

**U. S. Nuclear Regulatory Commission  
Indian Point Unit 2  
Written Examination**

**Applicant Information**

Name:	Region: I
Date:	Facility/Unit: Indian Point Unit 2
License Level: SRO	Reactor Type: Westinghouse PWR
Start Time:	Finish Time:

**Instructions**

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected six hours after the examination starts.

**Applicant Certification**

All work done on this examination is my own. I have neither given nor received aid.

\_\_\_\_\_  
Applicant's Signature

**Results**

Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

NRC Written Examination  
Indian Point Unit 2  
Senior Reactor Operator  
Answer Key

1. A	26. B	51. D	76. C
2. A	27. A	52. B	77. A
3. A	28. B	53. D	78. D
4. B	29. D	54. B	79. B
5. C	30. B	55. D	80. A
6. B	31. C	56. C	81. C
7. A	32. D	57. C	82. C
8. B	33. C	58. A	83. A
9. B	34. C	59. B	84. A
10. B	35. A	60. A	85. B
11. A	36. B	61. A	86. A
12. B	37. C	62. C	87. D
13. A	38. B	63. B	88. D
14. C	39. B	64. B	89. D
15. B	40. B	65. B	90. B
16. B	41. C	66. B	91. B
17. C	42. D	67. C	92. B
18. C	43. A	68. B	93. A
19. A	44. A	69. B	94. A
20. B	45. A	70. A	95. A
21. B	46. A	71. B	96. B
22. B	47. D	72. A	<del>97. A</del>
23. A	48. A	73. D	98. B
24. A	49. C	74. B	99. A
25. A	50. C	75. A	100. B

*deleted question  
John R. Caputo  
4/10/03*

U.S.N.R.C. Site-Specific Written Examination  
Indian Point Unit 2  
Senior Reactor Operator

1. <input checked="" type="radio"/> A    B    C    D	26.    A <input checked="" type="radio"/> B    C    D
2. <input checked="" type="radio"/> A    B    C    D	27. <input checked="" type="radio"/> A    B    C    D
3. <input checked="" type="radio"/> A    B    C    D	28.    A <input checked="" type="radio"/> B    C    D
4.    A <input checked="" type="radio"/> B    C    D	29.    A    B    C <input checked="" type="radio"/> D
5.    A    B <input checked="" type="radio"/> C    D	30.    A <input checked="" type="radio"/> B    C    D
6.    A <input checked="" type="radio"/> B    C    D	31.    A    B <input checked="" type="radio"/> C    D
7. <input checked="" type="radio"/> A    B    C    D	32.    A    B    C <input checked="" type="radio"/> D
8.    A <input checked="" type="radio"/> B    C    D	33.    A    B <input checked="" type="radio"/> C    D
9.    A <input checked="" type="radio"/> B    C    D	34.    A    B <input checked="" type="radio"/> C    D
10.    A <input checked="" type="radio"/> B    C    D	35. <input checked="" type="radio"/> A    B    C    D
11. <input checked="" type="radio"/> A    B    C    D	36.    A <input checked="" type="radio"/> B    C    D
12.    A <input checked="" type="radio"/> B    C    D	37.    A    B <input checked="" type="radio"/> C    D
13. <input checked="" type="radio"/> A    B    C    D	38.    A <input checked="" type="radio"/> B    C    D
14.    A    B <input checked="" type="radio"/> C    D	39.    A <input checked="" type="radio"/> B    C    D
15.    A <input checked="" type="radio"/> B    C    D	40.    A <input checked="" type="radio"/> B    C    D
16.    A <input checked="" type="radio"/> B    C    D	41.    A    B <input checked="" type="radio"/> C    D
17.    A    B <input checked="" type="radio"/> C    D	42.    A    B    C <input checked="" type="radio"/> D
18.    A    B <input checked="" type="radio"/> C    D	43. <input checked="" type="radio"/> A    B    C    D
19. <input checked="" type="radio"/> A    B    C    D	44. <input checked="" type="radio"/> A    B    C    D
20.    A <input checked="" type="radio"/> B    C    D	45. <input checked="" type="radio"/> A    B    C    D
21.    A <input checked="" type="radio"/> B    C    D	46. <input checked="" type="radio"/> A    B    C    D
22.    A <input checked="" type="radio"/> B    C    D	47.    A    B    C <input checked="" type="radio"/> D
23. <input checked="" type="radio"/> A    B    C    D	48. <input checked="" type="radio"/> A    B    C    D
24. <input checked="" type="radio"/> A    B    C    D	49.    A    B <input checked="" type="radio"/> C    D
25. <input checked="" type="radio"/> A    B    C    D	50.    A    B <input checked="" type="radio"/> C    D

U.S.N.R.C. Site-Specific Written Examination  
Indian Point Unit 2  
Senior Reactor Operator

51.	A	B	C	<input checked="" type="radio"/> D
52.	A	<input checked="" type="radio"/> B	C	D
53.	A	B	C	<input checked="" type="radio"/> D
54.	A	<input checked="" type="radio"/> B	C	D
55.	A	B	C	<input checked="" type="radio"/> D
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62.	A	B	<input checked="" type="radio"/> C	D
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73.	A	B	C	<input checked="" type="radio"/> D
74.	A	<input checked="" type="radio"/> B	C	D
75.	<input checked="" type="radio"/> A	B	C	D
76.	A	B	<input checked="" type="radio"/> C	D
77.	<input checked="" type="radio"/> A	B	C	D
78.	A	B	C	<input checked="" type="radio"/> D
79.	A	<input checked="" type="radio"/> B	C	D
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87.	A	B	C	<input checked="" type="radio"/> D
88.	A	B	C	<input checked="" type="radio"/> D
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99.	<input checked="" type="radio"/> A	B	C	D
100.	A	<input checked="" type="radio"/> B	C	D

*detected  
question  
John Blum  
4/10/03*

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U.S.N.R.C. Site-Specific Written Examination  
Indian Point Unit 2  
Reactor Operator

1.	<input checked="" type="radio"/> A	B	C	D
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3.	<input checked="" type="radio"/> A	B	C	D
4.	A	<input checked="" type="radio"/> B	C	D
5.	A	B	<input checked="" type="radio"/> C	D
6.	A	<input checked="" type="radio"/> B	C	D
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8.	A	<input checked="" type="radio"/> B	C	D
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U.S.N.R.C. Site-Specific Written Examination  
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51.	A	B	C	<input checked="" type="radio"/> D
52.	A	<input checked="" type="radio"/> B	C	D
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56.	A	B	<input checked="" type="radio"/> C	D
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99.	A	<input checked="" type="radio"/> B	C	D
100.	<input checked="" type="radio"/> A	B	C	D

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	003 A3.04	
	Importance Rating	3.6	3.6

Ability to monitor automatic operation of the RCPs, including: RCS flow.

Proposed Question: Common 1

Given the following conditions:

- The plant is in Hot Shutdown.
- RCS temperature is 540°F.
- RCS cooldown is in progress.

Which ONE (1) of the following describes the response of indicated RCS flow as the cooldown continues?

Indicated flow...

- A. INCREASES as coolant density INCREASES
- B. DECREASES as coolant density INCREASES
- C. INCREASES as coolant density DECREASES
- D. DECREASES as coolant density DECREASES

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Indicated flow will increase as density increases (DP increases)
- C. Incorrect. Density will increase as RCS cooldown continues
- D. Incorrect. Opposite of actual effect on both parameters



Technical Reference(s): Thermo? (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

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

Knowledge of RCPS design feature(s) and/or interlocks(s) which provide for the following: Adequate cooling of RCP motor and seals.

Proposed Question: Common 2

The plant is operating at 100% power.

RCP Thermal Barrier Return Isolation valve FCV-625 has inadvertently failed closed.

Which ONE (1) of the following describes the effect on RCP temperatures, if any, as a result of this failure?

- A. All RCP bearing temperatures will remain the same.
- B. #1 Seal Leakoff temperature will rise on all RCPs.
- C. RCP Lower Bearing temperature will rise on all RCPs.
- D. RCP Motor Bearing temperature will rise on all RCPs.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Seal Cooling provided by Charging Pump Seal Injection flow
- C. Incorrect. TBHX CCW is lost, but bearing cooling is not. Return lines are separate
- D. Incorrect. TBHX CCW is lost, but bearing cooling is not. Return lines are separate

Technical Reference(s): RCP SD (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: SYS-C-013 35.b (As available)

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

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	004 K6.17	
	Importance Rating	4.4	4.6

Knowledge of the effect of a loss or malfunction of the following will have on the CVCS: Flow paths for emergency boration.

Proposed Question: Common 3

Given the following conditions:

- An ATWS has occurred.
- The team is aligning CVCS for emergency boration.

If the Boric Acid Transfer Pumps tripped and could NOT be restarted, which ONE (1) of the following describes the Charging pump suction flowpath(s) that will remain available for boration in accordance with FR-S.1, Response to Nuclear Power Generation/ATWS?

- A. LCV-112B, RWST to Charging Pump suction
- B. LCV-112C, VCT Outlet to Charging Pump suction
- C. MOV-333, Boric Acid to Charging Pump suction
- D. The flow paths from both MOV-333 and LCV-112B

Proposed Answer: A

Explanation (Optional):

- A. Correct. Alternate flowpath IAW FR-S.1
- B. Incorrect. Isolated path. Regular makeup.
- C. Incorrect. If no BATPs, no emergency boration path through MOV-333
- D. Incorrect. LCV-112B is available, but MOV-333 is not

Technical Reference(s): FR-S.1

(Attach if not previously provided)

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Proposed References to be provided to applicants during examination: NONE

Learning Objective: 93 (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	013 A1.01	
	Importance Rating	4.0	4.2

Ability to predict and/or monitor changes in parameters (to Prevent exceeding design limits) associated with operating the ESFAS controls including: RCS Pressure and Temperature

Proposed Question: Common 4

Given the following conditions:

- A small break LOCA has occurred.
- The crew is performing the actions in ES-1.2, Post LOCA Cooldown And Depressurization.
- SI pumps have been stopped.
- Normal charging is aligned.
- The crew is depressurizing the RCS using normal spray.

Which ONE of the following describes the strategy for the continuing depressurization?

- A. Maximize subcooling to ensure continued RCP operation.
- B. Minimize subcooling to reduce RCS break flow.
- C. Maximize subcooling to prevent a challenge to the Core Cooling CSF.
- D. Minimize subcooling to ensure Pressurizer level remains above the lower limit to allow heater operation during the RCS cooldown.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Would increase break flow with higher pressure
- B. Correct
- C. Incorrect. Would raise break flow

D. Incorrect. Procedure has heaters restarted but not why subcooling is minimized.

Technical Reference(s): ES-1.2 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5603, 5604 (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	015 K5.02	
	Importance Rating	2.7	2.9

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

Proposed Question: Common 5

Which ONE (1) of the following describes the effect of an UNDERCOMPENSATED Intermediate Range channel following a reactor trip?

- A. The channel will indicate LOW, prematurely energizing the Source Range
- B. The channel will indicate LOW, and P-6 will not automatically energize the Source Range until the other Intermediate Range channel is below the required value
- C. The channel will indicate HIGH, preventing P-6 from automatically energizing the Source Range
- D. The channel will indicate HIGH, but the Source Range will be energized from the other Intermediate Range channel

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Undercompensated will indicate high
- B. Incorrect. Undercompensated will indicate high
- C. Correct.
- D. Incorrect. Both IR channels are required below P-6 to energize SR channels

Technical Reference(s): SYS-C-130 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE



Learning Objective: 245, 247 (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	017 A4.01	
	Importance Rating	3.8	4.1

Ability to manually operate and/or monitor in the Control Room: Actual in-core temperatures.

Proposed Question: Common 6

Which ONE (1) of the following describes the MINIMUM Core Exit Thermocouple (CET) input to determine that a RED Path exists on the Core Cooling Critical Safety Function Status Tree?

- A. The single highest CET indicates greater than 1200°F
- B. The five highest CETs all indicate greater than 1200°F
- C. The highest CET in each core quadrant indicates 1200°F
- D. The average of the five highest CETs calculated value is greater than 1200°F

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Could be failed indication
- B. Correct.
- C. Incorrect. If each quadrant had one CET >1200, only 4 would meet the criteria
- D. Incorrect. Calculated average is not an input, and the average value could be >1200 even with several CETs <1200

Technical Reference(s): FR-C.1 background (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONELearning Objective: 3539 (As available)

Question Source: Bank #

Modified Bank #

X

(Note changes or attach parent)

New

Question History: Vendor Bank

Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	022 A4.04	
	Importance Rating	3.1	3.2

Ability to manually operate and/or monitor in the Control Room: Valves in the CCS.

Proposed Question: Common 7

Given the following conditions:

- The plant is operating at 100% power.
- 21, 23, and 25 FCUs are in service to provide Containment Cooling.

Subsequently, reactor trip and Loss of Off-Site power occur. All equipment functions as designed.

Which ONE (1) of the following describes the resulting Containment Cooling lineup?

- A. FCUs must be started manually. Cooling water flow is maintained by TCV-1103, CNTMT BLDG Air Temperature controller.
- B. Only 21, 23, and 25 FCUs will be in service. Cooling water flow is raised by providing a Service Water flow path parallel to TCV-1103.
- C. All FCUs will be in service. Cooling water flow is maintained by TCV-1103.
- D. FCUs must be started manually. Cooling water flow is raised by providing a Service Water flow path parallel to TCV-1103.

Proposed Answer: A

Explanation (Optional):

- A. Correct. All previously running fans will <sup>NOT</sup> restart, *NONE of the fans will RESTART*
  - B. Incorrect. Parallel flow path only provided in safeguards mode *TCV-1103 STAYS open*
  - C. Incorrect. All fans start only in safeguards mode *Re-telecom BILL ALICE*
  - D. Incorrect. All fans start only in safeguards mode and no parallel flow path is provided. *Auto*
- John Lane 5/8/03*

Technical Reference(s): SYS-C-103 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 179 6.b (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	059 K4.19	
	Importance Rating	3.2	3.4

Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Automatic feedwater isolation of MFW.

Proposed Question: Common 8

Given the following conditions:

- The plant was operating at 100% power when a Station Blackout coincident with a Safety Injection occurred.
- The Diesel Generators have energized the 480 VAC busses.
- MCCs and lighting busses have **NOT** been reset.

Which ONE (1) of the following identifies the Feedwater System Valve position?

- A.
  - Main FW Reg. Valves CLOSED
  - FW Reg. Bypass Valves CLOSED
  - Main Feedwater header isolation valves OPEN
  - Feed Pump Discharge Valves CLOSED
- B.
  - Main FW Reg. Valves CLOSED
  - FW Reg. Bypass Valves CLOSED
  - Main Feedwater header isolation valves CLOSED
  - Feed Pump Discharge Valves CLOSED
- C.
  - Main FW Reg. Valves OPEN
  - FW Reg. Bypass Valves CLOSED
  - Main Feedwater header isolation valves OPEN
  - Feed Pump Discharge Valves CLOSED
- D.
  - Main FW Reg. Valves CLOSED
  - FW Reg. bypass Valves CLOSED
  - Main Feedwater header isolation valves OPEN
  - Feed Pump Discharge Valves OPEN

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Header isolation valves will be closed
- B. Correct.
- C. Incorrect. FRVs closed
- D. Incorrect. MBFP discharge valves closed

Technical Reference(s): SYS-C-210 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 378 (As available)

Question Source: Bank #

Modified Bank # X (Note changes or attach parent)

New

\_\_\_\_\_

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 X

55.43

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Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	059 A4.03	
	Importance Rating	2.9	2.9

Ability to manually operate and monitor in the Control Room: Feedwater control during power increase and decrease.

Proposed Question: Common 9

Given the following conditions:

- The plant is at 10% power.
- A power increase is in progress.

Which ONE (1) of the following describes the method used to transfer feedwater control to the Main Feedwater Regulating valves in accordance with SOP-21.1, Main Feedwater System?

