTSG levels will lower due to BTU limits being imposed

B. both OTSG levels will remain at normal level due to the Loop Masters being in hand

C. 'A' OTSG level will lower due to BTU limits and 'B' OTSG level will remain stable

D. 'A' OTSG level will lower and 'B' OTSG level will rise due to Feedwater re-ratioing

Proposed Answer: C. 'A' OTSG level will lower due to BTU limits and 'B' OTSG level will remain stable

Explanation:
Steam generator levels are controlled by the integrated control system, with the following priority, Low level limits, BTU limits, normal total feed water flow required for "integrated" operations. Failure of the RC flow instrument will cause the ICS to impose a BTU limit on the side with the lowered RC flow, and will close feedwater valves on that side automatically.

A. Plausible since a BTU limit will be imposed on the A OTSG; however the B OTSG will not be affected.
B. Plausible since the B OTSG will remain stable; however the level in the A OTSG will lower due to the BTU Limit.
C. Correct answer. The BTU limit on RCS flow will only affect the A OTSG by lowering its level.
D. Plausible since A OTSG level will lower; however the B OTSG will not be affected.

Technical Reference(s): TQ-TM-104-621-C001, Integrated Control System (Rev. 2)(Pages 148,149)
OP-TM-MAP-H0102, OTSG A BTU LIMIT (Rev. 2) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 621-GLO-8 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7
55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	K4.01 (041)	
	Importance Rating	2.9*	3.3*

(K&A Statement): **Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following:** RRG/ICS system.

Common 63

Initial Plant Conditions:

- Plant Startup in progress.
- Reactor at 22% Power.
- Unit Load Demand = 180 MWe
- Turbine Generator on line.
- Turbine Bypass Valves are closed in automatic.

Which of the following describes the OTSG pressure being maintained by the Turbine Bypass Valves?

A. 895 PSIG

B. 960 PSIG

C. 1010 PSIG

D. 1040 PSIG

Proposed Answer: B. 960 PSIG.

Explanation:

A. INCORRECT because the main turbine is on line and demand is > 15%, therefore the bias is + 75 psig. Distracter is plausible because this would be the setpoint if the main turbine wasn't on line or ULD demand was < 15%.
B. CORRECT. The turbine is not tripped and the ULD demand is >15% therefore the setpoint is 885 psig + 75 psig.
C. INCORRECT because this is the setpoint for post reactor trip. Distracter is plausible because this is one setpoint for the turbine bypass valves.
D. INCORRECT because this is the setpoint for the Atmospheric Dump Valves in this mode. Distracter is plausible because this is the correct setpoint for the Atmospheric Dump Valves. If there was a misconception about which set of valves is currently controlling, then this answer might be chosen.

Technical Reference(s): LP TQ-TM-104-621-C001 PG 37 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 621-GLO-5 (As available)

Question Source: Bank # IR-621-GLO-5-Q12

Modified Bank # (Note changes or attach parent)

New

Question History: Last NRC Exam 03-1 Q#035

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.7

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	G2.4.49 (035)	
	Importance Rating	4.6	4.4

(K&A Statement): **Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.** Steam Generator.

Common 64

Plant conditions:

- The plant tripped from 100% power
- Tave is 532°F and lowering
- RCS Pressure is 1720 psig and lowering
- Main Feedwater flow to the A OTSG is 2.6 Mlbm/hr
- Main Feedwater flow to the B OTSG is 0.12 Mlbm/hr
- A OTSG level is 98% and rising
- B OTSG level is 24 inches and slowly lowering

The **FIRST** action required to be taken is _____.

A. Initiate HPI

B. Trip Both Feedwater Pumps

C. Initiate Emergency Feedwater

D. Perform Phase 1 Isolation on A OTSG

Proposed Answer: B. Trip Both Feedwater Pumps

Explanation (Optional):

A. Plausible since RCS pressure is lowering and may get to the HPI actuation setpoint; however the first action to be taken is trip both FW Pumps due to OTSG level being >97.5%.
B. Correct answer. The first step in RULE 3 is "VERIFY OTSG level < 97.5%" and the RNO Step is "TRIP both Main FW Pumps".
C. Plausible since EFW will auto start and have to be verified; however it is not started before the FW Pumps are tripped.
D. Plausible since Phase 1 isolation will be performed due to excessive P-S heat transfer; however the tripping of the FW Pumps is the first step in RULE 3.

Technical Reference(s): OP-TM-EOP-010, Rule 3 (Rev. 10)(Page 6)
OS-24 Conduct of Operations During Abnormal and Emergency Events (Rev. 17)(Attachment A Step 3.5)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: XHT-PCO-1 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	A4.01 (075)	
	Importance Rating	3.2*	3.2*

(K&A Statement): **Ability to manually operate and/or monitor in the control room:** Emergency/essential SWS pumps

Common 65

Plant conditions:

- A plant shutdown is in progress due to a small steam leak in the Reactor Building
- Reactor power is 92% and lowering
- The A Train of RB Emergency Cooling is in service
- RB pressure is stable at 0.85 psig
- RB Emergency Cooler pressure is 62 psig and slowly rising

With the above conditions the operator must _____ to lower RB Emergency Cooler pressure.

A. place a third RB Emergency Cooler in service

B. start the second train of RB Emergency Cooling

C. jog open on RR-V-5 Emergency Cooling Discharge Bypass

D. take local control of RR-V-6 Emergency Cooling Discharge Valve and throttle it closed

Proposed Answer: C. jog open on RR-V-5 Emergency Cooling Discharge Bypass

Explanation:

A. Plausible if the examinee does not know that RR-V-6 is downstream of all of the coolers and putting a third cooler in service will not change cooler pressure.
B. Plausible if the examinee does not know that RR-V-6 is downstream of all of the coolers and putting the second train in service will not lower the pressure.
C. Correct answer. OP-TM-534-901 requires jogging open RR-V-5 with cooler pressure >62 psig.
D. Plausible since local control of RR-V-6 is possible; however the procedure calls for using RR-V-5 and throttling closed on RR-V-6 would be the wrong direction.

Technical Reference(s): OP-TM-534-901, RB Emergency Cooling Operations (Rev. 6)(Page 5) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 534-GLO-12 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.19	
	Importance Rating	3.9	3.8

(K&A Statement): **Ability to use plant computers to evaluate system or component status.**

Common 66

Which ONE of the following computer functions is used by the crew to evaluate plant status during transient conditions?

A. Power Loss Cutout

B. Emergency Response Data System

C. Fixed Incore Detector Monitoring System

D. Reactor Coolant Inventory Tracking System

Proposed Answer: C+ D. Reactor Coolant Inventory Tracking System Post EXAM Comment Resolution 2 Correct answer JHC 8/12/09

Explanation:

A. Plausible since this is a computer function that is associated with a transient; however it cuts out alarms associated with the bus that is lost.
B. Plausible since this is a computer function that is used to asses plant status; however it is used by the NRC, not the crew.
C. ~~Plausible~~ Correct since this is a computer function that monitors plant status; however the data is delayed and not used for transient conditions.
D. Correct answer. The Reactor Coolant Inventory Tracking system is used to assess plant inventory status in transient conditions.

Technical Reference(s): 1105-10, Plant Computer (Rev. IC-26611)(Enclosure 2 Steps 1.6-1.10) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 60201001 (As available)

Question Source: Bank #

Modified Bank # _____ (Note changes or attach parent)

New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10

55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.29	
	Importance Rating	4.1	4.0

(K&A Statement): **Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.**

Common 67

Plant Conditions:

- 100% power

A licensed off shift Control Room Operator (CRO) is performing an equipment lineup in preparation for performing a quarterly testing of the ESAS system. After verifying WDL-V-535 "RB Sump Drain to Aux BLDG Sump" is closed, the procedure requires WDL-V-534 "RB Sump Drain to Aux BLDG Sump" to be opened for the test.

Opening WDL-V-534 _____.

A. must be performed by the on duty CRO because it involves a component activated by ESAS.

B. must be performed by the on-duty CRO due to the evolution being a tech spec surveillance.

C. may be performed by the off shift CRO as long as the surveillance was scheduled as part of the daily work list.

D. may be performed by the off shift CRO as long as the proposed manipulations have been discussed with the on-duty main control room team.

Proposed Answer: D. may be performed by the off shift CRO as long as the proposed manipulations have been discussed with the on-duty main control room team.

Explanation:

A. Plausible due to the safety significance of the ESAS system. Incorrect because only the manipulation of reactivity controls is restricted to only the on-duty CRO.
B. Plausible because on-duty CROs normally conduct tech spec surveillances as part of their duties. Incorrect because operation of these controls may be performed by other personnel provided conditions in OP-AA-103-103 are met.
C. Plausible since off-duty CROs can perform can perform manipulations that are part of an approved procedure provided requirements are met. Incorrect because the manipulations must be discussed with the MCR team prior to operation.
D. Correct answer. The operation must be discussed with the MCR team per OP-AA-103-103. The other required conditions are satisfied per the stem. (Condition #1 is given as part of the quarterly testing. #2 is the answer. Condition #3 is met since WDL-V-534 is not a reactivity control. Condition #4 is met since WDL-V-535 is verified closed. Condition #5 is met due to the operator being a qualified CRO.)

Technical Reference(s): OP-AA-103-103, Operation of Plant Equipment (Rev. 0)(Page 2) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: OF-20 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.42	
	Importance Rating	2.5	3.4

(K&A Statement): **Knowledge of new and spent fuel movement procedures.**

Common 68

While performing fuel handling operations IAW 1505-1, Fuel and Control Component Shuffles, which ONE of the following requires permission from the CRO and SRO (Licensed Fuel Handling Supervisor):

A. Removing a fuel assembly from the core.

B. Inserting a control rod assembly into a fuel assembly in the core.

C. Disengaging the grapple from a fuel assembly in the Spent Fuel Pool.

D. Removing a control rod from fuel assembly in the Spent Fuel Pool upender basket.

Proposed Answer: A. Removing a fuel assembly from the core.

Explanation:

A. Correct answer. 1505-1 step 5.3.5 Fuel and Control Component Shuffles requires approval of the CRO and SRO prior to removing a fuel assembly from the core.
B. Plausible since permission from both is required to insert a fuel assembly into the core; or withdraw control components from the core, but not to insert control components.
C. Plausible since permission from both is required to disengage the grapple from a fuel assembly in the core; however it is not required in the Spent Fuel Pool.
D. Plausible since permission from both is required to remove a control component from a fuel assembly in the core; however it is not required in the Spent Fuel Pool.

Technical Reference(s): 1505-1, Fuel and Control Component Shuffles (Rev. 50)(Limitation 5.3.5) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 0340030101 (As available)

Question Source: Bank #

Modified Bank # _____ (Note changes or attach parent)

New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10

55.43 _____

Comments:

Revised 6/2//09 by MGS to make the correct answer one that normally adds negative reactivity.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.13	
	Importance Rating	4.1	4.3

(K&A Statement): **Knowledge of tagging and clearance procedures.**

Common 69

MS-V-13A, Steam supply to EF-P-1 is to be used as an isolation boundary for clearance and tagging IAW OP-MA-109-101, Clearance and Tagging.

Which ONE of the following describes the required method to ensure MS-V-13A remains closed?

A. Open the air supply to MS-V-13A positioner to lock air pressure at the positioner.

B. Close the air supply valve to the MS-V-13A positioner and bleed off air pressure at the positioner.

C. Take local manual control of MS-V-13A and place it in the closed position with its handwheel.

D. Lock closed the air supply valve to MS-V-13A and de-energize the associated air solenoid valve.

Proposed Answer: C. Take local manual control of MS-V-13A and place it in the closed position with its handwheel.

Explanation (Optional):

A. Plausible if the examinee does not know this valve fails open on loss of air pressure; however a gag would still need to be used to hold the valve closed.
B. Plausible since this is correct method for fails closed valves; however MS-V-13A fails open.
C. Correct answer - Must be gagged closed, installed handwheel functions as gag.
D. Plausible since this is a correct method for fails closed type solenoid valve; however MS-V-13A fails open.

Technical Reference(s): OP-MA-109-101, Clearance and Tagging (Rev. 7)(Page 28) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: Task EQC02014 (As available)

Question Source:	Bank #	QR-EQC02014-Q01	
	Modified Bank #		(Note changes or attach parent)
	New		
Question History:	Last NRC Exam	None	
Question Cognitive Level:	Memory or Fundamental Knowledge		
	Comprehension or Analysis	X	
10 CFR Part 55 Content:	55.41	b.10	
	55.43		

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.14	
	Importance Rating	3.9	4.3

(K&A Statement): **Knowledge of the process for controlling equipment configuration or status.**

Common 70

OP-AA-108-101, Control of Equipment and System Status contains directions on the use of the Abnormal Component Position Sheet (ACPS).

The ACPS provides a controlled method for . . .

A. aligning equipment outside of routine operations.

B. aligning equipment in support of maintenance activities.

C. positioning components as required per a surveillance or maintenance activity.

D. positioning components and jumpers as part of a Temporary Configuration Change Package (TCCP).

Proposed Answer: A. aligning equipment outside of routine operations.

Explanation:

A. CORRECT per 4.1.1 of OP-AA-108-101
B. Plausible since logging maintenance alterations is required; however the Maintenance Alteration Log defined in MA-AA-716-100 is used not the ACPS.
C. Plausible as components are repositioned for some surveillance and maintenance actions; however the note is section 4.1.2.6 exempts the need for ACPS.
D. Plausible as a TCCP may reposition components; however4.1.2.1 specifically states DO NOT use in this case.

Technical Reference(s): OP-AA-108-101, Control of Equipment and System Status (rev. 7)(Pages 3,4,5) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: Task EQC02018 (As available)

Question Source: Bank # IS-EQC02018-Q02

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10

55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.2.12	
	Importance Rating	3.7	4.1

(K&A Statement): **Knowledge of surveillance procedures.**

Common 71

It is the responsibility of the _____ to determine if an Inservice Testing (IST) pump reference value was affected or MAY be affected by a maintenance activity.

A. Shift Manager

B. Maintenance Foreman

C. IST Program Engineer

D. Cognizant System Engineer

Proposed Answer: A. Shift Manager

Explanation:

A. Correct answer. 1041 IST Program Requirements places the responsibility on the Shift Manager to determine if an IST pump reference value was affected or MAY be affected by a maintenance activity.
B. Plausible since the Shift Manager may request assistance from this person IAW 1041 to make the determination.
C. Plausible since the Shift Manager may request assistance from this person IAW 1041 to make the determination.
D. Plausible since the Shift Manager may request assistance from this person IAW 1041 to make the determination.

Technical Reference(s): 1041 IST Program Requirements (Rev. 43)(Step 4.1.1.c) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.3.12	
	Importance Rating	3.2	3.7

(K&A Statement): **Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.**

Common 72

Plant conditions:

- The plant has been shut down for 2 hours
- An urgent entry into the Reactor Building is directed by the Shift Manager
- RM-A-2 Particulate channel is OOS
- The Kidney Filter System has been in operation for one hour
- An RB Purge will not be in operation before the entry

With the above conditions _____.

A. there must be two persons to enter the RB, wearing respirators and having a valid RWP

B. there must be two persons to enter the RB, wearing respirators, one of which is an RP Technician

C. the entry can be made by one person in a respirator as long as a valid RWP exists

D. the entry can be made by one person in a respirator as long as it is an RP Technician

Proposed Answer: B. there must be two persons to enter the RB, wearing respirators, one of which is an RP Technician

Explanation (Optional):

A. Plausible since it does require two persons wearing respirators for the entry; however an RP Technician is required for urgent unplanned entries.
B. Correct answer RP-TM-460-1007, Access to TMI-1 Reactor Building requires two persons for all initial entries into the RB and requires a respirator if the Kidney Filter has not been run for four hours, a purge is not in operation or RM-A-2 Particulate/Iodine can not be used, as this is an urgent entry 1 person must be a RP tech.
C. Plausible since a respirator and valid RWP are required; however it must be made by two people.
D. Plausible since it does require a respirator and an urgent unplanned entry would require an RP Technician; however the initial entry requires two people.

Technical Reference(s): RP-TM-460-1007, Access to TMI Reactor Building (Rev. 5)(Pages 2,3,6,7) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 b.12
- 55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.3.15	
	Importance Rating	2.9	3.1

(K&A Statement): **Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.**

Common 73

Reactor Building Radiation Monitor RM-A-2 pump makeup air comes from the _____.

A. Reactor Building to ensure a representative sample flow

B. Reactor Building to prevent slowly pressurizing the Reactor Building

C. Intermediate Building to ensure a representative sample flow

D. Intermediate Building to prevent pressurizing the Reactor Building

Proposed Answer: B. Reactor Building to prevent slowly pressurizing the Reactor Building

Explanation (Optional):

The RM-A samplers take a sample flow of 1scfm (2scfm for RM-A-2) through the filtering / monitoring paths, then into the suction of a pump that draws extra makeup air to provide the pump minimum flow requirements. For RM-A-2 this is unique in that the makeup air must come from the RB to avoid pressurizing the RB slowly over time with makeup air.

A. Plausible since it does take the makeup air from the RB; however it is not to ensure a representative sample flow.
B. Correct answer. RM-A-2 receives its makeup air from the Reactor Building to prevent pressurizing the RB.
C. Plausible since the monitor is in the intermediate Building and other Atmospheric monitors take their makeup air from local air; however RM-A-2 takes its makeup air from the RB to prevent pressurizing the RB.
D. Plausible since the reason is to prevent from pressurizing the RB; however the makeup air comes from the RB.

Technical Reference(s): TQ-TM-104-661-C001, Radiation Monitoring System (Rev. 3)(Section III Page 27)
1105-8 rev 83 figure 2

(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 661-GLO-3 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.11
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.3	
	Importance Rating	3.7	3.9

(K&A Statement): **Ability to identify post-accident instrumentation.**

Common 74

Which ONE of the following is defined as Post Accident Monitoring Instrumentation by Tech Specs?

A. Thot indicator RC-4A-TE4 on console center.

B. RB Purge Radiation Monitor, RM-A-9 Particulate, Iodine and Gas Channels.

C. Reactor Coolant Inventory Trending System (RCITS) on the Plant Computer.

D. RCS Pressure Wide Range Pressure Instrument PI-963 at the Remote Shutdown Panel.

Proposed Answer: D. RCS Pressure Wide Range Pressure Instrument PI-963 at the Remote Shutdown Panel.