- A. Manually crack open the Main Feedwater Regulating valve (MFRV). When an increase in feedwater flow is observed, simultaneously close the associated Feedwater Regulating Bypass valve while opening the MFRV. Place the MFRV in AUTO when the Bypass is closed and SG level is stable.
- B. Place the MFRV in AUTO. Reduce SG level slightly using the MFRV Bypass Valve, and observe the MFRV restores SG level to the setpoint. Continue the process until the MFRV Bypass valve is closed.
- C. Manually crack open the MFRV. Ensure SG level is maintained on program by the automatic closure of the MFRV Bypass valve. When the MFRV Bypass valve is closed and SG level is stable at the setpoint, place the MFRV in AUTO
- D. Place the MFRV in AUTO. Raise controller output until SG level begins to rise. Manually throttle the MFRV Bypass valve closed, ensuring the MFRV automatically returns SG level to the setpoint.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. MFRV in AUTO



- B. Correct.
- C. Incorrect. No AUTO operation of Bypass valve
- D. Incorrect. No change of setpoint on MFRV in AUTO.

Technical Reference(s): POP-1.3 (Attach if not previously provided)

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Proposed References to be provided to applicants during examination: NONE

Learning Objective: 375 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

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

Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps.

**Proposed Question: Common 10**

Given the following plant conditions:

- Plant is at 50% power
- 21 MG set is out of service for bearing replacement
- A fault occurs on 3A 480V bus, coincident with a unit trip

Which ONE (1) of the following statements describes the configuration of the auxiliary feedwater system, prior to any operator actions?

- A. All AFW pumps running, AFW flow to each S/G
- B. Only 22 and 23 AFW pumps running, AFW flow to 23 and 24 S/G's only
- C. Only 21 and 22 AFW pumps running, AFW flow to 21 and 22 S/G's only
- D. Only 22 AFW pump running, NO AFW flow to any S/G

**Proposed Answer: B**

**Explanation (Optional):**

- A. Incorrect. 21 not available  
B. Correct.  
C. Incorrect. No flow to 21, 22 SGs with TDAFW CVs closed  
D. Incorrect. 23 is available

**Technical Reference(s):** SYS-C-210 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONELearning Objective: 384, 385 (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	071 K5.04	
	Importance Rating	2.5	3.1

Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: Relationship of hydrogen/oxygen concentrations to flammability.

Proposed Question: Common 11

The In-Service Large Gas Decay Tank has a Hydrogen concentration of 4.8%.

Per TS 3.9.B.6, Explosive Gas Mixture, which ONE of the following is the highest Oxygen concentration allowed to prevent a flammable mixture in the Waste Gas System?

- A. 2%.
- B. 3%.
- C. 4%.
- D. 5%.

Proposed Answer: A

Explanation (Optional):

- A. Correct
- B. Incorrect. Can be above 2% if H<sub>2</sub> levels below 4%
- C. Incorrect. Only if H<sub>2</sub> <4%
- D. Incorrect. Only if H<sub>2</sub><4%

Technical Reference(s): Tech Specs (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONELearning Objective: 3702 (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	072 A3.01	
	Importance Rating	2.9	3.1

Ability to monitor automatic operation of the ARM system, including: Changes in ventilation alignment.

Proposed Question: Common 12

Which ONE (1) of the following describes the **MINIMUM** requirement for automatic swap of CCR ventilation to the INCIDENT OUTSIDE AIR FILTERED FOR SI/HI RAD mode?

- A. Alarm on R-1, CCR Area Radiation Monitor.
- B. Alarm on either R-38-1 or R-38-2, CCR Intake Radiation Monitors.
- C. Alarm on R-1 AND either R-38-1 or R-38-2.
- D. Alarm on BOTH R-38-1 and R-38-2.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. No alignment on R-1
- B. Correct.
- C. Incorrect. Does not require R-1
- D. Incorrect. Does not require both

Technical Reference(s): SOP-12.1 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 241 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X \_\_\_\_\_  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	006 K2.04	
	Importance Rating	3.6	3.8

Knowledge of bus power supplies to the following: ESFAS-operated valves.

Proposed Question: Common 13

Given the following:

- 480V Bus 5A is deenergized due to a fault.
- All other equipment is in the normal configuration when the reactor automatically trips on low Pressurizer pressure.
- Safety Injection has actuated.

Which ONE (1) of the following describes the status of Safety Injection System?

- A. Two SI Pumps running and injecting to four RCS cold legs.
- B. Two SI Pumps running and injecting to two RCS cold legs.
- C. Three SI Pumps running and injecting to four RCS cold legs.
- D. Three SI Pumps running and injecting to two RCS cold legs.

Proposed Answer: A



## Explanation (Optional):

- A. Correct. Two pumps will inject through cold leg valves.
- B. Incorrect. All 4 flowpaths will be in use, no valves required to open for SI flow.
- C. Incorrect. Only 2 SI pumps have power available and will start.
- D. Incorrect. Only 2 SI pumps have power available and will start and inject to all 4 RCS cold legs.

Technical Reference(s): SYS-C-101 (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: NONELearning Objective: 148.d (As available)

Question Source: Bank #

Modified Bank # X (Note changes or attach parent)

New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X

55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	010 A3.02	
	Importance Rating	3.6	3.5

Ability to monitor automatic operation of PZR PCS, including: PZR pressure.

Proposed Question: Common 14

Given the following conditions:

- The plant is at 93% power after a short transient.
- All control systems are operating in their normal alignments
- Pressurizer PORVs indicate closed
- Pressurizer Spray valves indicate partial open
- Modulating Heaters are energized at minimum output
- One set of backup heaters is on in manual
- All other Backup Heaters are off with control switches in AUTO

Based on the conditions presented, which ONE (1) of the following is the current value of Pressurizer pressure?

- A. 2180 psig
- B. 2200 psig
- C. 2250 psig
- D. 2280 psig

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Backup heaters would be on
- B. Incorrect. Modulating heaters would be at full voltage

C. Correct.

D. Incorrect. Spray would be open

Technical Reference(s): SYS-C-014 (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: NONELearning Objective: 53 (As available)

Question Source:	Bank #	<u></u>	
	Modified Bank #	<u></u>	(Note changes or attach parent)
	New	<u>X</u>	

Question History:

Question Cognitive Level:	Memory or Fundamental Knowledge	<u></u>
	Comprehension or Analysis	<u>X</u>

10 CFR Part 55 Content:	55.41	<u>X</u>
	55.43	<u></u>

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u>2</u>
	Group #	<u>2</u>	<u>2</u>
	K/A #	<u>011 K2.02</u>	
	Importance Rating	<u>3.1</u>	<u>3.2</u>

Knowledge of bus power supplies to the following: PZR heaters.

Proposed Question: Common 15

480 volt bus 6A is de-energized.

Which ONE (1) of the following describes the combination of pressurizer heaters that is still available for pressurizer pressure control?

- A. Two groups of Backup heaters
- B. Three groups of Backup heaters
- C. One group of Backup heaters and Modulating heaters
- D. Two groups of Backup heaters and Modulating heaters

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Backup heaters all have power
- B. Correct.
- C. Incorrect. Modulating heaters are off
- D. Incorrect. Modulating heaters are off

Technical Reference(s): SYS-C-014 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 52 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

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

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

Proposed Question: Common 16

Which ONE (1) of the following reactor trips is designed to protect the core from a departure from nucleate boiling (DNB) condition?

- A. Power Range High Flux (high setpoint)
- B. Overtemperature-Delta Temperature
- C. Overpower-Delta Temperature
- D. Pressurizer High Level

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Fuel integrity and total core power
- B. Correct.
- C. Incorrect. Fuel integrity
- D. Incorrect. RCS pressure

Technical Reference(s): Tech Specs (Attach if not previously provided)  
\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # X

Modified Bank # \_\_\_\_\_

(Note changes or attach parent)

New \_\_\_\_\_

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis \_\_\_\_\_

10 CFR Part 55 Content: 55.41 X

55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	014 A4.01	
	Importance Rating	3.3	3.1

Ability to manually operate and/or monitor in the Control Room: Rod selection control.

Proposed Question: Common 17

Given the following conditions:

- The plant is operating at 88% power.
- Rod Control is in MANUAL
- Control Bank D rods are at 200 steps
- All Tav<sub>g</sub> channels are approximately 4.5°F higher than Tref

Which ONE (1) of the following describes the resulting rod control operation if the Rod Control System Mode Selector Switch is placed in AUTO prior to matching Tave and Tref?

- A. Step in at 32 SPM
- B. Step out at 32 SPM
- C. Step in at 56 SPM
- D. Step out at 56 SPM

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. 4.5 degree mismatch, rod control will be at a higher speed in auto
- B. Incorrect. Wrong speed and direction
- C. Correct. 56 spm. Speed is 8 SPM at 1.5 degree mismatch and up to 72 SPM at 5 degree mismatch. 8 SPM from 1.5 – 3 degree mismatch, then 32 SPM additional for each 1 degree mismatch above 3 degrees  $(8 + (1.5 \times 32)) = 56$
- D. Incorrect. Wrong direction

Technical Reference(s): SYS-C-161

(Attach if not previously provided)



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Proposed References to be provided to applicants during examination: NONE

Learning Objective: 280 (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	026 A1.01	
	Importance Rating	3.9	4.2

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment pressure.

Proposed Question: Common 18

Given the following conditions:

- A LBLOCA has occurred.
- Containment pressure is 33 psig and slowly rising.
- 21 Containment Spray pump is running.
- 22 Containment Spray Pump is tripped and cannot be started.

Which ONE (1) of the following is the MINIMUM number of Containment Fan Cooler Units (CFCUs) required to maintain containment pressure less than design?

- A. 1
- B. 2
- C. 3
- D. 4

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. 1 CS pump, requires 3 CFCUs
- B. Incorrect. See above
- C. Correct.
- D. Incorrect. See above

Technical Reference(s): LP SYS-C-102

(Attach if not previously provided)

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Proposed References to be provided to applicants during examination: NONELearning Objective: 3542 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	079 K1.01	
	Importance Rating	3.0	3.1

Knowledge of the physical connections and/or cause-effect relationships between the SAS and the following systems: IAS.

Proposed Question: Common 28

Given the following conditions:

- The plant is at 100% power.
- The Instrument and Station Air systems are in their normal, automatic alignments.
- An Instrument Air header leak occurs, and Instrument Air header pressure has decreased to 105 psig.

Assuming NO manual action has been taken, which ONE (1) of the following describes the air compressors that will be running?

- A. Unit 1 CENTAC only.
- B. Unit 2 Station Air Compressor, Unit 1CENTAC
- C. Unit 1 CENTAC, Unit 2 Instrument Air Compressors.
- D. Unit 2 Instrument Air Compressors, Unit 2 Station Air Compressor.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. SA compressor starts at 112 psig
- B. Correct
- C. Incorrect. IA compressors start at 95 psig
- D. Incorrect. CENTAC always has lead

Technical Reference(s): SYS C 292

(Attach if not previously provided)

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Proposed References to be provided to applicants during examination: NONELearning Objective: 469 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	086 K4.07	
	Importance Rating	2.5	2.8

Knowledge of design feature(s) and/or interlock(s) which provide for the following: MT/G and T/G protection.

Proposed Question: Common 29

Given the following conditions:

- The plant is operating at 100 % power
- The following CCR annunciators are lit:
  - DELUGE SYSTEM ACTIVATED
  - 21 MAIN XFMR DELUGE SYS TROUBLE
- The Rover reports that there is a fire at the 21 Main Transformer BUT the deluge system has not activated

Which ONE (1) of the following statements describes the actuation of the deluge system?

- A. Actuates ONLY by manual actions locally.
- B. Automatically actuates ONLY on high temperature coincident with smoke alarm actuation.
- C. Automatically actuates on a 3 minute time delay when fire is detected inside the Main Transformer.
- D. Automatically actuates with high temperature coincident with NO Main Transformer voltage.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Will auto actuate but only if Main Generator is off line
- B. Incorrect. High temp, but not smoke
- C. Incorrect.
- D. Correct. Generator protection by having TG trip prior to water actuation on main transformer

Technical Reference(s): SYS-C-296 (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: NONELearning Objective: 487 (As available)

Question Source:	Bank #	<u>X</u>	
	Modified Bank #	<u></u>	(Note changes or attach parent)
	New	<u></u>	

Question History:

Question Cognitive Level:	Memory or Fundamental Knowledge	<u>X</u>
	Comprehension or Analysis	<u></u>

10 CFR Part 55 Content:	55.41	<u>X</u>
	55.43	<u></u>

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	3	3
	K/A #	005 A2.02	
	Importance Rating	3.5	3.7

Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Pressure transient protection during cold shutdown.

Proposed Question: Common 30

The plant is being cooled down to cold shutdown. The following conditions exist:

- RHR has been placed in service.
- RCS TAVG is 260 °F
- RCS pressure increases rapidly to 650 psig and slowly continues to increase.

Which ONE (1) of the following actions, if any, is required?

- A. No action is required because RCS temperature is greater than 200°F.
- B. Open available PORVs to provide a cold over pressurization relief path.
- C. Ensure automatic closure of MOV-730 and 731 to prevent over pressurization of the RHR system.
- D. Open available PORVs to provide a cold overpressurization relief path and ensure automatic closure of MOV-730 and 731 to prevent overpressurization of the RHR system.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Action is required when OPS is in service
- B. Correct.
- C. Incorrect. No auto close 730 and 731
- D. Incorrect. No auto close 730 and 731

Technical Reference(s): AOI-4.2.1

(Attach if not previously provided)



SYS-C-042Proposed References to be provided to applicants during examination: Graph RCS-16CLearning Objective: 114, 118c (As available)

Question Source: Bank #

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

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge                     Comprehension or Analysis X10 CFR Part 55 Content: 55.41 X  
55.43                     

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	013 A4.03	
	Importance Rating	4.5	4.7

Ability to manually operate and/or monitor in the Control Room: ESFAS Initiation.

Proposed Question: Common 31

Given the following conditions:

- A Large Break LOCA has occurred.
- The team is performing the actions of E-0, Reactor Trip or Safety Injection
- When checking if Main Steam Lines should be isolated, the BOP operator is directed to check if Containment pressure ever exceeded the Main Steam Isolation setpoint.

Which ONE (1) of the following describes how the BOP will check this parameter?

- A. Containment Pressure Recorders on Panel FAF.
- B. Containment Pressure meters on Panel SB-1.
- C. Containment Pressure Recorders on the Accident Assessment Panel.
- D. Containment Pressure meters on the Accident Assessment Panel.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Recorders on FAF do not include Ctmt WR pressure
- B. Incorrect. No way to tell how high pressure got on the meter
- C. Correct. Accident Assessment Panel has recorders
- D. Incorrect. No Ctmt WR pressure indicators on Accident Assessment Panel.

Technical Reference(s): Sim

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u>2</u>
	Group #	<u>3</u>	<u>2</u>
	K/A #	<u>034 K4.02</u>	
	Importance Rating	<u>2.5</u>	<u>3.3</u>

Knowledge of design features and/or interlocks which provide for the following: Fuel movement

Proposed Question: Common 32

Which ONE (1) of the following describes the function of the Interlock Override Key switch on the Fuel Handling Manipulator Crane?

Provides a bypass for...

- A. Bridge and Trolley Boundary interlock and Slack Cable interlock only
- B. Bridge and Trolley interlocks but cannot bypass the Hoist interlocks
- C. Hoist interlocks, including the gripper unlatch solenoid valve, but cannot bypass the Bridge and Trolley interlocks
- D. Bridge and Trolley as well as Hoist interlocks, including the gripper unlatch solenoid valve

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Each have their own individual bypass
- B. Incorrect. All interlocks bypassed
- C. Incorrect. All interlocks bypassed
- D. Correct

Technical Reference(s): SOP-17.30 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

ES-401	Sample Written Examination Question Worksheet	Form ES-401-6
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Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u>2</u>
	Group #	<u>3</u>	<u>3</u>
	K/A #	<u>041 A3.03</u>	
	Importance Rating	<u>2.7</u>	<u>2.8</u>

Ability to monitor automatic operation of the SDS, including: Steam flow.

Proposed Question: Common 33

Given the following conditions:

- The plant is in Hot Shutdown
- Plant startup is in progress
- Steam dumps are modulating as required per procedure
- RCS temperature indicates 547°F

Which ONE (1) of the following actions will INCREASE steam flow through the Main Condenser steam dumps?

- A. Withdraw Shutdown Bank "A" rods
- B. Raise the steam dump pressure setpoint
- C. Lower the steam dump pressure setpoint
- D. Place steam dump control in "Temperature Control" mode

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Below POAH
- B. Incorrect. Would allow less flow
- C. Correct
- D. Incorrect. At 547 would not open dumps, at or below no load Tave

Technical Reference(s): Theory

(Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

**Learning Objective:** Not available (As available)

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

**Question History:**

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

X

10 CFR Part 55 Content:	55.41	X
	55.43	

**Comments:**

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	1	1
	K/A #	G2.1.8	
	Importance Rating	3.8	3.6

Ability to coordinate personnel activities outside the Control Room.