Explanation (Optional):

A. Plausible since Thot indication is an Accident Monitoring instrument; however the Accident Monitoring Instruments are on PCL.
B. Plausible since RM-A-9 Hi is a TS Post-Accident Monitor; however the PIG channels are not.
C. Plausible since the RCITS system will give RCS inventory status information in an inadequate core cooling situation; however it is not identified as Post Accident Monitoring Instrumentation by TS.
D. Correct answer. TS Table 3.5-3 identifies PI-963 as Post Accident Monitoring Instrumentation.

Technical Reference(s): Tech Spec Table 3.5-3, Accident (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 624-GLO-14 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 b.7
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.43	
	Importance Rating	3.2	3.8

(K&A Statement): **Knowledge of emergency communications systems and techniques.**

Common 75

Plant conditions:

- 09:22 - An Unusual Event (UE) was declared
- 09:26 - The Shift Communicator was provided the State/Local Event Notification Form EP-MA-114-100-F-01
- 09:27 - The initial role call is complete except for Dauphin County who did not answer
- 09:28 - A Site Area Emergency (SAE) was declared

With the above conditions the Shift Communicator is required to _____(1)_____ and the Site Area Emergency notification _____(2)_____.

A. (1) notify the Shift ED so Dauphin County can be notified within 15 minutes by an alternate means
(2) can be made in place of the Unusual Event if accomplished before 09:37

B. (1) notify the Shift ED so Dauphin County can be notified within 15 minutes by an alternate means
(2) must be made after the Unusual Event notification and before 09:43

C. (1) hold the notification until the Dauphin County is contacted via alternate means
(2) can be made in place of the Unusual Event if accomplished before 09:37

D. (1) hold the notification until the Dauphin County is contacted via alternate means
(2) must be made after the Unusual Event notification and before 09:43

Proposed Answer: A. (1) notify the Shift ED so Dauphin County can be notified within 15 minutes by an alternate means
(2) can be made in place of the Unusual Event if accomplished before 09:37

Explanation:

A. Correct answer. The Shift ED must be notified after the role call if a county or PEMA does not answer so they can be notified within 15 minutes by an alternate means IAW EP-MA-114-100. The SAE can be made instead of the UE if made within 15 minutes of the UE declaration IAW EP-AA-112-100-F-01.
B. Plausible since the Shift ED must be notified; however the SAE can be made instead of the UE if made by 09:37.
C. Plausible since the SAE notification can be made instead of the UE if made by 09:37; however the notification to the answering parties will not be held up while Dauphin County is contacted via alternate means.
D. Plausible since the SAE notification must be made by 09:43; however it can be made instead of the UE if made by 09:37 and the notification to the answering parties will not be held up while Dauphin County is contacted via alternate means.

Technical Reference(s): EP-MA-114-100, Mid-Atlantic State/Local Notifications (Rev. 13)(Page 8)
EP-AA-112-100-F-01, Shift Emergency Director Checklist (Rev. 1)(Page 3)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 b.10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	G2.2.39 (007)	
	Importance Rating		4.5

(K&A Statement): **Knowledge of less than or equal to one hour Technical Specification action statements for systems.** (Reactor Trip Stabilization)

SRO 76

Plant conditions:

- The plant tripped from 100% power
- A long period of high cooldown rate existed post trip
- The Makeup and Purification system is in ES Standby
- The Plant is currently stable;
  - Thot and Tcold are 310°F
  - RCS pressure is 500 psig
  - Pressurizer level is 150 inches

What action must be taken and what is the basis for the stated action?

A. Place NDTT switch in AUTO,
to prevent inadvertent opening on any subsequent heatup.

B. Rack out Make Up Pumps selected for ES,
to prevent potential for overpressure from ES signals.

C. Reduce Pressurizer level to ≤ 100" within 1 hour,
to allow operator action time to prevent severe overpressurization.

D. Raise RCS temperature or Block PORV and remove power within 8 hours,
to prevent potential for opening on low setpoint and loss of inventory.

Proposed Answer: C. Reduce Pressurizer level to ≤ 100" within 1 hour, to allow operator action time to prevent severe overpressurization.

Explanation:

A. Plausible since below 329°F the switch must be in Auto for LTOP protection (TS 3.1.12.2.a), however the reason given is the reason for placing the switch in OFF.
B. Plausible since T.S. action 3.1.12 would allow this as LTOP protection; however it is incorrect as RCP seal cooling is still needed and Makeup Pump breakers would have to be racked out.
C. Correct answer. Per T.S. 3.1.12 and the T.S bases, return level to ≤100" within 1 hour to allow time to prevent severe overpressurization in the event of any single failure.
D. Plausible raising temperature would remove LTOP concern, incorrect because 2nd stated part is time allowance for PORV setpoint above allowed and exceeds time allowed for >100" with HPI available.

Technical Reference(s): Tech Spec 3.1.12.1 and bases (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 220-GLO-14 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 b.2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	AA2.06 (026)	
	Importance Rating		3.1*

(K&A Statement): **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.

SRO 77

Plant conditions.

- Reactor at Hot Shutdown
- CRD Groups 1-4 withdrawn
- ICCW pump trips
- Standby ICCW fails to start

Which ONE of the following identifies the;

(1) component requiring mitigating action to be taken with associated time
(2) mitigating procedure entered from OP-TM-AOP-032, "Loss of ICCW"

A. (1) CRD motor, 7 minutes
(2) OP-TM-EOP-001, "Reactor Trip"

B. (1) RCP seals, 10 minutes
(2) OP-TM-AOP-040, "#1 RCP Seal Failure"

C. (1) RC Drain Tank Pump, 10 minutes
(2) OP-TM-PPC-A0459 "RC Drain Tank WDL-T-3 Temp"

D. (1) Pressurizer Level, 90 minutes
(2) OP-TM-AOP-043, "Loss of Pressurizer (Solid OPS Cooldown)"

Proposed Answer: A. (1) CRD motor, 7 minutes
(2) OP-TM-EOP-001, "Reactor Trip"

Explanation:

A. Correct answer OP-TM-AOP-0321 Loss of ICCW basis document reference to UFSAR section 9.3.2.6 for time limit, OP-TM-AOP-032 step 3.2 initiate OP-TM-EOP-001, "Reactor Trip"

B. Plausible since RCP seals do receive cooling on loss of SI from ICCW, time limit (10 minutes) based on loss NSCCW time; however we do not enter AOP-041 with SI still available.

C. Plausible since the RCDT is cooled by ICCW and AOP-032 references placing pump in PTL; however the tank should not reach high temperature under given conditions.

D. Plausible since Letdown is lost and the Pressurizer will fill; however the time to >370 inches (AOP-043 entry point) from 100" at 22 gpm (SI flow entering the RCS) would be ((370-100)*12)/22=147 minutes.

Technical Reference(s): OP-TM-AOP-0321 step 1.1, attachment 1 and OP-TM-AOP-032 Step 3.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-032-PCO-1 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	AA2.10 (027)	
	Importance Rating		3.6

(K&A Statement): **Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions**: PZR heater energized/de-energized condition.

SRO 78

Plant conditions:

- Reactor operating at 100% power with ICS in full automatic.
- RC-1 LT1 and RC-2 TE1 are selected for inputs to the Pressurizer level recorder.
- RCS-Pressurizer boron equalization in progress using OP-TM-220-461, Equalize RCS and Pressurizer Boron Concentration.
- Pressurizer Spray Valve RC-V-1 is partially open in manual.
- Console Right selector switches for Pressurizer Heater Banks 1-5 turned to the ON POSITION.

Event:

- SUBFEEDS - AUTO/HAND lamp de-energizes (NOT lit).
- MAP G-3-5, Pzr level Lo-Lo actuates.
- Operator determines this alarm is invalid, based on redundant indications.

Based on these conditions identify the ONE selection below that describes:
(1) Impact on Console Right Bank 1-5 heater control lamps.
(2) Procedure used to mitigate the condition.

A. (1) Red lamps NOT lit
(2) OP-TM-MAP-G0305 "Pzr Level Lo-Lo."

B. (1) Red lamps NOT lit
(2) OP-TM-AOP-027 "Loss of ATA or ICS Auto Power."

C. (1) Red lamps remain lit
(2) OP-TM-MAP-G0305 "Pzr Level Lo-Lo."

D. (1) Red lamps remain lit
(2) OP-TM-AOP-027 "Loss of ATA or ICS Auto Power."

Proposed Answer: B. (1) Red lamps NOT lit
(2) OP-TM-AOP-027 "Loss of ATA or ICS Auto Power."

Explanation (Optional):

A. INCORRECT. Plausible if the examinee believes the guidance to bypass the interlock is contained in the alarm response.
B. Correct answer. The Loss of ICS auto power procedure is used for partial losses, as described in the basis document. Alarm response procedure for G-3-5 does not include direction to bypass the heater cut-out.
C. INCORRECT. Plausible in the examinee believes the guidance to bypass the interlock is contained in the alarm response. Further plausibility if the examinee believes that operation of the heaters in manual bypasses the interlock.
D. INCORRECT. Plausible if the examinee believes that manual operation of the pressurizer heaters bypasses the interlock.

Technical Reference(s): OP-TM-AOP-027 page 5 (Attach if not previously provided)
OP-TM-AOP-0271 page 5
OP-TM-MAP-G0305

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source: Bank # IR-223-GLO-10-Q04
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	G2.4.30 (054)	
	Importance Rating		4.1

(K&A Statement): **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.** Loss of Main Feedwater.