Proposed Question: Common 34

The plant is in a refueling outage.

An RCS draining evolution for Reduced Inventory Operations has just been completed.

While in this configuration, a Work Permit has been issued which will result in a direct opening of containment atmosphere to the Aux Boiler Feed Pump building.

One of the requirements associated with issuance of the Work Permit must be:

- A. All other work activities that affect containment integrity shall be suspended and temporarily reclosed, the work group is responsible for emergency closure, and when directed can begin closure activities within 30 minutes using an approved procedure.
- B. All other work activities that affect containment integrity shall be suspended and temporarily reclosed, the Operations is responsible for emergency closure, and when directed can achieve closure within 60 minutes using an approved procedure.
- C. A dedicated person is assigned for closure, and when directed can achieve closure within 30 minutes using an approved procedure.
- D. A dedicated person is assigned for closure, and when directed can achieve closure within 60 minutes using an approved procedure.

Proposed Answer: C

Explanation (Optional):

Technical Reference(s): SAO (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_



Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	2	2
	K/A #	G2.2.13	
	Importance Rating	3.6	3.8

Knowledge of tagging and clearance procedures.

Proposed Question: Common 35

Which ONE (1) of the following sets of tags can be hung simultaneously on the same component, in accordance with OAD-19, Tagout Program?

- A. A Danger and a Caution tag
- B. Two (2) Test and Maintenance tags
- C. A Danger tag and a Test and Maintenance tag
- D. A Caution tag and a Test and Maintenance tag, only if each holder signs onto both tagouts.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. 2 T & M tags cannot be hung together.
- C. Incorrect. T & M tags not allowed on Danger tagged components
- D. Incorrect. Tags allowed, but no one signs onto Caution tagouts

Technical Reference(s): OAD-19 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Facility Bank Editorially modified  
Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	2	2
	K/A #	G2.2.33	
	Importance Rating	2.5	2.9

Knowledge of control rod programming.

Proposed Question: Common 36

Given the following conditions:

- The Control Rod Full Out position is 223 steps.
- The Bank Overlap Unit is set for normal operation.

During rod withdrawal, when Control Bank "B" reaches full out position, what will be the position of Control Bank "C"?

- A. 000 steps
- B. 100 steps
- C. 126 steps
- D. 230 steps

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Bank D would still be 0 steps, but Bank C will withdraw when Bank B reaches 123 steps
- B. Correct. Bank C will begin withdrawal at B = 130 steps
- C. Incorrect. Assumes withdrawal starts at 100 steps on B
- D. Incorrect. Would have to assume Bank C is withdrawn before B

Technical Reference(s): SYS-C-161 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 280c (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Is it 104 steps or 100?

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	2	2
	K/A #	G2.2.2	
	Importance Rating	4.0	3.5

Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.

Proposed Question: Common 37

The following plant conditions exist during a mid-cycle reactor start-up:

- The reactor is critical
- The MSIVs are closed
- RCS Boron is 850 PPM.
- Bank D at 180 steps
- The OTC withdraws control rods 12 steps
- Startup rate is 0.3 DPM

Without further action, which ONE (1) of the following describes the plant response to the rod withdrawal?

When the Point of Adding Heat is reached,

- A.  $T_{avg}$ , power level, pressurizer pressure and level will all increase until the reactor trips at 10% power.
- B.  $T_{avg}$ , power level, pressurizer pressure and level will increase until the condenser steam dumps open to stabilize power at a higher level.
- C.  $T_{avg}$ , power level, pressurizer pressure and level will increase until the atmospheric steam dumps open to stabilize power at a higher level.
- D.  $T_{avg}$  will increase which will add negative reactivity causing power to decrease, which will drive the reactor sub-critical unless rods are withdrawn further.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. POAH negative MTC would turn power
- B. Incorrect. No condenser, MSIVs closed
- C. Correct
- D. Incorrect. Below POAH

Technical Reference(s): POP-1.2 (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)Question Source: Bank #   
Modified Bank # X (Note changes or attach parent)  
New 

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge   
Comprehension or Analysis X10 CFR Part 55 Content: 55.41 X  
55.43 

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	3	3
	K/A #	G2.3.9	
	Importance Rating	2.5	3.4

Knowledge of the process for performing a containment purge.

Proposed Question: Common 38

Given the following conditions:

- The plant is in Cold Shutdown.
- Preparations are underway for a Containment Purge.
- Purge Supply and Exhaust isolation valves are open
- The selected fans control switch is placed in CLOSE

Which ONE (1) of the following describes the events that would automatically terminate or discontinue the purge?

- A. If any motor operated louver on the Purge Supply fan does not open within 60 seconds, the fan will trip.
- B. If either the Purge Supply Fan or PAB Exhaust Fan does not start within 60 seconds, the isolation valves will close.
- C. If WCCPPS pressure is not released within 90 seconds, the fans will not start.
- D. If any two motor operated louvers on the Purge Supply fan do not open within 60 seconds, the Purge Supply and Exhaust isolation valves will close.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Two louvers for 190 seconds
- B. Correct.
- C. Incorrect. Valve interlock, and wrong time



D. Incorrect. Time is 190 seconds

Technical Reference(s): SOP-5.4.3 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 223a (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	4	4
	K/A #	G2.4.19	
	Importance Rating	2.7	3.7

Knowledge of EOP layout, symbols, and icons.

Proposed Question: Common 39

Which ONE (1) of the following describes the purpose of an asterisk (\*) next to a procedure step in the EOP network?

- A. Identifies steps that must be completed prior to continuing in the EOP
- B. Identifies steps that are applicable throughout the procedure
- C. Identifies steps with subtasks that may be performed in any order
- D. Identifies beginning of Major Action Categories of the applicable procedure

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Hold steps are identified by the action stated in the step or subsequent step
- B. Correct.
- C. Incorrect. Bullets are used
- D. Incorrect. Only identified in basis document

Technical Reference(s): EOP User's Guide (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	4	4
	K/A #	G2.4.29	
	Importance Rating	2.6	4.0

Knowledge of the emergency plan.

Proposed Question: Common 40

Which ONE (1) of the following is the LOWEST emergency classification at which the Emergency Operations Facility (EOF) MUST be activated?

- A. Unusual Event
- B. Alert
- C. Site Area Emergency
- D. General Emergency

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. NUE does not require ERF staffing
- B. Correct.
- C. Incorrect. Alert is lowest
- D. Incorrect. Alert is lowest

Technical Reference(s): E-Plan (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # X

Modified Bank # \_\_\_\_\_

(Note changes or attach parent)

New \_\_\_\_\_

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis \_\_\_\_\_

10 CFR Part 55 Content: 55.41 X

55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	005 AK1.03	
	Importance Rating	3.2	3.6

Knowledge of the operational implications of the following concepts as they apply to the stuck rod: Xenon transient.

Proposed Question: Common 41

Given the following conditions:

- A rapid load reduction from 100% to 70% power was performed.
- Control Bank D rods were inserted to 180 steps.
- One Control Bank D rod did not move and is currently at 214 steps.

Which ONE (1) of the following describes a concern associated with the rod misalignment?

- A. Xenon buildup in the area of the stuck rod will immediately affect core power distribution
- B. Xenon burnout in the area of the stuck rod will immediately affect core power distribution
- C. Xenon buildup in the area of the inserted rods will affect core power distribution if left uncorrected
- D. Xenon burnout in the area of the inserted rods will affect core power distribution if left uncorrected

Proposed Answer: C

Explanation (Optional):

- A- Incorrect. Xenon will not immediately affect core power distribution. The effects of xenon will be felt an hour after the transient.
- B- Incorrect. Burnout at the affected location should not be occurring. Not immediately either
- C- Correct. When power is reduced locally, as in the case of inserted rods, xenon will build in for several hours, further depressing flux in that area. In the area of the stuck rod, xenon will not be building in because flux stayed the same or increased (relative to inserted rods)
- D- Incorrect. Xenon will not burn out in the area of the inserted rods

Technical Reference(s): Theory (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Vendor bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	E09 EK3.1	
	Importance Rating	3.3	3.6

Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Operations): Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.

Proposed Question: Common 42

The team is preparing to cool down the plant to Cold Shutdown in accordance with ES-0.2, Natural Circulation Cooldown.

What is the maximum allowed cooldown rate and why is this limit imposed?

- A. Less than 50°F per hour to prevent exceeding Tech Spec cooldown limits
- B. Less than 50°F per hour to minimize the probability of creating a void in the reactor vessel
- C. Less than 25°F per hour to prevent exceeding Tech Spec cooldown limits
- D. Less than 25°F per hour to minimize the probability of creating a void in the reactor vessel

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Wrong rate and wrong reason
- B. Incorrect. Wrong rate
- C. Incorrect. Wrong reason
- D. Correct.

Technical Reference(s): ES-0.2 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_



Proposed References to be provided to applicants during examination: NONELearning Objective: 3530 (As available)

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

Question History: INPO Bank  
Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	024 AA2.04	
	Importance Rating	3.4	4.2

Ability to determine and interpret the following as they apply to the Emergency Boration: Availability of BWST.

Proposed Question: Common 43

Given the following conditions:

- An ATWS has occurred.
- The team is performing actions of FR-S.1, Response to Nuclear Power Generation/ATWS.
- The team has initiated Emergency Boration.
- All equipment has operated as designed.
- SI is NOT actuated.
- RCS pressure is 2210 psig and Trending DOWN.
- Tavg is 567°F and Trending DOWN.

Which ONE (1) of the following describes plant response to initiation of the boration?

- A. Boric Acid Tank level will be dropping at a rate approximately equal to Charging flow.
- B. Volume Control Tank level will be dropping at a rate approximately equal to Charging flow.
- C. Refueling Water Storage Tank level will be dropping at a rate approximately equal to Charging flow.
- D. Pressurizer level will be rising at a rate approximately equal to Charging flow.

Proposed Answer: A

Explanation (Optional):

- A. Correct. BAT will be supplying borated water if everything works properly
- B. Incorrect. VCT level may actually be rising because there is no outflow, and Letdown may still be flowing
- C. Incorrect. RWST not supplying any water unless equipment does not work properly or SI is initiated
- D. Incorrect. In a transient like an ATWS, pressurizer level will also be in a transient state, due to RCS mass changing from temperature changing

Technical Reference(s): FR-S.1 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 82 (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	026 AK3.03	
	Importance Rating	4.0	4.2

Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: Guidance actions contained in EOP for Loss of CCW/Nuclear Service Water.

**Proposed Question: Common 44**

Which ONE (1) of the following describes the reason for isolating the CCW return lines from the RCP Thermal Barriers prior to restarting CCW pumps after a Loss of All AC Power?

- A. Prevents water hammer in the CCW system due to steam formation.
- B. Prevents thermal shock to the RCP thermal barrier heat exchanger.
- C. Prevent thermal shock to the RCP Seal package when a CCW Pump is started.
- D. Prevents exceeding the cooling capacity of the thermal barrier heat exchanger due to reduced RCP seal flows.

**Proposed Answer: A**

**Explanation (Optional):**

- A. Correct. With no CCW flow, the CCW in the TBHX may be hot and potentially flash to steam. If a CCW pump was started it could result in steam binding or water hammer if the TBHX return was not isolated.
- B. Incorrect. TB is a heat exchanger made for temperature differences of this magnitude
- C. Incorrect. CCW does not supply water to seal package
- D. Incorrect. Cooling capacity would not be exceeded whether seal injection was available or not. Relatively same amount of water will flow on other side of HX

**Technical Reference(s):** ECA-0.0 Background (Attach if not previously provided)

Proposed References to be provided to applicants during examination: None

Learning Objective: 3554 (As available)

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

Question History: Vendor Bank  
Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	2
	K/A #	027 AA2.15	
	Importance Rating	3.7	4.0

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

Proposed Question: Common 45

Given the following conditions:

- The plant is at 100% power.
- All control systems are in their normal automatic alignments.
- Pressurizer pressure channel PT-455 indicates 2275 psig and slowly rising.
- All other narrow range pressurizer pressure indications are 2220 psig and slowly dropping

Which ONE (1) of the following actions is required next?

- A. Place the pressurizer pressure controller in manual and control RCS pressure.
- B. Place the affected PORV control switch in 'close'
- C. Reset and reenergize pressurizer heaters
- D. Trip the reactor, enter E-0, Reactor Trip or Safety Injection

Proposed Answer: A

Explanation (Optional):

- A. Correct. Controlling channel is failing
- B. Incorrect. Only for channels directly impacting PORVs
- C. Incorrect. Heaters will not energize until pressure control in manual
- D. Incorrect. Rx trip criteria not yet met

Technical Reference(s): AOI-28.5

(Attach if not previously provided)

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Proposed References to be provided to applicants during examination: NONELearning Objective: 1201002 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	040 AK1.06	
	Importance Rating	3.7	3.8

Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: High-energy steam line break considerations.

Proposed Question: Common 46

Which ONE (1) of the following sets of conditions will result in the MOST SEVERE reactivity excursion during a Main Steam Line Break?

- A. 10% power, RCS Boron = 200 ppm
- B. 10% power, RCS Boron = 1200 ppm
- C. 100% power, RCS Boron = 200 ppm
- D. 100% power, RCS Boron = 1200 ppm

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. End of Life has a higher MTC than BOL
- C. Incorrect. High power, less mass in SG to boil off
- D. Incorrect. High power, less mass in SG to boil off. Also BOL

Technical Reference(s): FSAR, T&AA (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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



Question History: Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 X  
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	E12 EA1.2	
	Importance Rating	3.6	3.7

Ability to operate and/or monitor the following as they apply to the (Uncontrolled Depressurization of all Steam Generators):  
Operating behavior characteristics of the facility.

Proposed Question: Common 47

During the performance of ECA-2.1, Uncontrolled Depressurization of All Steam Generators, the following plant condition exists:

- Cooldown rate of the RCS is greater than 100°F/hour

How is the team directed to control feedwater flow?

- A. Feedwater flow is terminated to all but a single intact S/G, which is fed at 85 gpm
- B. Feedwater flow is maintained at least 400 gpm total until any SG narrow range is >10%
- C. Feedwater flow is maximized to all S/Gs until narrow range level in any SG is >10%
- D. Feedwater flow is reduced to 85 gpm to each S/G with narrow range level less than 10%

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. All SGs are fed
- B. Incorrect. Normal criteria
- C. Incorrect. Do not terminate flow
- D. Correct.

Technical Reference(s): ECA-2.1 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 606 (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	051 AA1.04	
	Importance Rating	2.5	2.5

Ability to operate and / or monitor the following as they apply to the Loss of Condenser Vacuum: Rod position.

Proposed Question: Common 48

Given the following conditions:

- The Unit is operating at 100% power with all systems in automatic alignments.
- The crew is referring to the ARPs due to a condenser vacuum alarm.

Assuming no action has been taken by the crew, which ONE of the following describes the response of the rod control system to this event?

Control rods will automatically...

- A. insert due to the rise in condenser backpressure causing a rise in  $T_{avg} - T_{ref}$  deviation.
- B. insert due to the drop in condenser backpressure causing a rise in  $T_{avg} - T_{ref}$  deviation.
- C. withdraw due to the rise in condenser backpressure causing a drop in  $T_{avg} - T_{ref}$  deviation.
- D. withdraw due to the drop in condenser backpressure causing a drop in  $T_{avg} - T_{ref}$  deviation.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Control rod motion in automatic will maintain  $T_{avg}$ .
- B. Incorrect. Backpressure will rise.
- C. Incorrect. Rods insert.

**D. Incorrect. Rods insert, and backpressure will rise.**

Technical Reference(s): Simulator (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

**Learning Objective:** Not available (As available)

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

Question History: Vendor Bank  
Previous NRC

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

10 CFR Part 55 Content:	55.41	X
	55.43	

**Comments:**

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	055 EA2.01	
	Importance Rating	3.4	3.7

Ability to determine or interpret the following as they apply to a Station Blackout: Existing valve positioning on a loss of instrument air system.

Proposed Question: Common 49

Given the following plant conditions:

- Reactor Trip and Turbine Trip has occurred from 100% power
- Loss of all AC power has occurred
- Each Steam Generator Atmospheric Relief Valve controller's output is full open
- Steam Driven Auxiliary Feedwater Pump is supplying feedwater to all four Steam Generators
- Steam Flow is approximately 0 pounds mass per hour from the 21 S/G and 24 S/Gs approximately 30 minutes after the trip

Which ONE (1) of the following statements explains the steam flow indication?