SRO 79

Which ONE of the following events would require a four (4) hour report to the NRC Operations Center, in accordance with LS-AA-1020, "Reportability Reference Manual"?

A. Loss of Main Feedwater Pumps from 100% power.

B. Completion of a cooldown to repair leaking Code Safety Valve.

C. Activation of ERDS, following declaration of a Site Area Emergency.

D. Fire destroys Emergency Diesel Generator 1A 480 V Aux Panel in EG-Y-1A room.

Proposed Answer: A. Loss of Main Feedwater Pumps from 100% power.

Explanation:

A. Correct – LS-AA-1110 SAF 1.6.
B. Plausible – however cooldown does not require report unless T.S. required and then would be 8 hour.
C. Plausible ERDS activation is reportable however it is required within 1 hour.
D. Plausible E-Plan entry HA6 would require immediate not to exceed 1 hour.

Technical Reference(s): LS-AA-1110, Exelon Reportability Reference Manual (Rev 12)(Page 19) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: LS-AA-1020, Reportability Reference Manual

Learning Objective: ADM08005 (As available)

Question Source: Bank #

	Modified Bank #	2007 NRC Q# 82	(Note changes or attach parent)
	New		
Question History:	Last NRC Exam	2007 Q82 modified	
Question Cognitive Level:	Memory or Fundamental Knowledge	X	
	Comprehension or Analysis		
10 CFR Part 55 Content:	55.41		
	55.43	b.5	

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	G2.1.25 (011)	
	Importance Rating		4.2

(K&A Statement): **Ability to interpret reference materials, such as graphs, curves, tables, etc.** Large Break LOCA.

SRO 80

Plant event:

- The reactor tripped from 100% power due to a large RCS leak
- SCM was lost due to the leak and Rule 1 was performed
- All RCPs remain running because they were not shut down
- The average of the five highest incore temperatures maximum value reached was 1525°F at 286 psig RCS pressure
- The TSC was manned 45 minutes after the event began

Plant conditions one hour into the event:

- All RCPs remain running
- The average of the five highest incore temperatures is 480°F
- RCS pressure is 600 psig

Which ONE of the following actions is required?

A. GO TO OP-TM-EOP-002 and perform OP-TM-EOP-010, Rule 1.

B. Trip all RCPs and GO TO ER-TM-TSC-010, Severe Accident Guidelines.

C. Open all the RCS High Point Vents IAW OP-TM-EOP-008, RCS Superheat.

D. Maintain all RCPs running IAW OP-TM-EOP-010 Rule 1, Loss of Subcooling Margin.

Proposed Answer: B. Trip all RCPs and GO TO ER-TM-TSC-010, Severe Accident Guidelines

Explanation (Optional):

A. Plausible since this is the routing that would occur if the RCS had not exceeded Curve B or Curve C; however Curve C was exceeded so the action required is trip RC-P-1A and GO TO ER-TM-TSC-010, Severe Accident Guidelines.
B. Correct answer. OP-TM-EOP-008 requires tripping all RCPs and routing to ER-TM-TSC-010, Severe Accident Guidelines.
C. Plausible since this is the action taken for exceeding Curve B but not exceeding Curve C.
D. Plausible since this would be required if Curve C had not been exceeded.

Technical Reference(s): OP-TM-EOP-008, RCS Superheated (Rev. 7)(Pages 3,7,9,11)
OP-TM-EOP-010, Figure 2 RCS Superheat (Rev. 10)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: OP-TM-EOP-010, Figure 2 RCS Superheat (Rev. 10)

Learning Objective: EP101019 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	EA2.1 (BW/E05)	
	Importance Rating		4.2

(K&A Statement): **Ability to determine and interpret the following as they apply to the (Excessive Heat Transfer)** Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

SRO 81

Plant conditions:

- The plant tripped from 100% power due to a loss of offsite power (LOOP)
- A large steam leak occurred in the Reactor Building on the 'B' OTSG post trip
- The 'B' OTSG has been isolated
- 'A' OTSG level is 12% and rising
- RB pressure peaked at 23 psig
- ESAS actuated as expected
- The average of the 5 highest incore temperatures is 548°F and lowering
- 'A' Loop Thot is 530°F and rising
- 'B' Loop Thot is 528°F and rising
- 'A' Loop Tcold is 526°F and lowering
- 'B' Loop Tcold is 523°F and stable
- RCS pressure is 1461 psig and rising
- Pressurizer level is 123 inches and rising

With the above conditions the CRS will direct _____.

A. INITIATIATION of Rule 4 Feedwater Control and feed the 'A' OTSG at >430 gpm

B. INITIATIATION of Rule 5 Emergency Boration and PERFORM Guide 1 "Emergency Boration Backup Methods"

C. THROTTLING HPI IAW OP-TM-211-901, "Emergency Injection (HPI / LPI)" to control SCM between 30°F and 70°F

D. THROTTLING open the Turbine Bypass Valves so that secondary Tsat is lower than RCS cold leg temperature IAW OP-TM-EOP-010 Guide 12, RCS Stabilization

Proposed Answer: C. THROTTLING HPI IAW OP-TM-211-901, "Emergency Injection (HPI / LPI)" to control SCM between 30°F and 70°F

Explanation (Optional):

A. Plausible since Rule 4 will be initiated; however with SCM >25°F there is no requirement to feed at >430 gpm.
B. Plausible since Rule 5 will be initiated; however there is no requirement to go to the backup method since the MU-V-14 valves are already open.
C. Correct answer. Rule 2 requires throttling HPI to minimize SCM with the RCPs off.
D. Plausible since guide 12 will be initiated and secondary Tsat will be reduced until it is lower than RCS cold leg temperature; however the Atmospheric Dump valves will be used since there are no Circ Water Pumps running.

Technical Reference(s): OP-TM-EOP-010, Rule 2 (Rev. 10) (Attach if not previously provided)
OP-TM-EOP-010, Rule 4 and Rule 5 (Rev. 10)
OP-TM-EOP-010, Guide 12 (Rev. 10)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP003-PCO-4 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	EA2.04 (074)	
	Importance Rating		4.2

(K&A Statement): **Ability to determine or interpret the following as they apply to Inadequate Core Cooling:** Relationship between RCS temperature and main steam pressure.

SRO 82

Plant conditions:

- The plant tripped from 100% power due to a leak through Pressurizer code Safety Valve RC-RV-1A
- Following the trip offsite power was lost
- The crew transitioned to OP-TM-EOP-006, LOCA Cooldown from OP-TM-EOP-002, Loss of 25°F Subcooling Margin
- Incore thermocouple temperature is 526°F
- RCS Pressure is 963 psig
- Core cooldown rate is 26°F/hour
- OTSG Pressures are 880 psig
- EF-P-1 is the only Emergency Feedwater Pump running

With the above conditions the CRS will direct an OTSG pressure band of ___(1)___ per ___(2)___.

A. 50 - 150 psig IAW OP-TM-EOP-006, LOCA Cooldown

B. 485 - 585 psig IAW OP-TM-EOP-006, LOCA Cooldown

C. 625 - 725 psig IAW OP-TM-EOP-010 Guide 6 OTSG Pressure Control

D. 725 - 825 psig IAW OP-TM-EOP-010 Guide 6 OTSG Pressure Control

Proposed Answer: B. 485 - 585 psig IAW OP-TM-EOP-006, LOCA Cooldown

Explanation (Optional):

A. Plausible since this pressure value is used in EOP-006 and is associated with EF-P-1; however it is a minimum value if only EF-P-1 is running. This value is incorrect since it is far below the secondary Tsat of 40-60°F below incore thermocouple temperature that EOP-006 requires the operator to establish for the given conditions.
B. Correct answer. EOP-006 requires reducing OTSG pressure so that secondary Tsat is 40-60°F below incore thermocouple temperature. This would be between 500 and 600 psig on the OTSGs for the given incore thermocouple temperatures.
C. Plausible since this is a pressure target in Guide 5; however it is for reseating MSSVs post trip.
D. Plausible since this is 100 psig below RCS pressure which is a pressure target in Guide 6 for <25°F SCM; however it will not establish a cooldown rate and EOP-006 requires reducing OTSG pressure so that secondary Tsat is 40-60°F below incore thermocouple temperature.

Technical Reference(s): OP-TM-EOP-006, LOCA Cooldown (Rev. 7)(Step 4.3)
OP-TM-EOP-010, Guide 6, OTSG Pressure Control (Rev. 10)(Page 15)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOP006-PCO-5 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	AA2.01 (032)	
	Importance Rating		2.9*

(K&A Statement): **Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation:** Normal/abnormal power supply operation.

SRO 83

Plant conditions:

- Reactor startup is in progress IAW 1103-8 Approach to Criticality
- Tave is 532°F
- NI-11 is OOS due to a detector calibration problem
- The Reactor is critical at $1X10^{-8}$ amps on the Intermediate Range instruments

Event:

- The power supply breaker to "B" RPS cabinet on VBB trips open.

With the above conditions _____.

A. action must be taken within one hour to place the reactor in hot shutdown until two Source Range Instruments are operable

B. action must be taken within one hour to place the reactor in hot shutdown until one Source Range Instrument is operable

C. power escalation is allowed to continue and no timeclock is in effect due to being $>10^{-10}$ amps in the Intermediate Range

D. power escalation is allowed to continue and action must be taken within one hour to return one Source Range Instrument to operability

Proposed Answer: C. power escalation is allowed to continue and no timeclock is in effect due to being $>10^{-10}$ amps in the Intermediate Range

Explanation (Optional):

A. Plausible since the reactor can not be critical at $<10^{-10}$ amps with no Source Range instruments; however Spec 3.0.1 applies and only one instrument is required.
B. Plausible since the reactor can not be critical at $<10^{-10}$ amps with no Source Range instruments and a one hour timeclock would be in effect; however the given condition is Intermediate Range at $1X10^{-8}$ amps, so no Source Range instruments are required to be operable.
C. Correct answer. TS 3.5-1 Table actions state "When 1 of 2 intermediate range instrument channels is greater than 10^{-10} amps, or 2 of 4 power range instrument channels are greater than 10 percent full power, source range instrumentation is not required."
D. Plausible since the power escalation can continue; however no timeclock is in effect.

Technical Reference(s): TS 3.5.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 623-GLO-14 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 b.2

Comments: Question revised based on NRC comments. (4/30/09)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	G2.2.25 (BW/A07)	
	Importance Rating		4.2

(K&A Statement): **Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.** Flooding.

SRO 84

Which ONE of the following identifies the Tech Spec requirement for a flood condition and the basis for the action?

A. The reactor must be placed in HOT SHUTDOWN if river water flow reaches 1,000,000 cfs to ensure adequate freeboard exists at the Intake Structure during shutdown of the unit.

B. The reactor must be placed in HOT SHUTDOWN if river water level reaches 300 feet at the Intake Structure due to the degradation of the dike.

C. The reactor must be placed in HOT STANDBY if river water flow reaches 1,100,000 cfs due to the degradation of the dike.

D. The reactor must be placed in HOT STANDBY if river water flow reaches 302 feet at the Intake Structure to ensure adequate freeboard exists at the Intake Structure during operation of the unit.

Proposed Answer: D. The reactor must be placed in HOT STANDBY if river water flow reaches 302 feet at the Intake Structure to ensure adequate freeboard exists at the Intake Structure during operation of the unit.

Explanation (Optional):

A. Plausible since 1,000,000 cfs is the flow used in Tech Specs corresponding to the limit of 302 feet and the concern is adequate freeboard at the Intake Structure; however the plant is required to go to HOT STANDBY and it is to ensure adequate freeboard during operation of the plant.
B. Plausible since 300 feet is an action point in OP-TM-AOP-002, Flood to place the plant in HOT SHUTDOWN if there is significant deterioration of the dike.
C. Plausible since HOT STANDBY is the TS required action; however the flowrate corresponding to 302 feet is 1,000,000 cfs and the concern is not degradation of the dike.
D. Correct answer. TS 3.14.2.1 states "If the river stage reaches elevation 302 feet at the River Water Intake Structure, corresponding to 1,000,000 cfs river flow, the unit will be brought to the hot standby condition."

The Tech Spec bases states "Placing the unit in hot standby when the river stage reaches 302 feet elevation provides an additional margin of conservatism by assuring that adequate freeboard exists during operation of the unit."

UFSAR states that the maximum probable flood is 304' elevation at the north tip of the island and 303' elevation at the intake structure. The dike extends from 310' elevation at the north end to 305' elevation across the south end. Free board at the intake structure is approximately 2 ft.

Technical Reference(s): TS 3.14.2 Flood Condition For Placing The Unit In Hot Standby and Bases; OP-TM-AOP-002, Flood (Rev. 0)(Step 6.2) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP002-PCO-1 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 ____
55.43 b.2

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	G2.4.8 (BW/A02)	
	Importance Rating		4.5

(K&A Statement): **Knowledge of how abnormal operating procedures are used in conjunction with EOPs.** Loss of NNI X (Hand Power).

SRO 85

Plant conditions:

- The plant is at 68% power
- Feedwater Pump 1A is running and FW-P-1B is OOS for maintenance
- The Feedwater Loop Masters are in HAND
- FW-V-17B and FW-V-16B are in HAND due to an ICS problem that is being investigated

Event:

- ICS HAND Power is lost

With the above conditions the crew will _____.

A. GO TO OP-TM-EOP-001, Reactor Trip, and trip the reactor

B. GO TO OP-TM-EOP-001, Reactor Trip, and trip the reactor, PERFORM the VSSVs and transition to OP-TM-AOP-026, Loss of ATB or ICS HAND Power

C. INITIATE OP-TM-AOP-026, Loss of ATB or ICS HAND Power and stabilize the plant at the current power level with the ICS in HAND

D. INITIATE OP-TM-AOP-026, Loss of ATB or ICS HAND Power, Perform OP-TM-EOP-001, Reactor Trip IMAs, trip FW-P-1A, INITIATE Emergency Feedwater and INITIATE OP-TM-EOP-001, Reactor Trip

Proposed Answer: D. INITIATE OP-TM-AOP-026, Loss of ATB or ICS HAND Power, Perform OP-TM-EOP-001, Reactor Trip IMAs, trip FW-P-1A, INITIATE Emergency Feedwater and INITIATE OP-TM-EOP-001, Reactor Trip

Explanation (Optional

A. Plausible since the reactor will be tripped; however the Feedwater pump will be tripped, EFW will be initiated and EOP-001 will be INITIATED IAW AOP-026.
B. Plausible since AOP-026 will be INITIATED; however the crew does not GO TO EOP-001. AOP-026 IMAs will be performed (EOP-001 IMAs, FW-P-1A will be tripped and EFW will be initiated) EOP-001 will then be INITIATED.
C. Plausible if the examinee does not know the reactor trip criteria is for power being <75% with the FW valves in HAND.
D. Correct answer. AOP-026 requires the crew to PERFORM EOP-001 IMAS, trip both feedwater pumps, INITIATE OP-TM-424-901 EFW and INITIATE EOP-001.

Technical Reference(s): OP-TM-AOP-026, Loss of ATB or ICS HAND Power (Rev. 2)(Step 2.1) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP026-PCO-1 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 ____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	A2.07 (008)	
	Importance Rating		2.8*

(K&A Statement): **Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations**: Consequences of high or low CCW flow rate and temperature; the flow rate at which the CCW standby pump will start

SRO 86

Plant conditions:

- The plant is heating up IAW 1102-1, Plant Heatup to 525°F
- Normal equipment lineups exist
- RCS Temperature is 485°F and rising
- Seal Injection flow is at 20 gpm
- RCP Seal #1 Seal temperatures are stable at 187°F

Event:

- IC-V-3 IC RB Outlet Valve, fails closed

With the above conditions IC-P-1B will _____.

A. start, all RCPs will automatically trip and OP-TM-226-901, Loss of ALL RCP Seal Cooling will be initiated, Seal Cooling will be isolated

B. start, all RCPs will automatically trip and OP-TM-AOP-032, Loss of Intermediate Component Cooling will be initiated, IC-P-1A and IC-P-1B will be placed in PTL

C. NOT start and OP-TM-226-901, Loss of ALL RCP Seal Cooling will be initiated, to restore Seal Cooling

D. NOT start and OP-TM-AOP-032, Loss of Intermediate Component Cooling will be initiated, IC-P-1B will be manually started.

Proposed Answer: B. start, all RCPs will automatically trip and OP-TM-AOP-032, Loss of Intermediate Component Cooling will be initiated, IC-P-1A and IC-P-1B will be placed in PTL

Explanation (Optional):

A. Plausible since IC-P-1B will start when total ICCW flow drops to 550 gpm and all RCPs will trip after 10 seconds due to Seal injection flow being <22 gpm and ICCW flow <550 gpm; however OP-TM-226-901, Loss of ALL RCP Seal Cooling would only be initiated RCP Seal #1 temperature has exceeded 235°F and would be used to isolate seal cooling.
B. Correct answer. IC-P-1B will start on low flow and all RCPs will trip after 10 seconds due to Seal injection flow being <22 gpm and ICCW flow <550 gpm. No ICCW flow in the RB and the reactor shut down is an entry condition to OP-TM-AOP-032, Loss of Intermediate Component Cooling, which would be used to place both IC-P-1s in PTL.
C. Plausible if the examinee does not realize ICCW flow will be <550 gpm through the Recirc valve IC-V-74 and OP-TM-226-901, Loss of ALL RCP Seal Cooling is not entered until RCP Seal Temperatures are >235°F.
D. Plausible since OP-TM-AOP-032, Loss of Intermediate Component Cooling will be initiated; however the RCPs will trip automatically and IC-P-1B will start on low ICCW flow.

Technical Reference(s): OP-TM-226-901, Loss of ALL RCP Seal Cooling (Rev. 1)(Page 1)
OP-TM-AOP-032, Loss of Intermediate Component Cooling (Rev. 2)(pages 1,5)
OP-TM-MAP-C0202, IC SYSTEM FLOW LO, (Rev. 1)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP032-PCO-2 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	G2.4.8 (078)	
	Importance Rating		4.5

(K&A Statement): **Knowledge of how abnormal operating procedures are used in conjunction with EOPs.** Instrument Air System

SRO 87

Plant conditions:

- The plant is at 100% power
- Primary IA header pressure is 76 psig (PI-222) and slowly lowering
- Secondary IA header pressure 83 psig (PI-1403) and stable
- Seal Injection flowrate is 38 gpm
- Letdown flowrate is 50 gpm
- Pressurizer level is 200 inches and slowly falling
- Make-up flow is 0 gpm

With the above conditions which ONE of the following procedures will be initiated directly from OP-TM-AOP-028, Loss of Instrument Air?