- A. Main Steam Isolation Valves closed on an automatic isolation signal
- B. Main Steam Isolation Valves closed on loss of AC power
- C. Steam Generator Atmospheric Relief Valves closed on loss of Instrument Air
- D. Steam Generator Atmospheric Relief Valves closed on loss of AC power

Proposed Answer: C

Explanation (Optional):

- A. The steam flow indication is upstream of the MSIV. Closure of the MSIVs (which should not have occurred) would not affect steam flow indication.
- B. MSIV control power is not affected by the loss of AC power
- C. S/G Atmospheric Relief Valves will go closed on loss of instrument air as a result of loss of AC power. Operator action is required to align the nitrogen bottles for S/G Atmospheric Relief Valve operation.
- D. S/G Atmospheric Relief Valve control power is not affected by the loss of AC power.

Technical Reference(s): SYS-C-180 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 331 7B (As available)

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

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	057 AK3.01	
	Importance Rating	4.1	4.4

Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital AC electrical instrument bus.

Proposed Question: Common 50

Given the following conditions:

- The plant is at 80% power.
- A loss of Instrument Bus 21 has occurred.

Which ONE (1) of the following statements describes why the HI-HI Containment Pressure relays are blocked when performing the appropriate attachment in accordance with AOI-27.1.6?

- A. Blocks inadvertent actuation of Containment Spray in the case of a redundant channel failure
- B. Provides a channel trip of Containment Spray to change the coincidence to 1 out of 3 for Spray actuation
- C. Makes up part of the coincidence circuitry for Spray initiation, since Containment Spray relays are energized to actuate
- D. Blocks the actuation signal from the channel supplied from the de-energized instrument bus from causing an inadvertent Phase B containment isolation signal

Proposed Answer: C

Explanation (Optional):

Incorrect. Makes up part of trip coincidence

Incorrect. Logic does not change

Correct

Incorrect. Channel is energize to actuate



Technical Reference(s): AOI-27.1.6 (Attach if not previously provided)  
SOP-27.1.6  
AOI-28.19

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1201032 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	062 AA2.01	
	Importance Rating	2.9	3.5

Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: Location of a leak in the CCWS.

Proposed Question: Common 51

Given the following:

- Unit is at 100% power.
- CCW surge tank Low level alarm condition is present.
- CCW surge tank level is DECREASING.
- The makeup valve is OPEN.
- There is NO indication of relief valve leakage in any CCW-cooled components

Which ONE (1) of the following is the location of the leak?

- A. RCS sample coolers
- B. Non-Regenerative heat exchanger
- C. Thermal barrier heat exchanger
- D. Seal return heat exchanger

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Higher pressure than CCW would cause in-leakage
- B. Incorrect. Higher pressure than CCW would cause in-leakage
- C. Incorrect. Higher pressure than CCW would cause in-leakage
- D. Correct.

Technical Reference(s): SYS-C-041 (Attach if not previously provided)

AOI-4.1.1Proposed References to be provided to applicants during examination: NONELearning Objective: 107b (As available)

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

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	015/017 AA1.22	
	Importance Rating	4.0	4.2

Ability to operate and/or monitor the following as they apply to the RCP malfunctions: RCP seal failure/malfunction.

Proposed Question: Common 52

The plant has been operating at steady state conditions at 100% power for the past 30 days.

Number 1 seal return flow has dropped rapidly from 3.0 GPM to 0.9 GPM, and the "Reactor Coolant Pump Standpipe High Level" alarm has annunciated for RCP 21.

Which ONE (1) of the following describes the reason for these indications?

- A. RCP Seal No. 1 Failure
- B. RCP Seal No. 2 Failure
- C. RCP Seal No. 3 Failure
- D. Loss of Seal Injection flow

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Failure of #1 seal would cause leakoff to rise
- B. Correct. The RCP high standpipe level in coincidence with RCP#1 seal return low flow is indicative of a number 2 RCP seal failure.
- C. Incorrect. If standpipe was low, may be #3 seal failure
- D. Incorrect. Even if seal injection is lost, seal flows would be provided by RCS fluid

Technical Reference(s): AOI-1.3 (Attach if not previously provided)

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Proposed References to be provided to applicants during examination: NONELearning Objective: 40b (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

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

Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: Definition of saturated liquid.

Proposed Question: Common 53

Given the following conditions:

- A small break LOCA has occurred.
- Due to a CSF Red Path, the team entered FR-C.1, Response to Inadequate Core Cooling, and restored Safety Injection flow
- The team is currently performing the actions in E-1, Loss Of Reactor Or Secondary Coolant
- Core exit thermocouples indicate approximately 520°F.
- RCS pressure indicates approximately 800 psig.

Which ONE (1) of the following describes the status of the Reactor Coolant System throughout this event?

- A. Saturated upon entry to FR-C.1; Saturated at the present time
- B. Saturated upon entry to FR-C.1; Subcooled at the present time
- C. Superheated upon entry to FR-C.1; Superheated at the present time
- D. Superheated upon entry to FR-C.1; Saturated at the present time

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Cannot be in FR-C.1 unless superheated.

- B. Incorrect. Cannot be in FR-C.1 unless superheated. Saturated currently
- C. Incorrect. Not currently superheated
- D. Correct. 800 psig and 520 is approximately saturated (within 1°F)

Technical Reference(s): Steam Tables (Attach if not previously provided)

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\_\_\_\_\_

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

Learning Objective: 576 (As available)

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

Question History: Vendor Bank, Previous NRC Exam

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	E06 EK1.3	
	Importance Rating	3.7	3.9

Knowledge of the operational implications of the following concepts as they apply to the (Degraded Core Cooling): Annunciators and conditions indicating signals, and remedial actions associated with the (Degraded Core Cooling).

Proposed Question: Common 54

Following a LOCA with subsequent ECCS failures, the crew is performing the actions in FR-C.2, Response To Degraded Core Cooling.

- RCS pressure is rising.
- Pressurizer Pressure High annunciator on Panel SAF is Lit
- Core Cooling has NOT been restored

Which ONE (1) of the following describes the required operation of the Pressurizer PORVs in this event?

- A. Leave closed and isolated until required to establish a vent path prior to RCP restart.
- B. Verify they operate automatically or operate manually for RCS overpressure control if necessary.
- C. Leave closed and isolated to prevent further loss of RCS inventory.
- D. Open to depressurize the RCS to facilitate SI accumulator injection.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. The PORVs are not used for RCP vent paths and there is no provision in FR-C.2 for RCP restart.
- B. Correct.



- C. Incorrect. The PORVs are verified closed with block valves open as long as pressure is below setpoint.
- D. Incorrect. This is an action possibly taken in FR-C.1.

Technical Reference(s): FR-C.2 (Attach if not previously provided)

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Proposed References to be provided to applicants during examination: NONE

Learning Objective: 3539 (As available)

Question Source: Bank #

Modified Bank # X (Note changes or attach parent)

New

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Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

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\_\_\_\_\_

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	E07 EA1.2	
	Importance Rating	3.2	3.7

Ability to operate and/or monitor the following as they apply to the (Saturated Core Cooling): Operating behavior characteristics of the facility.

Proposed Question: Common 55

What is the primary purpose of depressurizing the steam generators in response to a degraded core-cooling situation?

- A. To collapse the steam voids and enhance reflux cooling in the RCS
- B. To increase the primary to secondary thermal driving head for natural circulation
- C. Clear the loop seal and vent steam to provide maximum cooling from the RHR pumps
- D. The cooldown and depressurization of the RCS will facilitate core recovery via the SI accumulators

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Steam voids collapsed by pressurization.
- B. Incorrect. Natural Circulation will not exist with a superheated RCS
- C. Incorrect. RHR pumps will not be providing flow to RCS until after depressurization, and then not maximum
- D. Correct. The SGs are depressurized to bring an accumulator injection and minimum RHR flow at shutoff head.

Technical Reference(s): FR-C.2 Background (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 3540 (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	076 AA2.02	
	Importance Rating	2.8	3.4

Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: Corrective actions required for high fission product activity in RCS.

Proposed Question: Common 56

Given the following conditions:

- A rapid load reduction from 100% power to 65% power was performed approximately 3 hours ago.
- R-4, Charging Pump Room Area Radiation Monitor, is in alarm.
- Chemistry confirms RCS activity exceeds Technical Specification limits.

The CRS directs a plant shutdown be performed.

Which ONE (1) of the following actions is designed to limit the release of radioactivity in the event of a subsequent SGTR?

- A. MSIVs are closed.
- B. SG Atmospheric Dump valve setpoints are raised.
- C. RCS is cooled down below 500°F.
- D. Long Loop Polishing System is placed in service.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Closing MSIVs would contribute to rad release through SG ADVs and Safeties if cooldown and depressurization was not performed in a timely manner
- B. Incorrect. ADV setpoints are normally raised in SGTR procedure
- C. Correct.
- D. Incorrect. Condensate polishing would help clean the secondary plant but not an action

performed in accordance with the ARPs

Technical Reference(s): TS (Attach if not previously provided)  
AOI-12.1  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1201023 (As available)

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

Question History: Vendor Bank. Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	001 AA1.05	
	Importance Rating	4.3	4.2

Ability to operate and/or monitor the following as they apply to the Continuous Rod Withdrawal: Reactor trip switches

Proposed Question: Common 57

Given the following conditions:

- The plant is at 100% power.
- All control systems are operating in their normal alignments
- Tavg and Tref are matched and stable
- Control Bank D begins stepping out at a rate of 8 steps per minute.
- The CRS directs entry to AOI-16.1.2, Continuous Rod Motion

Which ONE (1) of the following conditions will require initiation of a manual reactor trip in accordance with AOI-16.1.2?

- A. Rod motion continues beyond actuation of the OT Delta T rod stop
- B. Any control rod drop during the rod motion
- C. Rod motion continues with the bank selector switch in MANUAL or BANK SELECT
- D. Rod motion continues beyond actuation of any Power Range High Flux Rod Stop

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. May be an entry condition, but not trip
- B. Incorrect. Multiple rod drops require a trip
- C. Correct
- D. Incorrect. Rod stops are not trip criteria

Technical Reference(s): AOI-16.1.2 (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	003 AK2.05	
	Importance Rating	2.5	2.8

Knowledge of the interrelations between the Dropped Control Rod and the following: Control rod drive power supplies and logic circuits.

Proposed Question: Common 58

Given the following conditions:

- The plant is at 100% power.
- All control systems are in their automatic alignments
- The following annunciator is received on Panel SBF
  - Rod Control Non-Urgent Failure
- Investigation determines that a failure of a redundant power supply in Power Cabinet 2AC is the cause of the alarm.
- Rod Control is placed in Manual per the ARP

If the other redundant power supply to Power Cabinet 2AC were to fail, which ONE (1) of the following conditions would result?

- A. Rods controlled by Power Cabinet 2AC would drop
- B. All rod motion by rods controlled by Power Cabinet 2AC would be frozen
- C. The Bank Overlap Unit would reset to zero
- D. One reactor trip breaker would lose control power and the reactor would trip

Proposed Answer: A

Explanation (Optional):

- A. Correct
- B. Incorrect. No power, rods will drop



- C. Incorrect. BOU is not powered by power cabinet
- D. Incorrect. Different power supplies

Technical Reference(s): ARP SBF (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 279.b (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	008 AK2.02	
	Importance Rating	2.7	2.7

Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Sensors and detectors.

Proposed Question: Common 59

Given the following conditions:

- Pressurizer pressure is 985 psig
- Pressurizer Relief Tank pressure is 5 psig
- PRT temperature is 90°F
- The reactor is shut down

If a pressurizer safety valve begins to leak, which ONE (1) of the following is the temperature seen downstream of the leaking valve?

- A. 230°
- B. 300°
- C. 340°
- D. 550°

Proposed Answer: B

Explanation (Optional):

- A. Incorrect.
- B. Correct. Approximate BTU/LBM for PRZR saturation would be actual value of 1195. In this case, constant enthalpy (throttling) process, mollier line to 20 psia, temperature is approximately 300°F (Superheat)
- C. Incorrect.
- D. Incorrect.

Technical Reference(s): Steam Tables (Attach if not previously provided)

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\_\_\_\_\_

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

Learning Objective: Not available (As available)

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

Question History: Facility Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	2
	Group #	2	1
	K/A #	009 EA1.18	
	Importance Rating	3.4	3.2

Ability to operate and monitor the following as they apply to a small break LOCA: Balancing of HPI loop flows.

Proposed Question: Common 60

Given the following conditions:

- Reactor trip and safety injection have occurred.
- RCS pressure is 400 psig and stable
- Containment pressure is 0.7 psig and rising

If the break is at the SI Cold Leg discharge line connection to loop 21, which ONE (1) of the following describes the SI flow indication in the CCR?

- A. SI flow indication is approximately equal in all 4 loops. RHR flow is zero in all 4 loops.
- B. SI flow and RHR flow to loop 21 is off-scale high. SI flow to loops 22, 23, 24 is reduced. RHR flow to loops 22, 23, 24 is zero.
- C. SI flow is zero to loop 21. SI flow to loops 22, 23, 24 is elevated. RHR flow is zero to all 4 loops.
- D. SI flow to loop 21 is off-scale high. SI flow to loops 22, 23, 24 is reduced. RHR flow to all loops is zero.

Proposed Answer: A

Explanation (Optional):

- A. Correct. At higher SI flow rates such as at 400 psig, the SI discharge lines are throttled to ensure even distribution of flow to loops (Orifice valves)
- B. Incorrect. Pressure too high for RHR and SI would not be off-scale due to throttled line
- C. Incorrect. At connection to loop, flow will be going through SI line

D. Incorrect. Throttled on discharge

Technical Reference(s): SYS-C-101 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 145c, 149b (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	011 EA1.01	
	Importance Rating	3.7	3.8

Ability to operate and monitor the following as they apply to a Large Break LOCA: Control of RCS pressure and temperature to avoid violating PTS limits.

Proposed Question: Common 61

Given the following conditions:

- The reactor has tripped. Safety Injection and Containment Spray have actuated.
- The team is performing the actions of E-1, Loss of Reactor or Secondary Coolant
- RCS pressure is 20 psig.
- RHR flow is 3000 gpm.
- Containment Sump level is rising rapidly.
- SG pressures are approximately 680 psig and stable.
- A Red Path exists on the Integrity Status Tree
- The CRS directs transition to FR-P.1, Response to Imminent Pressurized Thermal Shock
- The procedure immediately sends the team back to E-1

Based on the above plant conditions which ONE (1) of the following states the reason for the procedure transition from FR-P.1 back to E-1?

- A. The RCS cooldown and pressure reduction performed in FR-P.1 are not required during a Large Break LOCA.
- B. A Small Break LOCA has priority over Pressurized Thermal Shock concerns.
- C. Faulted SG isolation must occur prior to transition to a Functional Recovery Procedure.
- D. Since Safety Injection cannot be terminated, FR-P.1 provides an immediate transition back to E-1.

Proposed Answer: A

**Explanation (Optional):**

- A. Correct
- B. Incorrect. SBLOCA is a concern for PTS
- C. Incorrect. Not reason for this procedure transition
- D. Incorrect. Wrong reason for transition back

**Technical Reference(s):** FR-P.1 Basis Document (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

**Learning Objective:** 3557 (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content:	55.41	X
	55.43	

**Comments:**

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	E01 EK3.2	
	Importance Rating	3.0	3.9

Knowledge of the reasons for the following responses as they apply to the Reactor Trip or Safety Injection/Rediagnosis: Normal, abnormal and emergency operating procedures associated with (Reactor Trip or Safety Injection/Rediagnosis).

Proposed Question: Common 62

Procedure ES-0.0, "REDIAGNOSIS" is implemented...

- A. at the discretion of the CRS anytime during the performance of the Emergency Operating Procedures.
- B. when directed to do so according to criteria listed on the foldout page of the current procedure in effect.
- C. only after transition out of E-0 has occurred when Safety Injection has been actuated.
- D. at the discretion of the CRS, but only after completion of a Functional Restoration Procedure.

Proposed Answer: C

Explanation (Optional):

Technical Reference(s): ES-0.0 (Attach if not previously provided)  
OAD 26

Proposed References to be provided to applicants during examination: NONE



Learning Objective: 506 (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	022 AA1.08	
	Importance Rating	3.4	3.3

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

Proposed Question: Common 63

Assuming no operator actions are taken, which ONE of the following describes the plant conditions following VCT level channel LT-112 failure HIGH?

- A. Increasing VCT level and letdown diverted to the HUT.
- B. Decreasing VCT level and loss of NPSH to the charging pumps.
- C. Increasing VCT level and continuous makeup from the blender to the VCT.
- D. Decreasing VCT level and auto swapover of the charging pump suction to the RWST.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. No increasing level because makeup will not actuate. Level will decrease because of divert
- B. Correct.
- C. Incorrect. No increasing level and makeup is disabled
- D. Incorrect. No swapover because transmitter is failed high

Technical Reference(s): AOI-3.1 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 87g (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	025 AA2.07	
	Importance Rating	3.4	3.7

Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Pump cavitation.

Proposed Question: Common 64

Given the following conditions:

- RHR is in service at Reduced Inventory conditions.

Which ONE (1) of the following indications are used to determine if cavitation is occurring?

- A. RHR flow and pump amps increasing as RCS inventory is raised.
- B. RHR flow and pump discharge pressure oscillations.
- C. RHR pump discharge pressure and RVLIS Full Range level oscillations.
- D. RHR flow high coincident with RVLIS Full Range level low.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Description of inventory restoration, not cavitation
- B. Correct.
- C. Incorrect. RVLIS not used in RIO
- D. Incorrect. RVLIS not used but describes a condition that could potentially lead to cavitation

Technical Reference(s): SYS-C-042 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 120c (As available)

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

Question History: Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43                     

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	054 G2.4.2	
	Importance Rating	3.9	4.1

Emergency Procedures/Plan: Knowledge of system setpoints, interlocks, and automatic actions associated with EOP entry conditions.

Proposed Question: Common 65

Given the following conditions:

- RCS pressure is 1000 psig and trending down.
- Safety Injection has actuated.
- 21 SG NR level is 5% and trending down, pressure is 500 psig and trending down slowly.
- 22 SG NR level is 7% and trending down, pressure is 480 psig and trending down slowly.
- 23 SG NR level is 3% and trending down, pressure is 490 psig and trending down slowly.
- 24 SG NR level is 3% and trending down, pressure is 500 psig and trending down slowly.
- Total AFW flow is 180 GPM
- Containment pressure is 4 psig and rising.
- The team is preparing to transition from E-0, Reactor Trip or Safety Injection.

Which ONE (1) of the following procedures will be entered under these conditions?

- A. E-2, Faulted Steam Generator Isolation.
- B. FR-H.1 Response to Loss of Secondary Heat Sink.
- C. FR-H.5, Response to Steam Generator Low Level.
- D. ECA-1.2, Uncontrolled Depressurization of All Steam Generators.

Proposed Answer: B

Explanation (Optional):

- A- Incorrect. Not RED, and not an FR
- B- Correct. Entry met for FR-H.1
- C- Incorrect. Not RED. Yellow path procedure
- D- Incorrect. Not RED, and not an FR

Technical Reference(s): FR-H.1 Entry Conditions (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 693 (As available)

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

Question History: Vendor Bank  
Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 X  
55.43 X

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	3	2
	K/A #	065 G2.1.2	
	Importance Rating	3.9	4.0

Conduct of operations: Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: Common 66

Given the following conditions:

- The plant is at 100% power.
- A Loss of Instrument Air pressure has occurred
- The CRS has directed entry to AOI-29.2, Loss of Instrument Air

Which ONE (1) of the following plant conditions will require a reactor trip in accordance with AOI-29.2?

- A. Instrument Air pressure cannot be maintained above 80 psig
- B. Steam Generator Levels cannot be maintained less than 62%
- C. Loss of 21, 22, and 23 Instrument Air Compressors
- D. Loss of Charging Pump Speed Control

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Based on parameters
- B. Correct
- C. Incorrect. Centacs usually in control
- D. Incorrect. NPO would take local control

Technical Reference(s): AOI-29.2 (Attach if not previously provided)



Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	058 AA2.03	
	Importance Rating	3.5	3.9

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

Proposed Question: Common 67

Given the following conditions:

- The plant is in Hot Shutdown.
- 21 and 23 Auxiliary Boiler Feed Pumps (ABFPs) are in service feeding all 4 SGs.
- 125 VDC control power to the 23 ABFP is lost.

Which ONE (1) of the following describes the effect on the operation of 23 ABFP?

- A. Breaker indication in CCR is lost  
CCR breaker control is lost  
Pump will trip
- B. Breaker indication is available  
CCR breaker control is lost  
Pump will trip
- C. Breaker indication in CCR is lost  
CCR breaker control is lost  
Pump remains running
- D. Breaker indication in CCR is available  
CCR breaker control is lost  
Pump will remain running

Proposed Answer: C

**Explanation (Optional):**

- A. Incorrect. Pump will not trip
- B. Incorrect. Breaker indication lost
- C. Correct
- D. Incorrect. Breaker indication lost

Technical Reference(s): AOI-27.1.11 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

**Learning Objective:** 6454 (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content:	55.41	X
	55.43	

**Comments:**

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	060 AA1.02	
	Importance Rating	2.9	3.1

Ability to operate and/or monitor the following as they apply to the Accidental Gaseous Waste Release: Ventilation system

Proposed Question: Common 68

Given the following conditions:

- The plant is at 100% power
- 23 Large Gas Decay Tank is aligned for in-service and re-use
- 24 Large Gas Decay Tank is in standby
- 22 Large Gas Decay Tank is isolated with a pressure of 90 psig and a content of 5000 Curies
- All remaining Gas Decay Tanks are inerted with nitrogen
- 22 Large Gas Decay Tank relief valve (1622) has failed open

Which ONE (1) of the following describes the plant response to this event?

- A. High radiation level alarm on R-50, Waste Gas Decay Tank Monitor.
- B. High radiation level alarm on R-44, Plant Vent Air Monitor.
- C. PAB Exhaust Fans 21 and 22 start and/or shift to high speed.
- D. PAB Exhaust Fans 21 and 22, and PAB Supply Fan stops.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Monitor is upstream of release
- B. Correct
- C. Incorrect. No automatic PAB fan actuation
- D. Incorrect. No automatic PAB fan actuation

Technical Reference(s): SOP 5.1.5 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONELearning Objective: SYS-C-052 Obj 3698 & 3699 (As available)

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

Question History: Facility Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	038 EK3.01	
	Importance Rating	4.1	4.3

Knowledge of the reasons for the following responses as they apply to the Steam Generator Tube Rupture: Equalizing pressure on primary and secondary sides of ruptured SG.

Proposed Question: Common 69

Given the following conditions:

- A Steam Generator Tube Rupture has occurred.
- The team is performing actions contained in E-3, Steam Generator Tube Rupture.

Which ONE (1) of the following describes the reason for reducing RCS pressure to match ruptured SG pressure in E-3?

- A. To eliminate concern for SG overfill and damage to secondary side steam piping.
- B. To restore RCS inventory and reduce break flow prior to stopping ECCS pumps.
- C. To minimize the probability of a Pressurized Thermal Shock event when RCS cooldown is commenced.
- D. To ensure there will be no release of radioactivity through the SG Atmospheric Dump valves for the duration of the SGTR.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. May not be able to stop overfill if release is large enough
- B. Correct
- C. Incorrect. PTS is only a concern if ruptured SG pressure is low. (Also faulted)
- D. Incorrect. May not be able to stop release if SGTR is large enough

Technical Reference(s): E-3 Basis Document (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not Available (As available)

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

Question History: Vendor Bank  
Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	3	3
	K/A #	028 AK3.02	
	Importance Rating	2.9	3.2

Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions: Relationships between PZR pressure increase and reactor makeup/letdown imbalance.

Proposed Question: Common 70

Given the following conditions:

- The plant is at 100% power. All control systems are in automatic.
- Steady state conditions exist.
- The controlling pressurizer level channel, LT-460, slowly fails high.

Without operator action, which ONE (1) of the following describes the response of charging and letdown?

- A. Charging flow will decrease due to the level channel failure, and the letdown isolation valve, LCV-459, will close.
- B. Charging flow will decrease due to the level channel failure, and the in-service letdown orifice isolation valve, LCV-200A, B, or C will close.
- C. Charging flow will increase due to the level channel failure, and the letdown isolation valve, LCV-459, will close.
- D. Charging flow will increase due to the level channel failure, and the in-service letdown orifice isolation valve, LCV-200A, B, or C will close.

Proposed Answer: A

Explanation (Optional):

- A. Correct. Level channel fails high will cause backup heaters to turn on. No action, backup channel will go low, causing 459 closure
- B. Incorrect. RCS pressure rises. L/D orifice isolations will not auto close on level
- C. Incorrect. Charging flow drops as indicated level rises



D. Incorrect. Charging flow drops as indicated level rises. L/D orifice isolation valves will not auto close on low level

Technical Reference(s): AOI-3.1 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 87g (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	3	3
	K/A #	056 AA2.51	
	Importance Rating	3.3	3.4

Ability to determine and interpret the following as they apply to the Loss of Offsite Power: \_T, (core, heat exchanger, etc.)

Proposed Question: Common 71

Given the following conditions:

- The plant was at 100% power, BOL
- A loss of off-site power has occurred
- Subsequently, a loss of CCW required a reactor trip and a trip of all RCPs

Which ONE (1) of the following describes the response of the reactor core  $\Delta T$  from the time the RCPs are tripped until one hour later in the event?

Core  $\Delta T$ ...

- A. Rises as natural circulation is being established, then remains constant as heat removal is established with the atmospheric steam dumps
- B. Rises as natural circulation is being established, then lowers as decay heat load diminishes and heat removal is controlled by the atmospheric steam dumps
- C. Lowers as natural circulation is being established, then remains constant as heat removal is established with the atmospheric steam dumps
- D. Lowers as natural circulation is being established, then rises as decay heat load diminishes and heat removal is controlled by the atmospheric steam dumps

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Does not take decay heat into account
- B. Correct

- C. Incorrect. Delta T has to become higher to establish a driving head for natural circulation
- D. Incorrect. Delta T has to become higher to establish a driving head for natural circulation. Distractor provides opposite of actual effect

Technical Reference(s): T&AA (Attach if not previously provided)  
\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	032 AA2.04	
	Importance Rating	3.1	

Ability to determine and interpret the following as they apply to the Loss of Source Range Instrumentation: Satisfactory Source Range/Intermediate Range overlap.

Proposed Question: RO 72

Given the following conditions:

- A reactor startup is in progress.
- Intermediate Range N35 and N36 indicate approximately  $3 \times 10^{-11}$  amps and rising at approximately 0.2 DPM

Which ONE (1) of the following states the approximate indication on Source Range channels N31 and N32?

- A.  $10^2$  CPS
- B.  $10^3$  CPS
- C.  $10^4$  CPS
- D.  $10^5$  CPS

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Too low
- B. Incorrect. Too low, IR on scale at  $10^{-11}$  amps which corresponds to approximately  $5 \times 10^3$  CPS
- C. Correct
- D. Incorrect. SR Trip on high flux

Technical Reference(s): SYS-C-130 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 251 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	054 G2.2.25	
	Importance Rating		3.7

Equipment control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.

Proposed Question: SRO 72

Which ONE (1) of the following describes the design basis of the AFW system?

With the Condensate Storage Tank (CST) at the minimum level required by Technical Specifications,

- A. Any one AFW pump can remove decay heat for 24 hours in Hot Shutdown following a loss of off-site power
- B. Any two AFW pumps can remove decay heat for 24 hours in Hot Shutdown following a loss of all AC power
- C. Any one AFW pump can remove decay heat for 72 hours in Hot Shutdown following a loss of off-site power
- D. Any two AFW pumps can remove decay heat for 72 hours in Hot Shutdown following a loss of all AC power

Proposed Answer: A

Explanation (Optional):

- A. Correct
- B. Incorrect. Only 1 pump required
- C. Incorrect. 24 hours, not 72
- D. Incorrect. 24 hours, not 72, and only 1 pump required

Technical Reference(s): TS 3.7.5 and basis (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 372 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 1 and 2 because it is design basis, and TS basis for system operability

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	001 K4.02	
	Importance Rating	3.8	

Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: Control rod mode select control (movement control).

Proposed Question: RO 73

An Urgent Failure has occurred in the 1BD Power Cabinet.

Which ONE (1) of the following describes rod control capability from the Control Room?

- A. All rod motion is inhibited.
- B. All Bank D rods will move in MANUAL or INDIVIDUAL BANK SELECT mode.
- C. All Bank B and D rods will move only in INDIVIDUAL BANK SELECT mode.
- D. Bank D Group 2 rods will move only in INDIVIDUAL BANK SELECT mode.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Bank select in unaffected groups is functional
- B. Incorrect. Not in manual
- C. Incorrect. Not in the affected power cabinet
- D. Correct

Technical Reference(s): AOI-16.1.5 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 00029, 274, 277 (As available)



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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	001 A2.03	
	Importance Rating		4.2

Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of stuck rod or Misaligned rod.

Proposed Question: SRO 73

The Unit is at 91% power.

Control Bank "D" Group 1 indicates the following:

- Group step counter position is 180 steps.
- DRPI indicates the following:
  - Control Rod F-02 at 178 steps
  - Control Rod B-10 at 191 steps
  - Control Rod K-14 at 166 steps
  - Control Rod P-06 at 164 steps

Which ONE (1) of the following describes the action(s) required by Technical Specifications and AOI-16.1.1, Dropped or Misaligned Rod/Rod Position Indication failure?

- A. Immediately trip the reactor and emergency borate the RCS.
- B. Reduce thermal power to less than 80% within 1 hour and restore both control rods to within alignment within 2 hours, or borate to Hot Shutdown conditions within the following 6 hours.
- C. Restore both control rods to within alignment in 2 hours or be in Hot Shutdown within the following 6 hours.
- D. Be in Hot Shutdown within 6 hours. If multiple rod misalignment is corrected, the shutdown may be terminated

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Reactor trip is not required.
- B. Incorrect. A full shutdown is required immediately with multiple misalignments.
- C. Incorrect. Required to be in Hot Shutdown in 6 hrs. No grace period for realignment.
- D. Correct.

Technical Reference(s): Tech Specs (Attach if not previously provided)

AOI-16.1.1

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 160012 (As available)

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

Question History: Vendor Bank.  
Previous NRC  
exam

Question Cognitive Level: Memory or Fundamental Knowledge \_\_\_\_\_  
Comprehension or Analysis Comprehension

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments: 10CFR55.43(b) item 2 because the SRO must determine action IAW Technical Specifications. This requires knowledge of the applicable LCO

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	004 K5.19	
	Importance Rating	3.5	

Knowledge of the operational implications of the following concepts as they apply to the CVCS: Concept of SDM.

Proposed Question: RO 74

The plant is operating at 80% power.

Which ONE (1) of the following actions will result in an INCREASE in Shutdown Margin?

- A. Withdrawing control bank D 3 steps
- B. Lowering Condenser Steam Dump setpoint by 50 psi
- C. Initiating boration to control Axial Flux Difference within the target band
- D. Inserting control bank D 10 steps to restore Axial Flux Difference to the target band

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Rods will have no effect by themselves
- B. Incorrect. No effect until pressure mode operation, then a lower setpoint would reduce SDM
- C. Correct.
- D. Incorrect. Rods will have no effect by themselves

Technical Reference(s): Theory (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	056 A2.04	
	Importance Rating		2.8

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

Proposed Question: SRO 74

Given the following conditions:

- The plant is at 100% power.
- All control systems are in their normal automatic alignments
- 23 Condensate pump trips and cannot be restarted

Which ONE (1) of the following actions is required?

- A. Enter AOI-21.1.1, Loss of Feedwater, and place MBFP speed control in manual.  
Reduce speed until suction pressure is stable above 310 psig
- B. Enter AOI-21.1.1 and initiate a manual turbine load reduction to approximately 900 MWe
- C. Enter E-0, Reactor Trip or Safety Injection, and transition to ES-0.1, Reactor Trip Response, to establish AFW flow
- D. Enter E-0, Reactor Trip or Safety Injection, and transition to FR-H.1, Loss of Secondary Heat Sink, to establish AFW flow

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Need to reduce load, not MBFP speed
- B. Correct
- C. Incorrect. No reason to trip.
- D. Incorrect. No reason to trip and wrong transition from E-0

Technical Reference(s): AOI-21.1.1 (Attach if not previously provided)Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must diagnose plant conditions and determine a course of action

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	013 A2.01	
	Importance Rating	4.6	

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

Proposed Question: RO 75

Given the following conditions:

- The plant was operating at 100% power.
- A PORV failed open.
- The reactor has tripped on low pressurizer pressure.
- Pressurizer pressure is at 1700 psig and dropping.
- Containment pressure is 0.4 psig and rising slowly

Plant status is as follows:

- All control rods are fully inserted.
- Normally running Charging pump is in service.
- No SI or RHR pumps running.
- CIA not actuated.
- CIB not actuated.
- Main Steam Lines not isolated.
- Feedwater Isolation not actuated.