A. OP-TM-EOP-001, Reactor Trip

B. OP-TM-AOP-041, Loss of Seal Injection

C. OP-TM-211-950, Restoration of Letdown flow

D. OP-TM-EOP-010, Guide 9, RCS Inventory Control

Proposed Answer: D. OP-TM-EOP-010, Guide 9, RCS Inventory Control

Explanation (Optional):

A. Plausible since EOP-001 could be entered directly from AOP-028; however only if Instrument Air pressure is below 60 psig.
B. Plausible since AOP-041 can be entered directly from AOP-028; however only if Seal Injection flow is <22 gpm.
C. Plausible since OP-TM-211-950 can be entered directly from AOP-028; however only if letdown flow is <30 gpm.
D. Correct answer. With MU-V-18 closed Guide 9 must be initiated to restore makeup flow using MU-V-16B.

Technical Reference(s): OP-TM-AOP-028, Loss of Instrument Air 9 (Rev. 4)(Pages 1,5,7) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: AOP-028-PCO-1 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 _____
- 55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	G2.1.32 (013)	
	Importance Rating		4.0

(K&A Statement): **Ability to explain and apply system limits and precautions.** Engineered Safety Features Actuation.

SRO 88

Plant conditions:

- The plant is at 100% power
- EG-Y-1B is running loaded on the 1E 4160V due to an earlier failure of the 1A Aux Transformer
- MU-P-1A is supplying Seal Injection and RCS Makeup

Event;

- The reactor trips due to a large RCS leak
- 1600 psig ESAS actuation occurs
- MU-P-1A trips

With the above conditions MU-P-1B will be started on the _____.

A. 1D 4160V bus IAW OP-TM-AOP-041, Loss of Seal Injection

B. 1D 4160V bus IAW OP-TM-211-901, Emergency Injection, (HPI/LPI)

C. 1E 4160V Bus IAW OP-TM-AOP-041, Loss of Seal Injection

D. 1E 4160V bus IAW OP-TM-211-901, Emergency Injection, (HPI/LPI)

Proposed Answer: B. 1D 4160V bus IAW OP-TM-211-901, Emergency Injection, (HPI/LPI)

Explanation (Optional):

A. Plausible since the pump will be started on the 1D 4160V bus; however the controlling procedure is OP-TM-211-901, Emergency Injection, (HPI/LPI).
B. Correct answer. OP-TM-211-901, Emergency Injection, (HPI/LPI) a states "If MU-P-1B is operable but lined up to an inoperable power supply, then INITIATE OP-TM-211-449, "Aligning MU-P-1B To 1D 4160V BUS" to transfer MU-P-1B power supply." MU-P-1B can not be started on the 1E 4160V bus since the bus is separated from the grid and MU-P-1C is already running. Selecting MU-P-1B for ES on the 1E bus would trip MU-P-1C (1105-3 Limit and Precaution 2.2.1 - Do Not start a 2nd makeup pump on an ES Bus during a blackout with diesels operating. Rotation of the 43SS during this condition will cause the operating makeup pump on the same ES Bus to trip.)
C. Plausible if the examinee believes the pump can be restarted on the 1E bus because a normal power is available or examinee is unaware of 43SS interlock.
D. Plausible if the examinee believes the pump can be restarted on the 1E bus because a normal power is available or examinee is unaware of 43SS interlock.

Technical Reference(s): 1105-3 Safeguards Actuation System (Rev. 51)(Step 2.1.2) (Attach if not previously provided)
OP-TM-211-901, Emergency Injection, (HPI/LPI)(Rev. 3)(Page 6)
TQ-TM-104-211, Makeup System (Rev. 2)(Page 43)

Proposed references to be provided to applicants during examination: None

Learning Objective: 211-901-PCO-4 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	G2.2.25 (012)	
	Importance Rating		4.2

(K&A Statement): **Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.** Reactor Protection System.

SRO 89

Plant conditions:

- The plant is operating at 80% power with the ICS in automatic with the exception of the STAR Module
- Control Rod index is 250
- The ICS remains in automatic during the event

If a continuous rod withdrawal event occurs, which ONE of the following trip setpoints will be exceeded **FIRST**, IAW Tech Specs, and what is the trip protecting against?

A. High Flux / prevent fuel damage.

B. High Flux / prevent excessive RCS temperatures.

C. High RCS pressure / prevent exceeding 2750 psig.

D. High RCS pressure / prevent lifting the Pressurizer Safety Valves.

Proposed Answer: C. High RCS pressure / prevent exceeding 2750 psig

Explanation (Optional):

A. Plausible since the High Flux trip does protect against fuel damage; however it would not occur first in the above transient.
B. Plausible since the High flux trip occurs in reactivity excursions too rapid to be detected by pressure and temperature measurements; however it would not occur first in the above transient.
C. Correct answer. Tech Spec 2.3.1.c basis states "During a startup accident from low power or a slow rod withdrawal from high power, the system high pressure trip setpoint is reached before the nuclear overpower trip setpoint. The trip setting limit shown in Figure 2.3-1 for high reactor coolant system pressure ensures that the system pressure is maintained below the safety limit (2750 psig) for any design transient (Reference 2)."
D. Plausible since the High RCS Pressure trip will occur first; however the basis is not to prevent lifting the Pressurizer Safety Valves.

Technical Reference(s): TS 2.3.1 Limiting Safety system Settings, Protection Instrumentation and Basis (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 641-GLO-14 (As available)

Question Source: Bank #
Modified Bank # IR-641-GLO-14-Q04 (Note changes or attach parent)
New

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 b.2

Comments: Modified Question distracters and stem

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	A2.06 (062)	
	Importance Rating		3.9

(K&A Statement): **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:** Keeping the safeguards buses electrically separate.

SRO 90

Plant conditions:

- The plant is at 100% power
- Normal equipment lineups exist:

Event:

- MAP Annunciator AA-2-7 AUX XFMR 1A TROUBLE is in alarm due to low oil level
- The AO at the transformer reports an unisolable oil leak on the 1A Aux transformer

With the above conditions the _____.

A. 1A, 1B and 1E 4160V busses will be transferred to the 1B Aux Transformer IAW 1107-1, Normal Electrical System

B. 1A and 1B 4160V busses will be transferred to the 1B Aux transformer and the 1E 4160V bus will be placed on EG-Y-1B immediately IAW AA-2-7, Aux XFMR 1A Trouble

C. 1A, 1B and 1E 4160V busses will be transferred to the 1B Aux Transformer IAW 1107-1, Normal Electrical System, then the 1E bus will be paralleled with EG-Y-1B or the SBO Diesel

D. CRS will request the dispatcher to deenergize the 230KV bus 8, allowing the 1A and 1B 4160V busses to fast transfer and EG-Y-1B to start and load the 1E 4160V bus IAW 1107-11, Grid Operations

Proposed Answer: B. 1A and 1B 4160V busses will be transferred to the 1B Aux transformer and the 1E 4160V bus will be placed on EG-Y-1B immediately IAW AA-2-7, Aux XFMR 1A Trouble

Explanation (Optional):

A. Plausible since the 1A and 1B 4160V busses will be transferred to the 1B Aux transformer and the 1E bus could physically be transferred; however 1107-2A states "During power operation, aligning both 4KV ES Busses to a single aux. transformer is prohibited. If the Aux. Transformer will not be able to supply the vital 4KV loads, it will be necessary to load it on its emergency diesel immediately."

B. Correct answer. 1107-2A states "During power operation, aligning both 4KV ES Busses to a single aux. transformer is prohibited. If the Aux. Transformer will not be able to supply the vital 4KV loads, it will be necessary to load it on its emergency diesel immediately."

C. Plausible since the 1A and 1B 4160V busses will be transferred to the 1B Aux transformer and the 1E bus could be paralleled with either diesel; however 1107-2A states "During power operation, aligning both 4KV ES Busses to a single aux. transformer is prohibited. If the Aux. Transformer will not be able to supply the vital 4KV loads, it will be necessary to load it on its emergency diesel immediately."

D. Plausible since this action would deenergize the transformer and cause auto transfer of the busses and the dispatcher is the controller of the Substation breakers; however it is not an option provided in the procedure.

Technical Reference(s): MAP AA-2-7, AUX XFMR 1A TROUBLE (Rev. 12)(Page 6)
1107-2A, Emergency Electrical (Rev. 18)(L&P N)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 701-PCO-1 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	G2.1.7 (017)	
	Importance Rating		4.7

(K&A Statement): **Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.** In-core Temperature Monitoring.

SRO 91

Plant Conditions:

- A small break LOCA has occurred
- 25°F SCM was lost
- All RCPs were shut down
- The leak was isolated when MU-V-1A and MU-V-1B, Letdown Cooler Inlet Isolations, were closed

15 minutes following the event:

- A Loop Subcooling Meter 39°F and slowly rising
- B Loop Subcooling Meter 23°F and stable
- RCS Wide Range Pressure 1395 psig and slowly rising
- Incore Thermocouple avg 549°F and stable
- Pressurizer level is 67 inches and rising
- Containment pressure 3 psig and trending down slowly

Which ONE of the following actions is correct given the above conditions and plant status?