Based upon the current plant conditions, which of the following ESF systems must be manually actuated in E-0, Reactor Trip or Safety Injection?

- A. Safety Injection only.
- B. Main Steam Line Isolation only.
- C. Safety Injection and Main Steam Line Isolation.
- D. Safety Injection, Main Steam Line Isolation, and Containment Spray.

Proposed Answer: A

Explanation (Optional):



- A. Correct.
- B. Incorrect. Pressure below SI setpoint, not MSLI.
- C. Incorrect. MSLI not necessary
- D. Incorrect. Spray is not actuated on low pressurizer pressure.

Technical Reference(s): E-0 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 503 (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	003 G2.4.31	
	Importance Rating		3.4

Emergency Procedures / Plan: Knowledge of annunciators alarms and indications, and use of the response instructions.

Proposed Question: SRO 75

Given the following conditions:

- The plant is operating at 75% power during a load increase following refueling.
- The following alarms are received in the CCR
  - SFF 1-5, RCP #1 Seal Return Flow High/Low, is in alarm
  - SAF 1-1, Reactor Coolant Pump Standpipe High Level 1'
- 21 RCP #1 Seal return flow indicates 0.1 gpm.
- 21 RCP seal leakoff temperature is slowly rising.

Which ONE (1) of the following describes the required action?

- A. Trip the reactor; Trip 21RCP within 5 minutes, enter E-0, Reactor Trip or Safety Injection.
- B. Trip the reactor; Trip 21RCP, isolate #1 seal leakoff, enter E-0.
- C. Initiate a plant shutdown IAW POP-3.1; when the reactor is tripped, stop 21 RCP and isolate #1 seal leakoff within 5 minutes
- D. Check seal injection temperatures stable; Restore flow to the RCP seal within 5 minutes; If unable to restore flow within 5 minutes, trip the reactor, trip 21 RCP, and enter E-0.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. No need to isolate seal leakoff for #2 seal failure
- C. Incorrect. Trip will be required, no need to isolate seal leakoff

D. Incorrect. Once indications above are received, trip requirements are met.

Technical Reference(s): AOI-1.3 (Attach if not previously provided)  
ARP SAF, SFF  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not Available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 4 because the SRO must know the requirements and procedures for release termination

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	015 K4.03	
	Importance Rating	3.9	

Knowledge of NIS design feature(s) and/or interlock(s) provide for the following: Reading of source range/intermediate range/power range outside Control Room.

Proposed Question: RO 76

Which ONE (1) of the following actions is required after evacuating the control room using AOI-27.1.9, Control Room Inaccessibility Safe Shutdown Control?

- A. Check the reactor SUBCRITICAL using the Alternate Shutdown Panel Source Range Indication.
- B. Maintain 21 – 24 Narrow Range SG levels between 10% and 50% using the Alternate Shutdown Panel controls.
- C. Vent the Main Generator Hydrogen if H2 pressure remains greater than 50 psig.
- D. Start the EDGs locally to ensure a backup 480 volt power source is available.

Proposed Answer: A

Explanation (Optional):

- A. Correct
- B. Incorrect. Only 2 SGs in wide range
- C. Incorrect. Not as part of procedure
- D. Incorrect. Only if no power and no auto start

Technical Reference(s): AOI-27.1.9 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X  
Comprehension or Analysis10 CFR Part 55 Content: 55.41 X  
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	016 G2.1.28	
	Importance Rating		3.3

Conduct of Operations: Knowledge of the purpose and function of major system components and controls.

Proposed Question: SRO 76

Reactor/Turbine power is 42%. A Reactor trip occurs due to I&C Testing.

After the trip, you observe the following parameter values:

- Reactor Power is 5%
- SG 22 and 23 levels are 9%
- SG 21 and 24 levels are 15%

Select the answer that describes how the AMSAC system will respond to these indications.

- A. AMSAC WILL NOT actuate because PT-412A & PT-412B will indicate turbine load less than 40% following the turbine trip
- B. AMSAC WILL actuate after the functional timer times out and will start the ABFPs
- C. AMSAC WILL NOT actuate because the SG low level setpoint/logic is not satisfied
- D. AMSAC WILL NOT actuate because C-20 timer will actuate bypassing AMSAC before the actuation timer is completed

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Permissive is from before the trip
- B. Incorrect. Will NOT actuate. Criteria not met
- C. Correct.
- D. Incorrect. Criteria not met

Technical Reference(s): SYS-C-210 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONELearning Objective: 378e (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	017 K1.01	
	Importance Rating	3.2	

Knowledge of the physical connections and/or cause/effect relationship between the ITM system and the following: Plant computer

Proposed Question: RO 77

Due to a ventilation failure, the Train A core exit thermocouple junction box is 20°F higher than the Train B core exit thermocouple junction box.

Which ONE (1) of the following describes the core exit thermocouple (CET) readings as displayed on the plant computer during this event?

- A. Train A CETs will indicate 20°F higher than Train B.
- B. Train A CETs will indicate 20°F lower than Train B.
- C. Train A CETs will indicate the same as Train B.
- D. Train A CETs will flash question marks (????) on reverse colored background.

**Proposed Answer: C**

**Explanation (Optional):**

- A. Incorrect. Reference junction compensates temp
- B. Incorrect. Temperature is compensated
- C. Correct. The CETs are compensated at the reference junction, so ventilation failure will not affect their reading.
- D. Incorrect.

**Technical Reference(s):** SYS-C-140 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

**Learning Objective:** 264 (As available)



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

Question History: Facility Bank IP3

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	062 G2.1.33	
	Importance Rating		4.0

Ability to recognize indications for system operating parameters which are entry level conditions for Technical Specifications

Proposed Question: SRO 77

Given the following conditions:

- The plant is operating at 100% power.
- 21 EDG is declared INOPERABLE.
- While verifying breaker alignments, the determination is made that 22 and 23 EDGs are also inoperable due to a common mode failure

Which ONE (1) of the following actions is required in accordance with Technical Specifications?

- A. Immediately enter TS 3.0.1 and make preparations for a plant shutdown.
- B. Immediately verify availability of the Off-Site Power sources. Restore at least 1 EDG within 6 hours or enter TS 3.0.1.
- C. Immediately verify availability of Off-Site Power sources. Restore at least 1 EDG to OPERABLE status within 24 hours or enter TS 3.0.1.
- D. Return at least 1 EDG to OPERABLE status within 24 hours or enter TS 3.0.1 and make preparations for a plant shutdown.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Meet entry to 3.0.1 because beyond LCO
- C. Incorrect. No grace period
- D. Incorrect. No grace period

Technical Reference(s): TS 3.7.A.5 and 3.0.1 (Attach if not previously provided)Proposed References to be provided to applicants during examination: NONELearning Objective: 431 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 2 because the SRO must understand equipment condition leading to TS  
3.0.1 shutdown

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	001 A3.05	
	Importance Rating	3.5	

Ability to monitor automatic operation of the CRDS, including: Individual versus group position

Proposed Question: RO 78

Given the following conditions:

- Reactor startup is in progress
- While stabilizing power at 1.0 E-8 amps, IR nuclear power suddenly dropped by one-third decade and continued to decrease at a -0.3 dpm SUR
- There was no significant change in Tavg
- The Control Bank D step counters now read 119 steps
- The individual rod position indication for all Control Bank D Group 1 rods indicates 0 steps
- All other rod position indications are unchanged

Which ONE (1) of the following can be determined from these indications?

- A. The individual rod position indicators have failed, because more than one dropped rod would have caused an automatic reactor trip.
- B. The Control Bank D Group 1 step counter has failed, because it should read zero when all of the rods in this group are fully inserted.
- C. The Control Bank D step counters and the associated individual rod position indicators are consistent with a multiple dropped rod accident.
- D. Either the Control Bank D step counters, or the individual rod position indicators, have failed, but there is not enough information to determine which ones have failed.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Multiple dropped rods do not always initiate a trip
- B. Incorrect. Demand counters do not indicate zero for a dropped rod
- C. Correct.
- D. Incorrect. Demand counters indicate properly, there is no failure, except for a dropped rod event

Technical Reference(s): AOI-16.1.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 299, 300 (As available)

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

Question History: Facility Bank

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

X

10 CFR Part 55 Content:	55.41	X
	55.43	

**Comments:**

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		3
	K/A #	008 A2.02	
	Importance Rating		3.5

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: High/Low Surge Tank Level

Proposed Question: SRO 78

Given the following conditions:

- The plant is at 100% power
- The following annunciator is received in the control room:
  - COMPONENT COOLING SURGE TANK LEVEL (SGF 1-2)
- The CRS directs entry to AOI-4.1.1, Loss of Component Cooling
- Makeup to the CCW Surge Tank is initiated using 831, Primary Makeup Stop
- CCW Surge Tank level indicates 12% and rapidly Trending Down

Which ONE (1) of the following actions is required in accordance with AOI-4.1.1?

- A. Check PAB sump level in an attempt to locate the source of out-leakage in accordance with AOI-4.1.1
- B. Start an additional CCW pump to raise CCW header pressure to >107 psig in accordance with AOI-4.1.1
- C. Stop all but one running CCW pump and isolate the Seal Water and Excess Letdown heat exchangers in accordance with AOI-4.1.1
- D. Stop all CCW pumps, trip the reactor, trip RCPs, and enter E-0, Reactor Trip or Safety Injection

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Subsequent action if level was not trending down so quickly  
B. Incorrect. Subsequent action  
C. Incorrect. Subsequent action  
D. Correct.

Technical Reference(s): AOI-4.1.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

**Learning Objective:** 11211 (As available)

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

Question History:

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

10 CFR Part 55 Content:	55.41	
	55.43	X

**Comments:**

10CFR55.43(b) item 5 because the SRO must assess the condition of the plant and direct appropriate action

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	056 G2.1.2	
	Importance Rating	3.3	

Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: RO 79

Given the following conditions:

- A plant startup is in progress
- Reactor Power is 35%
- The team is starting 23 Condensate Pump
- You have been designated to maintain 480 volt bus voltage within required parameters denoted on DSR-1

Which ONE (1) of the following describes your responsibilities for this task?

- A. Place the applicable voltage regulator tap changer in Manual, and raise voltage prior to the Condensate pump start, to ensure voltage remains within limits.
- B. Place the applicable voltage regulator tap changer in Manual, and adjust voltage as required after the Condensate pump starting current has decayed.
- C. Place the applicable voltage regulator tap changer in Automatic, and ensure voltage is adjusted within limits during the Condensate pump start. If voltage trends out of limit, place the tap changer in Manual and adjust as necessary.
- D. Place the applicable voltage regulator tap changer in Automatic, and ensure voltage is adjusted within limits during the Condensate pump start. If a reactor trip occurs, immediately place the tap changer in Manual

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Wait until after starting current decays



- B. Correct
- C. Incorrect. Do not place in auto during start
- D. Incorrect. Do not place in auto during start

Technical Reference(s): SOP-20.2 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 364 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		3
	K/A #	078 G2.1.23	
	Importance Rating		4.0

Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Proposed Question: SRO 79

Given the following conditions:

- A loss of Instrument Air has occurred.
- The CRS has directed a reactor trip in accordance with the requirements of AOI-29.2, Loss of Instrument Air
- Prior to initiating the reactor trip, the OTC informs the CRS that some actions of AOI-29.2 may help stabilize the plant.

Which ONE (1) of the following describes the allowable usage of AOI-29.2 while responding to this event?

- A. Remain in AOI-29.2 until all actions are completed. If plant cannot be stabilized, trip the reactor and enter E-0, Reactor Trip or Safety Injection.
- B. Trip the reactor, enter E-0. When immediate actions are complete, parallel use of AOI-29.2 is allowed.
- C. Trip the reactor, enter E-0. Discontinue use of AOI-29.2 until transition to Plant Operating Procedures has been made.
- D. Trip the reactor, enter E-0. Discontinue use of AOI-29.2 until transition to any recovery procedure. Parallel use is only allowed when E-0 is complete.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. If trip requirement is met, then trip the plant
- B. Correct

C. Incorrect. Concurrent use allowed

D. Incorrect. Concurrent use allowed

Technical Reference(s): Not available (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41   
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must assess conditions with multiple failures and determine success path

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	061 K4.04	
	Importance Rating	3.1	

Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: Prevention of AFW runout by limiting AFW flow.

Proposed Question: RO 80

How are the Motor Driven Auxiliary Boiler Feed Pumps (ABFPs) protected from runout conditions at IP2?

- A. Maximum AFW flow is limited by the design of the AFW pump flow control valves
- B. AFW flow is measured and provides an input to the AFW regulating valve control circuit to limit pump flow
- C. AFW pump discharge pressure is measured and provides an input to the AFW regulating valve control circuit to limit pump discharge pressure
- D. AFW pump suction flow is measured and provides an input to the FCV-1121 and FCV-1123 valve controllers to provide recirculation flow back to the pump suction

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Valves designed to pass max flow through pipe
- B. Incorrect. No flow signal to valve control
- C. Correct.
- D. Incorrect. Recirculation not affected, valves operate based on discharge pressure

Technical Reference(s): SYS-C-210 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 378f (As available)

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

Question History: ILO Bank 10472  
Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43                     

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.11	
	Importance Rating		3.8

Knowledge of less than one hour technical specification action statements for systems.

Proposed Question: SRO 80

Given the following conditions:

- The plant is at 100% power
- Current date and time are: 03/08/2003 at 1030
- Axial Flux Difference is outside the target band
- RCS Chloride concentration is 0.13 ppm
- 21 Auxiliary Feedwater Pump has been INOPERABLE since 03/07/2003 at 1130

Based on these conditions, how soon must the Control Room team take corrective action?

- A. Immediately.
- B. 1 hour.
- C. 7 hours.
- D. 2 days.

Proposed Answer: A

Explanation (Optional):

- A. Correct. TS 3.10.2.5.1 Axial Flux Difference outside the band above 90% power
- B. Incorrect. TS for AFD allows up to one hour outside band if less than 90%
- C. Incorrect. None of the above conditions require the actions of TS 3.0.1
- D. Incorrect. The Aux Feed Pump is a 72 hour action, 23 hours have elapsed

Technical Reference(s): TS 3.10 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONELearning Objective: 2618,2613 (As available)

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

Question History: Facility Bank Previous NRC

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

10 CFR Part 55 Content: 55.41                       
55.43 X

## Comments:

10CFR55.43(b) item 2 because the SRO must know TS actions required immediately

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	068 A3.02	
	Importance Rating	3.6	

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

Proposed Question: RO 81

13 Waste Distillate Storage Tank is being released to the discharge canal using 13 Waste Distillate Transfer pump.

A high radiation alarm is received on Radiation Monitor R-54, Liquid Waste Distillate.

Which ONE (1) of the following describes ALL of the automatic actions that occur upon the receipt of a high radiation signal from R-54?

- A. Common Waste Distillate discharge valve, LW-701, trips closed
- B. A High Radiation Alarm is also received in the CCR, and LW-701 trips closed
- C. 13 Waste Distillate Transfer pump trips, 13 Waste Distillate pump discharge valve, LW-685, closes, LW-701 trips closed
- D. 13 Waste Distillate Transfer pump trips, 13 Waste Distillate pump discharge valve, LW-685, closes, LW-701 trips closed, and the 13 Waste Distillate Storage Tank recirc valve, LW-709, opens

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Not all actions
- B. Incorrect. Not all actions
- C. Correct
- D. Incorrect. Recirc valve does not open

Technical Reference(s): SFS-C-270 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_



Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History: Facility Bank Editorially modified

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.20	
	Importance Rating		4.2

Ability to execute procedure steps.

Proposed Question: SRO 81

Given the following conditions:

- The plant was operating at 100% power when a reactor trip occurred on low pressurizer pressure.
- A Steam Generator Tube Rupture was diagnosed, and E-3, Steam Generator Tube Rupture was entered.
- RCS Cooldown and Depressurization is complete.

Given the following control room indications:

- SG 23 Blowdown Sample indicates high radiation.
- SG 23 NR level is 32% and dropping.
- Feed flow has been isolated to SG 23.
- SG 21, 22, and 24 levels are slowly lowering.
- PRZR level is 63% and rising.

Which ONE (1) of the following describes the appropriate operator action?

- A. Depressurize RCS.
- B. Lower Charging flow.
- C. Turn on PRZR heaters.
- D. Depressurize RCS and lower Charging flow.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. If ruptured SG level is rising with a lower pwr level than exists, would depressurize RCS
- B. Incorrect. If prwr level is greater than 71%, would lower charging
- C. Correct.
- D. Incorrect. If ruptured SG level was rising, would perform both

Technical Reference(s): E-3 Step 27 (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: E-3Learning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41   
55.43 X

## Comments:

10CFR55.43(b) item 5 because the SRO must determine the appropriate action for a given set of conditions

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	068 K1.07	
	Importance Rating	2.7	

Knowledge of the interrelations and/or cause-effect relationships between the Liquid Radwaste System and the following:  
Sources of liquid waste for LRS.

Proposed Question: RO 82

Which ONE (1) of the following describes three sources of liquid waste to the Reactor Coolant Drain Tank?

- A. Recirculation sump, Containment sump, Reactor cavity sump
- B. Fan cooler leak-off, CCW surge tank, SG blowdowns
- C. Non-regenerative heat exchange divert, Chemical Drain Tank, 21 Sump Tank
- D. RCS loop drains, RCP seal leak-off, Excess Letdown heat exchanger divert

**Proposed Answer: D**

**Explanation (Optional):**

- A. Incorrect  
B. Incorrect  
C. Incorrect  
D. Correct

Technical Reference(s): **SYS-C-051** (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 132 (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.2.6	
	Importance Rating		3.3

Knowledge of the process for making changes in procedures as described in the safety analysis report.

Proposed Question: SRO 82

Which ONE (1) of the following describes the restrictions on Temporary Procedure Change usage for Emergency Operating Procedures in accordance with OAD-27, Temporary Procedure Change?

- A. Only permanent changes are allowed, and must be incorporated into the next revision within 30 days.
- B. Only permanent changes are allowed, and the applicable procedure must be revised within 7 days if there are TWO outstanding TPCs written for it.
- C. Only non-permanent changes are allowed, addressing changes in equipment status or temporary administrative situations
- D. Only non-permanent changes are allowed, and only for non-intent changes to provide tracking for administrative enhancements to be incorporated in future revisions

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. No permanent revisions to EOPs through TC process
- B. Incorrect. No permanent revisions to EOPs using this process
- C. Correct
- D. Incorrect. Only for temporary use, no tracking for future revisions

Technical Reference(s): OAD-27 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 1 and item 3, the SRO must know the requirements relating to procedure and facility changes

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	056 K1.03	
	Importance Rating	2.6	

Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems: MFW.

Proposed Question: RO 83

Given the following conditions:

- Reactor power is 60%.
- A load increase is in progress.
- 22 Condensate pump is in standby and armed for auto start.

Which ONE (1) of the following conditions will automatically start 22 Condensate pump?

- A. 21 MBFP trips off line
- B. 21 Condensate pump trips resulting in 310 psig MBFP suction pressure.
- C. PT-412A or PT-412B, Turbine First Stage Pressure, indicates <50% of full load
- D. PT-412A or PT-412B indicate > 89% of full load

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. 290 psig suction pressure will auto start pump
- C. Incorrect. Automatic start of a Condensate Pump disarms at less than 50%
- D. Incorrect. 89% or higher, if a Condensate Pump trips, a load reduction required

Technical Reference(s): SYSC200 (Attach if not previously provided)



Proposed References to be provided to applicants during examination: NONE

Learning Objective: 362 7b (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.22	
	Importance Rating		4.1

Knowledge of LCOs and Safety Limits.

Proposed Question: SRO 83

Given the following conditions:

- The plant is in Cold Shutdown.
- Hydrostatic testing is in progress.
- RCS pressure is inadvertently raised to 2750 psig.

Which ONE (1) of the following states the MAXIMUM amount of time allowed to restore RCS pressure to within the applicable safety limit?

- A. 5 minutes
- B. 15 minutes
- C. 30 minutes
- D. 60 minutes

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Time for notification of states and local gov't.
- C. Incorrect. Distractor symmetrical
- D. Incorrect. Time for Power Ops or Startup Ops violation

Technical Reference(s): TS Section 2.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History: Facility Bank  
Previous Audit  
exam

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

## Comments:

10CFR55.43(b) item 1 and 2 because the SRO must interpret action required for TS and SL violations

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	002 K4.02	
	Importance Rating	3.5	

Knowledge of RCS design features and/or interlocks which provide for the following: Monitoring reactor vessel level

Proposed Question: RO 84

Given the following:

- A LOCA has occurred.
- SI, CIA, CIB, Main Steam Line Isolation, and Containment Spray have actuated
- All actions of E-0, Reactor Trip or Safety Injection, have been taken

Which of the following statement most correctly describes use of the Reactor Vessel Level Instrumentation System (RVLIS) for this event?

- A. The RCP RUNNING range is used and indicates coolant void content.
- B. The NATURAL CIRCULATION range is used and indicates liquid level in the reactor vessel.
- C. The RCP RUNNING range is used and indicates liquid level in the reactor vessel.
- D. The NATURAL CIRCULATION range is used and indicates coolant void content.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. RCPs running, use dynamic range.
- B. Correct. Nat Circ range used for level with RCPs off. Conditions above would have RCPs off, due to CIB
- C. Incorrect. RCP Running does not indicate level.
- D. Incorrect. Nat Circ Range range does not indicate void content.

Technical Reference(s): \_\_\_\_\_ (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_Proposed References to be provided to applicants during examination: NONE

Learning Objective: \_\_\_\_\_ (As available)

Question Source: Bank # \_\_\_\_\_

Modified Bank # X (Note changes or attach parent)

New \_\_\_\_\_

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge \_\_\_\_\_

Comprehension or Analysis X10 CFR Part 55 Content: 55.41 X

55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.34	
	Importance Rating		3.2

Knowledge of the process for determining the internal and external effects on core reactivity.

Proposed Question: SRO 84

A reactor startup is being performed 20 hours after a trip from 100% power.

- Estimated Critical Rod Position is Control Bank D at 100 steps
- Criticality is predicted in approximately 5 hours

If the startup was to proceed one hour LATER than scheduled, what is the effect on the  $1/M$  plot data taken during the startup?

The  $1/M$  plot will...

- A. ACCURATELY predict criticality at a LOWER rod height
- B. ACCURATELY predict criticality at a HIGHER rod height
- C. INACCURATELY predict criticality in a CONSERVATIVE direction
- D. INACCURATELY predict criticality in a NON-CONSERVATIVE direction

Proposed Answer: A

Explanation (Optional):

- A. Correct. Less xenon will mean less poison. Lower rod height for criticality
- B. Incorrect. If xenon was building in, it would take more reactivity from rods to get critical
- C. Incorrect.  $1/m$  is accurate. ECP may not be
- D. Incorrect.  $1/m$  is accurate. ECP may not be

Technical Reference(s): Theory (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History: Vendor Bank

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	016 K3.04	
	Importance Rating	2.6	

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

**Proposed Question: RO 85**

Given the following conditions:

- The plant is at 100% power.
- All control systems are in their normal alignments.
- Instrument Bus 23 loses power and is de-energized

Which ONE (1) of the following describes the effect on the feedwater system?

- A. All Main Feed Regulating valves will fail AS IS
- B. All Main Feed Regulating valves will fail CLOSED
- C. ONLY 23 Feed Regulating Valve will fail AS IS
- D. ONLY 23 Feed Regulating valve will fail CLOSED

**Proposed Answer: B**

**Explanation (Optional):**

- A. Incorrect. Power lost to 3 element controllers, valves will fail closed
- B. Correct
- C. Incorrect. All 4 valves affected
- D. Incorrect. All 4 valves affected

Technical Reference(s): AOI-27.1.6 (Attach if not previously provided)



Proposed References to be provided to applicants during examination: NONELearning Objective: 384h (As available)

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

Question History: Facility Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.4	
	Importance Rating		4.3

Ability to recognize abnormal indications for system operating parameters which are entry level conditions for emergency and abnormal operating procedures

Proposed Question: SRO 85

Given the following conditions:

- The reactor has tripped.
- Safety Injection and Main Steam Line Isolation have actuated.
- The crew is performing actions of E-0, Reactor Trip or Safety Injection. After evaluating RCP trip criteria, the following conditions exist:
  - RCS pressure 1680 psig and trending up
  - SG Pressures approximately 770 psig and stable
  - Tave 520° F and trending up
  - AFW flow approximately 200 GPM to each SG
  - SG NR levels off scale low
  - Pressurizer level 15% and trending up
  - Containment temperature is 105° F and stable
  - Containment pressure is 0.1 psig and stable

Which ONE (1) of the following procedure transitions will be made upon exit from E-0?

- A. E-2, Faulted Steam Generator Isolation
- B. ES-1.1, SI Termination
- C. E-1, Loss of Reactor or Secondary Coolant
- D. ECA-1.2, LOCA Outside Containment

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Fault no longer exists, was downstream of MSIV
- B. Correct. Transition criteria already met
- C. Incorrect. No LOCA indicated, although RCS pressure indicates low
- D. Incorrect. No LOCA indicated inside ctmt, and RCS pressure low, but no indication of LOCA outside ctmt

Technical Reference(s): E-0 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must have ability to assess plant conditions and determine appropriate course of action

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	029 A1.02	
	Importance Rating	3.4	

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment Purge System controls including: Radiation levels.

Proposed Question: RO 86

A VC Purge is in progress.

Which ONE (1) of the following indications may exist if a degraded air flow condition develops after starting two exhaust fans?

- A. A rise in radiation monitor R-44, Plant Vent
- B. A rise in R-41 or R-42, Containment gas and particulate
- C. A drop in R-44 indication
- D. A drop in R-41 or R-42 indication

Proposed Answer: A

Explanation (Optional):

- A. Correct. Plant Vent may rise
- B. Incorrect. Levels would remain the same
- C. Incorrect. Activity would rise, not drop
- D. Incorrect. No effect

Technical Reference(s): SOP-5.4.3 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 227f, 229 (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.6	
	Importance Rating		4.0

Knowledge of symptom based EOP mitigation strategies.

Proposed Question: SRO 86

Given the following sequence of events:

- The plant was initially operating at 100% power.
- High containment pressure resulted in Safety Injection and containment spray actuation.
- Steamline isolation occurred and all MSIVs have closed.
- The reactor did NOT trip automatically or manually.
- SG-21 indicates 600 psig and dropping.
- All other SG pressures have stabilized.

Which one (1) of the following describes the correct sequence of EOP implementation?

The crew will enter E-0, Reactor Trip or Safety Injection; transition to...

- A. FR-S.1, Response to ATWS, and when FR-S.1 is complete, return to E-0, Reactor Trip or Safety Injection.
- B. E-2, Faulted Steam Generator Isolation, and when E-2 is complete, return to E-0, Reactor Trip or Safety Injection
- C. E-2, Faulted Steam Generator Isolation, and when E-2 is complete, transition to E-1, Loss Of Reactor or Secondary Coolant.
- D. FR-S.1, Response to ATWS, and when all control rods have been fully inserted, transition to E-1, Loss Of Reactor or Secondary Coolant.

Proposed Answer: A

Explanation (Optional):

A. Correct.

- B. Incorrect. ATWS indicated, no manual trip, must go to FR-S.1
- C. Incorrect. From FR-S.1 return to procedure in effect (E-0)
- D. Incorrect. SI initiated but due to SLB. E-1 would be performed after E-2

Technical Reference(s): E-0, FR-S.1 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must evaluate plant conditions and determine an appropriate course of action in accordance with procedure usage rules

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	3	
	K/A #	076 K3.07	
	Importance Rating	3.7	

Knowledge of the effect that a loss or malfunction of Service Water will have on the following: ESF loads

Proposed Question: RO 87

The valve lineups were performed to swap the ESSENTIAL Service Water Header from the 24/25/26 Service Water Pumps to the 21/22/23 Service Water Pumps.

HOWEVER, the Service Water Pump MODE selector switch on CCR safeguards panel SBF-1 was inadvertently left in the 4-5-6 position.

Assuming no operator action, which ONE (1) of the following systems WILL be supplied by Service Water if a Safety Injection actuation were to occur?

- A. Emergency Diesel Generators.
- B. CCW Heat Exchangers.
- C. Containment Recirculation Fan Cooling Coils.
- D. Instrument Air Compressors.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Essential will not be supplied to DGs
- B. Correct
- C. Incorrect. No supply with wrong pumps receiving start signal
- D. Incorrect. No supply from essential

Technical Reference(s): SYS-C-240 (Attach if not previously provided)

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\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE



Learning Objective: 399 (As available)

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

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 X  
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.45	
	Importance Rating		3.6

Ability to prioritize and interpret the significance of each annunciator or alarm.

Proposed Question: SRO 87

The following alarms have just actuated:

- PROCESS MONITOR HIGH RAD
- COMPONENT COOLING SURGE TANK LEVEL
- THERMAL BARRIER CCW HEADER LOW FLOW

What ONE (1) of the following procedures will be used to respond to this event?

- A. AOI-1.3, Reactor Coolant Pump Malfunction
- B. AOI-1.7, Excessive Reactor Coolant System Leakage
- C. AOI-4.1.1, Loss of Component Cooling
- D. AOI-4.1.2, Leakage into the Component Cooling System

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. No ARPs would lead to RCP malfunction
- B. Incorrect. No entry condition met yet
- C. Incorrect. Leakage going wrong way
- D. Correct

Technical Reference(s): AOI-4.1.2 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Facility Bank

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must assess plant conditions, determine failure present, and choose correct procedure

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	3	
	K/A #	045 A1.06	
	Importance Rating	3.3	

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: Expected response of secondary plant parameters following T/G trip.

Proposed Question: RO 88

Given the following conditions:

- The plant was operating at 78% power.
- All Service Water Cooling was lost.
- All Circulating Water pumps were tripped.
- All equipment functioned as designed.
- The CRS has directed transition to ES-0.1, Reactor Trip Response

Which ONE (1) of the following describes the approximate Tavg 10 minutes following the reactor trip?

- A. 541°F
- B. 547°F
- C. 550°F
- D. 555°F

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Low Tave interlock
- B. Incorrect. Normal temperature at no load
- C. Correct

D. Incorrect. Safety Valve heat removal not required

Technical Reference(s): Steam Tables (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

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

Learning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.24	
	Importance Rating		3.7

Knowledge of loss of cooling water procedures.

Proposed Question: SRO 88

Given the following conditions:

- The plant is at 26% power during a plant startup
- Service Water is in 3 header operation
- 11 River Water pump is supplying Conventional loads

Subsequently, 11 River Water pump trips. The team enters AOI-24.1, Service Water System Malfunction.

- NEITHER River Water pump can be started

Which ONE (1) of the following actions is required by AOI-24.1?

- A. Shift Service Water System operation to 2 header in accordance with AOI-24.1
- B. Commence a plant shutdown in accordance with POP-3.1
- C. Trip the Turbine and go to AOI-24.4.6, Main Turbine Trip Without a Reactor Trip
- D. Trip the reactor and go to E-0, Reactor Trip or Safety Injection

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. No RW pumps, trip reactor
- B. Incorrect. No RW pumps, trip reactor
- C. Incorrect. Power too high.
- D. Correct

Technical Reference(s): AOI-24.1 (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:**

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

10 CFR Part 55 Content:	55.41	
	55.43	x

**Comments:**

10cfr55.43(B) Item 5 because the SRO must assess plant conditions and determine a course of action in accordance with facility procedures

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	3	
	K/A #	076 K2.01	
	Importance Rating	2.7	

**Knowledge of bus power supplies to the following: Service water.**

**Proposed Question: RO 89**

Which ONE (1) of the following states the power supply(s) to 24 Service Water Pump?

- A. Bus 6A
- B. Bus 2A or 3A
- C. Bus 5A or 12RW3
- D. Bus 6A or 12RW3

**Proposed Answer: C**

**Explanation (Optional):**

- A. Incorrect.  
B. Incorrect  
C. Correct  
D. Incorrect

Technical Reference(s): **SYS-C-240** (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE



Learning Objective: 392b (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.12	
	Importance Rating		3.9

Knowledge of general operating crew responsibilities during emergency operations.