A. A Loop SCM Meter is accurate and HPI may be throttled IAW OP-TM-211-901, Emergency Injection (HPI/LPI).

B. A Loop SCM Meter is inaccurate and HPI must be maintained IAW OP-TM-EOP-010, Rule 1, Loss of Subcooling Margin.

C. B Loop SCM Meter is accurate, perform a Rapid RCS Cooldown IAW OP-TM-EOP-002, Loss of 25°F Subcooling margin.

D. B Loop SCM Meter is inaccurate, RCPs can be restarted IAW OP-TM-EOP-010, Guide 7, RCP Restart.

Proposed Answer: A. A Loop SCM Meter is accurate and HPI may be throttled IAW OP-TM-211-901, Emergency Injection (HPI/LPI)

Explanation (Optional):

A. Correct answer. Incore SCM from steam tables is 39°F and HPI Cooling is not required, which allows throttling HPI.
B. Plausible if the examinee miscalculates SCM. HPI would be required to be maintained.
C. Plausible since this is an action that would be taken if SCM <25°F and HPI is inadequate; however SCM is 39°F and Pressurizer level is rising.
D. Plausible since B Loop is reading inaccurately; however RCP restart criteria are not met.

Technical Reference(s): OP-TM-EOP-002, Loss of 25°F Subcooling Margin (Rev. 7)(Step 3.9)
OP-TM-EOP-010, Emergency Procedure Rules, Guides and Graphs (Rev. 10)
Rule 1, Rule 2, Guide 7
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: 711-901-PCO-4 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	A2.03 (034)	
	Importance Rating		4.0

(K&A Statement): **Ability to (a) predict the impacts of the following malfunctions or operations on the Fuel Handling System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** Mispositioned fuel element.

SRO 92

Plant conditions:

- The plant is in refueling outage with fuel handling operations in the RB in progress
- The Main Bridge Operator has lowered an assembly that is NOT an anti-straddle type assembly into the core location with open water on one side only.
- The ZZ tape reading for the assembly is Approximately 2" high with full down load cell indication

With the above indications the assembly is resting on the _____.

A. grid of an adjacent assembly and can be shaken while moving through the grid region as the assembly is lowered

B. grid of an adjacent assembly and the mast can be rotated to reposition the assembly prior to lowering

C. reactor lower grid and can be moved slightly toward the open side and lowered

D. reactor lower grid and the assembly can be raised and jog can be used to reposition the assembly prior to lowering

Proposed Answer: D. reactor lower grid and the assembly can be raised and jog can be used to reposition the assembly prior to lowering

Explanation (Optional):

A. Plausible since shaking a fuel assembly while moving is allowed; however not through the grid region.
B. Plausible since rotating the mast is allowed; however the assembly is not resting on an adjacent assembly grid it is resting on the reactor lower grid.
C. Plausible since the assembly is resting on the reactor lower grid; however moving the assembly toward the open area is not allowed.
D. Correct answer. The assembly is on the reactor lower grid and can be raised and jog can be used to realign the assembly IAW section 7.4 of 1505-3.

Technical Reference(s): 1505-3, Fuel Handling Problems (Rev. 20)(Section 7.4) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 0348110101 (As available)

Question Source:
Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 _____
55.43 b.7

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	A2.02 (011)	
	Importance Rating		3.2

(K&A Statement): **Ability to (a) predict the impacts of the following malfunctions or operations on the PZR LCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:** Excessive charging

SRO 93

Plant conditions:

- Reactor is tripped.
- All 4 RCPs are operating.
- OP-TM-EOP-001 Follow-up Actions in progress.
- RCS pressure is 2100 psig, rising at 10 psi per minute.
- RCS temperature is 550 degrees F, stable.
- RCS letdown flow is 45 gpm.
- RCP Seal Injection Total flow is 38 gpm.
- Pressurizer level control setpoint is at the pre-trip value.
- Pressurizer level is 160 inches, rising at 3 inches per minute.
- MU-V-17, Normal Makeup Valve, is in MANUAL control, 0% open.
- Leakage through one or both MU-V-16A/B, HPI Valves, is the suspected cause for rising Pressurizer level.
- Makeup Tank level is 85 inches, lowering at 1 inch per minute.

Based on these conditions, identify the ONE selection below that describes all of the following:
(1) Predict impact of the malfunction if no actions are taken.
(2) Identify actions required.
(3) Identify the applicable procedure.

A. (1) PTS event;
(2) Raise letdown flow to reduce Pressurizer level to 90-110 inches;
(3) OP-TM-EOP-010 Guide 9, RCS Inventory Control.

B. (1) PTS event;
(2) Raise Pressurizer level setpoint to 200-240 inches, transfer MU-V-17 to automatic when new setpoint is reached;
(3) OP-TM-211-472, Manual Pressurizer Level Control.

C. (1) Solid Pressurizer;
(2) Raise letdown flow to reduce Pressurizer level to 90-110 inches;
(3) OP-TM-EOP-010 Guide 9, RCS Inventory Control.

D. (1) Solid Pressurizer;
(2) Raise Pressurizer level setpoint to 200-240 inches, transfer MU-V-17 to automatic when new setpoint is reached;
(3) OP-TM-211-472, Manual Pressurizer Level Control.

Proposed Answer: C. (1) Solid Pressurizer;
(2) Raise letdown flow to reduce Pressurizer level to 90-110 inches;
(3) OP-TM-EOP-010 Guide 9, RCS Inventory Control.

Explanation (Optional):

A. Plausible since actions and procedure cited are correct; however flow through HPI Valves constitutes a PTS event if all 4 RCPs are off.
B. Plausible since OP-TM-211-472 provides guidance for manual Pressurizer level control using MU-V-17; however flow through HPI Valves constitutes a PTS event if all 4 RCPs are off.
C. CORRECT answer. Pressurizer would continue to fill to solid conditions. Correct actions and procedure are cited.
D. Plausible since the Pressurizer will go solid; however OP-TM-211-472 is not the correct procedure.

Technical Reference(s): OP-TM-EOP-010 Guide 9, RCS Inventory Control (Rev. 10)(Page 21) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EOPG9-PCO-1 (As available)

Question Source: Bank # IR-EOPG9-PCO-1-Q01
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.34	
	Importance Rating		3.5

(K&A Statement): **Knowledge of primary and secondary plant chemistry limits.**

SRO 94

The specific activity of the primary and secondary coolant are as follows:

	Two days ago at 1200	Yesterday at 1200	Today at 1200
RCS Dose Equivalent I-131	0.50 microcuries/gram	0.53 microcuries/gram	0.52 microcuries/gram
OTSG Dose Equivalent I-131	0.05 microcuries/gram	0.053 microcuries/gram	0.052 microcuries/gram

The ____(1)_____ is out of specification, and the basis of the specification is ____(2)____.

A. (1) RCS
(2) dose from a tube rupture accident.

B. (1) OTSG
(2) dose from a steam line break accident.

C. (1) RCS
(2) dose from baseline OTSG tube leakage.

D. (1) OTSG
(2) dose from normal condenser Offgas.

Proposed Answer: A. (1) RCS
(2) dose from a tube rupture accident.

Explanation (Optional):

A. Correct answer. TS 3.1.4 states "With the specific activity of the primary coolant greater than 0.35 microcurie/gram DOSE I EQUIVALENT 1-131 for more than 48 hours*' during one continuous time interval or exceeding the limit line shown on Figure 3.1-24 be in at least HOT SHUTDOWN within 6 hours. Power operation may continue when DOSE EQUIVALENT 1-131 is below 0.35 microcurie/gram."
Basis "The limitations on the specific activity of the primary coolant ensure that the resulting 2 hour doses at the site boundary will be well within the Part 100 limit following a steam generator tube rupture accident or steam line break accident with postulated accident induced steam generator tube leakage in conjunction with an assumed steady state primary-to-secondary steam generator leakage rate of 1.0 GPM."

B. Plausible since this is the specific activity limit for the Secondary Coolant and it is based on a steam line rupture with tube leakage; however the specific activity limit is 0.35 microcurie/gram for the Primary Coolant and the primary-to-secondary steam generator leakage rate of 1.0 GPM is assumed.

C. Plausible since the limit and basis is correct; however it is correct for the Primary Coolant.

D. Plausible since the limit is correct for the Secondary Coolant; however the basis is for a coincident 1.0 GPM primary-to-secondary tube leak.

Technical Reference(s): TS 3.1.4 (Attach if not previously provided)
TS 3.13

Proposed references to be provided to applicants during examination: None

Learning Objective: 220-GLO-14 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 b.2

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.43	
	Importance Rating		4.3

(K&A Statement): **Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.**

SRO 95

Plant conditions:

- The plant is at 100% power entering the End of Cycle Tave Reduction and Coast Down IAW 1102-4, Power Operation
- Tave is 579°F
- Control Rod Index is 291%
- RCS Boron concentration is 3 ppmB
- The specified minimum REMA temperature is 572.5°F
- 1102-4 Power Operations, End of Cycle Tave Reduction and Coast Down has been initiated
- The STA has just raised the Feedwater Flow Correction Factor to 1.000 from 0.92 IAW 1102-4

Based on the change in the Feedwater Flow Correction Factor _____.