Proposed Question: SRO 89

Given the following conditions:

- Reactor has tripped and SI is initiated.
- Due to some ECCS problems, core cooling is diminished.
- The crew is performing the actions of E-1, Loss of Reactor Coolant.
- RCS pressure is 1400 psig and stable.
- PZR level is off-scale low.
- All SG NR levels are between 15-20%.
- 21, 22, 23 SG pressures are approximately 1020 psig and stable.
- 24 SG pressure is 1140 psig and slowly rising.

Which ONE (1) of the following describes the appropriate action?

FR-H.2, Response to Steam Generator Overpressure,....

- A. MUST be entered and performed until 24 SG pressure is returned to within limits or until a higher priority condition develops.
- B. MAY be entered at CRS discretion. If entered, it MUST be performed to completion.
- C. MUST be entered and performed to completion unless a higher priority condition exists.
- D. MAY be entered or exited at CRS discretion.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. Yellow condition not mandatory
- B. Incorrect. Not mandatory to finish
- C. Incorrect. Not mandatory
- D. Correct.

Technical Reference(s): OAD 27 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO has to choose the correct action based upon the condition presented

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	3	
	K/A #	008 K3.01	
	Importance Rating	3.4	

Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following: Loads cooled by CCWS.

**Proposed Question: RO 90**

TCV-130, Component Cooling Water Return from the Non-Regenerative Heat Exchanger Temperature Control Valve, fails due to a broken air line.

Assuming no action by the team, which ONE (1) of the following describes the effect of this failure on the plant?

- A. Letdown temperature goes up; the rise in letdown temperature causes the letdown demineralizers to remove less boron, resulting in a minor dilution.
- B. Letdown temperature goes down; the decrease in letdown temperature causes the letdown demineralizers to remove more boron, resulting in a minor boron dilution.
- C. Letdown temperature goes up; the rise in letdown temperature causes the letdown demineralizers to remove less boron, resulting in a minor boration.
- D. Letdown temperature goes down; the decrease in letdown temperature causes the letdown demineralizers to remove more boron, resulting in a minor boron boration.

**Proposed Answer: B**

**Explanation (Optional):**

- A. Incorrect. Temp goes down due to valve failing open
- B. Correct
- C. Incorrect. Temp goes down
- D. Incorrect. No boration with boron removal

**Technical Reference(s):** SYS-C-030 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONELearning Objective: 80a, 80b (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	E10 G2.4.50	
	Importance Rating		3.3

Ability to identify system alarm setpoints and operate controls identified in the alarm response manual

Proposed Question: SRO 90

Given the following conditions:

- A reactor trip has occurred due to a loss of off-site power.
- RCPs are tripped.
- The team is performing actions of ES-0.2, Natural Circulation Cooldown.
- RVLIS is NOT available.
- The crew has commenced RCS depressurization to 1890 psig.
  - RCS pressure is 2080 psig and Trending DOWN.
  - RCS Tavg is 548°F and STABLE.
  - PRESSURIZER LOW LEVEL, on panel SAF, has alarmed.
  - Pressurizer Level is 5% and Trending DOWN.

Which ONE (1) of the following actions will be required?

- A. Continue depressurization to 1890 psig and block SI.
- B. Initiate Safety Injection and go to E-0, Reactor Trip or Safety Injection.
- C. Stop the cooldown, Block SI, and initiate depressurization to 1890 psig.
- D. Stop the depressurization and go to ES-0.4, Natural Circulation with Steam Void in Vessel, without RVLIS.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Continuous Action requires SI initiation
- B. Correct.
- C. Incorrect. SI blocked when 1890 psig is reached.
- D. Incorrect. If steam voids were formed, they would cause pressurizer level to rise, not drop.

Technical Reference(s): ES-02, Foldout (Attach if not previously provided)  
ARP-SAF  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: \_\_\_\_\_ (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

10CFR55.43(b) item 5 because the SRO must assess plant conditions and determine a course of action in accordance with procedures

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.2	
	Importance Rating		

Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: RO 91

OAD-15, Policy for Conduct of Operations, describes the Departure From License Conditions or deviation from Technical Specifications which can be invoked to protect the health and safety of the public.

Which ONE (1) of the following conditions must ALWAYS be met when departing from a license condition or technical specification in accordance with 10 CFR 50.54 (x) and (y)?

- A. The action must be necessary to prevent equipment damage.
- B. The action must be approved by a licensed SRO prior to taking the action.
- C. The NRC must be notified prior to the action and must concur with the action to be taken.
- D. The action must be approved by the Plant Manager when the action is necessary to protect plant personnel.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Protection of personnel and public is priority
- B. Correct.
- C. Incorrect. NRC does not have to concur
- D. Incorrect. Plant Manager approval not required

Technical Reference(s): OAD-15, Pg 46 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE



Learning Objective: Not available (As available)

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

Question History: Facility Bank  
Previous Audit  
Exam

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

10 CFR Part 55 Content: 55.41 X  
55.43                     

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	029 EA2.02	
	Importance Rating		4.4

Ability to determine or interpret the following as they apply to ATWS: Reactor trip alarm.

Proposed Question: SRO 91

Following a load rejection from 100% to 60% power, the crew is attempting to stabilize the plant.

- The RO reports that a 'Pressurizer Pressure High' first out annunciator on Panel FDF.
- Indications exist that the Pressurizer PORVs have opened
- Pressurizer pressure spiked to approximately 2370 psig and is now dropping rapidly
- The reactor and turbine remain on-line

Which ONE (1) of the following actions is required?

- A. Stabilize the plant at 60% power. Initiate boration for AFD control.
- B. Trip the reactor, enter E-0, Reactor Trip or Safety Injection
- C. Trip the reactor, enter FR-S.1, Response to Nuclear Power Generation/ATWS
- D. Verify the PORVs have closed. Close the PORV block valves. Monitor RCS pressure for Reactor Trip and Safety Injection initiation setpoints

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Past a trip setpoint
- B. Correct
- C. Incorrect. Wrong procedure to enter for trip
- D. Incorrect. Past trip setpoint. RCS high pressure

Technical Reference(s):

(Attach if not previously provided)

ARP SAFProposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must assess conditions and choose an appropriate course of action

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.12	
	Importance Rating	3.0	

Knowledge of surveillance procedures.

Proposed Question: RO 92

You have been directed to perform a Surveillance Test that is part of a Post Maintenance Test (PMT).

Which ONE (1) of the following describes a condition where a step in the Surveillance Test may be marked 'N/A'?

- A. To change the conditions or intent of the test.
- B. A precaution or limitation of a test is not applicable.
- C. To designate components that are not being used as part of the PMT.
- D. To identify required components that are out of service during the performance of a test.

Proposed Answer: C

Explanation (Optional):

- A. Incorrect. Using N/A to change conditions or ignore precautions is forbidden.
- B. Incorrect. Using N/A to change conditions or ignore precautions is forbidden.
- C. Correct. N/A should be used when performing partial STs to designate components that will not be used in the ST
- D. Incorrect. If required equipment is OOS, the OOS should be marked next to the step as well as action taken in the ST 'comments' section

Technical Reference(s): Not available (Attach if not previously provided)  
OAD-3 for logs  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43                     

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	E08 EA2.1	
	Importance Rating		3.7

Ability to operate and/or monitor the following as they apply to the (Pressurized Thermal Shock): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Proposed Question: SRO 92

Given the following conditions:

- A LOCA has occurred.
- The team is performing actions contained in E-1, Loss of Reactor or Secondary Coolant.
- The following conditions currently exist:
  - All SI equipment is operating as required.
  - RCS pressure is 80 psig.
  - The Watch Engineer informs you of the following CSF Orange conditions:
    - Integrity
    - Containment

Which ONE (1) of the following describes the correct response to these indications?

- A. Enter FR-P.1, Response to Imminent Pressurizer Thermal Shock Condition. Take action to stop RCS cooldown and reduce RCS pressure. When directed, enter FR-Z.1, Response to High Containment Pressure.
- B. Enter FR-P.1, Response to Imminent Pressurizer Thermal Shock Condition. Ensure RHR flow is consistent with RCS pressure. Transition to FR-Z.1, Response to High Containment Pressure.
- C. Enter FR-Z.1, Response to High Containment Pressure. When action is complete, transition to FR-P.1, Response to Imminent Pressurizer Thermal Shock Condition. Take action to stop RCS cooldown and reduce RCS pressure, then return to E-1.
- D. Enter FR-Z.1, Response to High Containment Pressure. When action is complete, transition to FR-P.1, Response to Imminent Pressurizer Thermal Shock Condition. Ensure RHR flow is consistent with RCS pressure, then return to E-1.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. FR-P.1 actions do not apply if RCS pressure is low and RHR flow is high. A PTS event is not imminent
- B. Correct.
- C. Incorrect. FR-P.1 is higher priority than FR-Z.1
- D. Incorrect. FR-P.1 is higher priority than FR-Z.1

Technical Reference(s): FR-P.1 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 675 (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must evaluate conditions, determine appropriate procedure sequence, and also use of applicable procedures

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.1.18	
	Importance Rating	2.9	

Ability to make accurate, clear and concise logs, records, status boards, and reports.

Proposed Question: RO 93

A parameter requires a log reading once per hour.

The most recent reading was at 0600.

In accordance with OAD-3, Plant Surveillance and Log Keeping, which ONE (1) of the following states the EARLIEST and the LATEST times the reading may be taken next?

	<u>Earliest</u>	<u>Latest</u>
A.	0630	0730
B.	0645	0715
C.	0645	0730
D.	0630	0715

Proposed Answer: C

Explanation (Optional):

+30 minutes, -15 minutes

Technical Reference(s): OAD-3 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE



Learning Objective: Not Available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	059 AA2.02	
	Importance Rating		3.9

Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: The permit for liquid radioactive-waste release.

Proposed Question: SRO 93

You are preparing a Liquid Waste Release Permit in accordance with SOP-5.1.5, Calculation and Recording of Liquid Radioactive Waste Releases.

R-54, liquid effluent process monitor, fails its source check.

Which ONE (1) of the following describes the actions necessary to authorize the release?

- A. Chemistry must be requested to draw two independent samples. The release calculations must be independently verified prior to approval of the permit.
- B. Chemistry must be requested to draw two samples. The tank must be recirculated for an additional 8 hours. The time to release the tank and the volume released must be independently verified before the permit can be approved.
- C. The permit may not be approved until R-54 is restored to operable status. When operability is restored, the release may proceed without additional action if the tank to be released has remained isolated.
- D. The permit may not be approved until R-54 is restored to operable status. Volume of liquid to be released must be recirculated a minimum of 2 hours and all calculations performed prior to release.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. Recirc not required
- C. Incorrect. May approve permit if 2 independent samples are taken and analyzed, and independent calculation of release is performed
- D. Incorrect. Permit may approved subject to conditions

Technical Reference(s): SOP-5.1.5 (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)Question Source: Bank #   
Modified Bank #  (Note changes or attach parent)  
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X  
Comprehension or Analysis 10 CFR Part 55 Content: 55.41   
55.43 X

Comments:

10CFR55.43(b) item 4 because the SRO must understand the requirements for release to unrestricted waters

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.3.4	
	Importance Rating	2.5	

**Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.**

Proposed Question: RO 94

**Given the following conditions:**

- Reactor Power was at 100% when a LBLOCA occurred.
- A General Emergency has been in effect for 6 hours.

Which ONE (1) of the following is the TEDE limit for performing Life-Saving actions?

- A. 5 Rem  
B. 25 Rem  
C. 75 Rem  
D. 250 Rem

**Proposed Answer: B**

**Explanation (Optional):**

- A. Incorrect. Annual TEDE limit
- B. Correct. Lifesaving action 25 Rem
- C. Incorrect.
- D. Incorrect

Technical Reference(s): E-Plan (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	069 AA2.02	
	Importance Rating		4.4

Ability to determine and interpret the following as they apply to the Loss of Containment Integrity: Verification of automatic and manual means of restoring integrity.

Proposed Question: SRO 94

The Reactor Coolant System is in a reduced inventory condition and preparations are being made to detention the RV Head for eventual removal. Additional plant status information is as follows:

- RCS boron concentration is 2050 ppm
- Zone II of the Weld Channel & Penetration Pressurization System (WCPPS) was tagged out 48 hours ago
- Both doors of the 95' containment airlock are open to facilitate repairs of the WCPPS airlock seals
- One door of the 80' personnel airlock is properly closed
- Containment leakage was previously verified to be less than 0.2% of the containment free volume per day

Given the above plant conditions, which ONE (1) of the following describes a requirement that must be met prior to proceeding with the RV Head detentioning?

- A. Repair and properly close at least ONE door in the 95' personnel airlock.
- B. Verify the Isolation Valve Seal Water System (IVSWS) is OPERABLE.
- C. Verify the automatic containment purge and pressure relief isolation valves are set to limit travel to less than or equal to 60 degrees travel.
- D. Close the other door of the 80' personnel airlock.

Proposed Answer: A

Explanation (Optional):

- A. Correct.
- B. Incorrect. IVSW for Hot Shutdown and above

- C. Incorrect. Purge may be in operation in CSD  
D. Incorrect. Only 1 door required

Technical Reference(s): Tech Specs (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 2, Tech Spec requirement for containment integrity

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.14	
	Importance Rating	3.0	

Knowledge of general guidelines for EOP flowchart use.

Proposed Question: RO 95

Which ONE (1) of the following describes the EOP implementation hierarchy in the event of a reactor trip concurrent with a loss of AC power to all AC Emergency Busses?

- A. Enter ECA-0.0, Loss Of All AC Power directly. Suspend actions in ECA-0.0 and enter the appropriate FRP only upon a CSF Status Tree RED path condition.
- B. Enter ECA-0.0, Loss Of All AC Power directly and regardless of the CSF Status Trees, continue in ECA-0.0 until AC power is restored to at least one AC emergency bus.
- C. Transition to ECA-0.0, Loss Of All AC Power from E-0, Reactor Trip Or Safety Injection. Suspend actions in ECA-0.0 and enter the appropriate FRP only upon a CSF Status Tree RED path condition.
- D. Transition to ECA-0.0, Loss Of All AC Power from E-0, Reactor Trip Or Safety Injection. Suspend actions in ECA-0.0 and enter the appropriate FRP upon any CSF ORANGE or RED path condition.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Because no AC powered safeguards equipment is available, FRPs cannot be implemented. Remain in ECA-0.0 until power is restored.
- B. Correct.
- C. Incorrect. ECA-0.0 is entered directly.
- D. Incorrect. ECA-0.0 is entered directly.

Technical Reference(s): EOP User's Guide (Attach if not previously provided)



Proposed References to be provided to applicants during examination: NONE

Learning Objective: 650 (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	007 G2.1.14	
	Importance Rating		3.3

Conduct of Operations: Knowledge of system status criteria, which require the notification of plant personnel.

Proposed Question: SRO 95

Given the following conditions:

- The plant is in Refueling mode
- Refueling is in progress
- The Refueling SRO reports damage to an irradiated fuel assembly on the Refueling Crane mast
- R-41 and R-42, Containment Radiation monitors, are in alarm

Which ONE (1) of the following is required to be performed immediately in accordance with AOI-17.0.1, Irradiated Fuel Damage in Refueling Cavity?

- A. Evacuate Containment
- B. Start the Containment Recirculation Filter Fans
- C. Initiate a Containment Purge
- D. Move the assembly to a safe location that will not allow debris to fall into the core

Proposed Answer: A

Explanation (Optional):

- A. Correct
- B. Incorrect. Not with personnel in containment
- C. Incorrect. No purge with accident in progress
- D. Incorrect. Do not move the assembly until an evaluation is made

Technical Reference(s): AOI-17.0.1

(Attach if not previously provided)

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Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History:

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) items 4 and 5 because the SRO must know the requirements for evacuation of containment when high radiation exposure may result

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.34	
	Importance Rating	3.8	

Knowledge of RO tasks performed outside the main control room during emergency operations including system geography and system implications.

Proposed Question: RO 96

WHICH ONE of the following states the basic actions required to start 23 Charging Pump when a fire in the Control Room requires a plant shutdown using the Alternate Safe Shutdown Equipment?

- A. Transfer 23 Charging Pump to Alternate Feed using transfer switch on the Alternate Safe Shutdown Panel, place Local/Remote switch in Local, and start pump using local control