A. BTU Limits will be challenged requiring the ULD to be lowered

B. Heat Balance Power will indicate high requiring a power reduction

C. OTSG High level limits will be challenged requiring Tave to be lowered

D. Tave will have to be lowered and NI indication will read lower than actual power

Proposed Answer: B. Heat Balance Power will indicate high requiring a power reduction

Explanation:

A. Plausible since BTU limits may be challenged during the coastdown; however Tave will have to be raised, not lowered to compensate, this will happen later in coastdown not immediately on resetting Feedwater flow corrections.
B. Correct answer. 1102-4 states "Resetting the Feedwater Flow Correction Factor will cause the calculated Heat Balance Power to indicate HIGH. A Reactor Power reduction will be required to maintain Calculated Thermal power ≤ 2568 MWT."
C. Plausible since High Level Limits may be challenged during the coastdown; however the ULD Target Load will have to be lowered, not Tave.
D. Plausible since NI indication will read lower than actual reactor power when Tave is lowered; however no action is required for Tave currently since rod index is <293 and reactor power is not <100%.

The feedwater flow correction factors are computer compensations made in the plant process computer to allow for feedwater flow venturii "fouling". These correction factors are to allow the calculated heat balance to more closely resemble actual power. The factors are only allowed to be applied during 100% power operations. When they are removed for power reduction, the heat balance indicates more conservative (higher) than it really is therefore as stated above the actual power will have to be lowered to match the more conservative number indicated as power.

Technical Reference(s): 1102-4, Power Operation (Rev. 115)(Section 4.0 Infrequent Operations) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: GOP-004-PCO-5 (As available)

Question Source: Bank # ____
Modified Bank # ____ (Note changes or attach parent)
New X

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ____
55.43 b.6

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.6	
	Importance Rating		3.6

(K&A Statement): **Knowledge of the process for making changes to procedures.**

SRO 96

Plant conditions:

- In accordance with LS-AA-104-1000, "Exelon 50.59 resource manual", which of the following changes to a procedure will require a 50.59 screening prior to implementation:

A. A previously approved interim change which changed the sequence of valve operation for the make-up system is being made into a permanent procedure.

B. The permanent change in the procedure to disassemble and reassemble the main generator exciter (Alterex) is made to incorporate lessons learned.

C. An interim change is being made to the sequence of valve operation during startup of the circulating water system.

D. The clearance and tagging procedure is changed to incorporate tagging requirements for a new valve design.

Proposed Answer: C. An interim change is being made to the sequence of valve operation during startup of the circulating water system.

Explanation (Optional):

A. Plausible since the make up system is a safety grade system. Incorrect because the 50.59 review was previously performed.
B. Plausible since the main generator exciter is a component described in the UFSAR. Incorrect since the procedure to disassemble and reassemble the main generator is maintenance, which is excluded from 50.59 reviews.
C. Correct answer since this is a change to a plant operating procedure which has not been previously reviewed.
D. Plausible since the clearance and tagging program is required for personnel safety. Incorrect since this program is part of the maintenance exclusion.

Technical Reference(s): LS-AA-104-1000, pages 4-7, 4-13, 4-14. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: EQC00017 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 b.3

Comments: Question clarified during administration by adding , "Exelon 50.59 resource manual", to stem behind LS-AA-104-1000 and by changing wording from "will require a 50.59 review" to "will require a 50.59 screening"

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.17	
	Importance Rating		3.8

(K&A Statement): **Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator.**

SRO 97

Plant conditions:

- Reactor is operating at 100% power, with ICS in full automatic.
- Non-Licensed Operator reports to you, the Shift Manager, that leakage from a cooling water drain valve at the Stator Coolant Surge Tank outlet has risen to five drops/minute.
- This leak has been previously identified and was added to the Condition Based Monitoring (CBM) Program.
- Cooling system information:
  - Surge tank level is in the normal operating band.
  - All surveillances are current for present operating conditions.

Based on these conditions, identify the ONE selection below that describes:

(1) Assessment required, related to managing maintenance activities during power operation.
(2) Procedure that provides guidance to perform this function.

A. (1) Determine if the cooling system is INOPERABLE.
(2) WC-AA-104, Review and Screening for Production Risk.

B. (1) Determine if the cooling system is INOPERABLE.
(2) WC-AA-106, Work Screening and Processing.

C. (1) Determine if current conditions no longer represent an INCONSEQUENTIAL LEAK.
(2) WC-AA-104, Review and Screening for Production Risk.

D. (1) Determine if current conditions no longer represent an INCONSEQUENTIAL LEAK.
(2) WC-AA-106, Work Screening and Processing.

Proposed Answer: D. (1) Determine if current conditions no longer represent an INCONSEQUENTIAL LEAK.
(2) WC-AA-106, Work Screening and Processing.

Explanation:

A. NOT CORRECT. Wrong procedure is cited for this shift activity. Distracter is plausible because shift management is assigned responsibility for this action in OP-AA-108-115, Operability determinations (CM-1).
B. NOT CORRECT. Wrong procedure is cited for this shift activity. Distracter is plausible because shift management is assigned responsibility for this action in OP-AA-108-115, Operability determinations (CM-1).
C. NOT CORRECT. Wrong procedure is cited for this shift activity. Distracter is plausible because operations is assigned responsibility for this action in WC-AA-106 (Appendix A).
D. CORRECT. Refer to WC-AA-106 Appendix A, Page 51, Rev. 9.

Technical Reference(s): WC-AA-106 Rev 9 Appendix "A" (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: Task SGT-PTO-0201 (As available)

Question Source: Bank # IS-SGT-PTO-0201-Q01
Modified Bank # (Note changes or attach parent)
New

Question History: Last NRC Exam None

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 b.5

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		3
	K/A #	G2.3.6	
	Importance Rating		3.8

(K&A Statement): **Ability to approve release permits.**

SRO 98

Plant conditions:

- The plant is shutdown and cooled down in preparation for refueling
- RM-A-9 Iodine Channel is OOS due to an instrument problem
- The Kidney Filter System is OOS due to a motor failure
- The most recent Reactor Building air samples have identified iodines and particulates as positive (i. e. >LLD)
- Chemistry has just presented a Reactor Building Purge gas release permit form 1622-1 to the Shift manager for approval

With the above conditions the purge can_____.

A. be approved by the Shift Manager if iodine grab samples are collected every four hours while the purge is in service

B. be approved with concurrence of Rad Pro Supervision if iodine samples are continuously collected with auxiliary equipment

C. NOT be approved due to the Kidney Filter System being out of service with iodines above LLD in the Reactor Building

D. NOT be approved due to RM-A-9 Iodine channel being out of service with iodines above LLD in the Reactor Building

Proposed Answer: B. be approved with concurrence of Rad Pro Supervision if iodine samples are continuously collected with auxiliary equipment

Explanation:

A. Plausible since the purge can be approved; however iodine must be sampled continuously during the purge per the ODCM Manual and 6610ADM-4250.10, Radiological Controls/Chemistry Actions when RMS Malfunctions.

B. Correct answer. Per 6610-ADM-4250.12 the purge can be approved even with the Kidney Filter System OOS with concurrence of Rad Pro Supervision. It can also be approved with RM-A-9 Iodine channel OOS if iodine is sampled continuously with auxiliary equipment per the ODCM.

C. Plausible since the purge would not be able to be approved with the Kidney Filter System OOS without the concurrence of Rad Pro Supervision.

D. Plausible since the purge would not be able to be approved with RM-A-9 Iodine channel OOS unless iodine is continuously sampled using auxiliary equipment.

Technical Reference(s): CY-TM-170-300, Offsite Dose Calculation Manual (ODCM)(Rev. 1)(Table 2.1-2)
6610-ADM-4250.10, Radiological Controls/Chemistry Actions when RMS Malfunctions (Rev. 14)(Step 4.8.C)
6610-ADM-4250.12, Releasing Radioactive Gaseous Effluents – Reactor Building Purge (Rev. 15)(Step 4.1.B)
(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: ADM08016 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 b.1

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		3
	K/A #	G2.3.11	
	Importance Rating		4.3

(K&A Statement): **Ability to control radiation releases.**

SRO 99

Which ONE of the following is designed to ensure Offsite doses will be less than the 10 CFR 100 guidelines for accidents analyzed in Chapter 14 of the FSAR during a fuel handling accident?

A. RM-A-9 MAP 5 Purge Exhaust Iodine Sampler operation.

B. Fuel handling Building ESF Air Treatment System operation.

C. AH-E-10 Fuel Handling Building Supply Fan trip on RM-A-4G High alarm.

D. Fuel Handling Building Dampers AH-D-120, AH-D-121, and AH-D-122 close on RM-G-9 high alarm.

Proposed Answer: B. Fuel handling Building ESF Air Treatment System operation.

Explanation (Optional):

A. Plausible since the MAP 5 sampler would start on RM-A-9G high alarm; however it is only for iodine monitoring.
B. Correct answer. TS 3.15.4 basis states "The FHB ESF Air Treatment System contains, controls, mitigates, monitors and records radiation release resulting from a TMI-1 postulated spent fuel accident in the Fuel Handling Building as described in the FSAR. Offsite doses will be less than the 10 CFR 100 guidelines for accidents analyzed in Chapter 14 (Reference 1)."
C. Plausible since this fan will trip on high radiation from RM-A-4G; however it is the supply fan not FH Building exhaust.
D. Plausible since these dampers will close on RM-G-9 high radiation alarm; however they are the supply dampers and do not affect FH Building exhaust.

Technical Reference(s): TS 3.15.4 Basis (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 8290GLO-14 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 b.4

Comments: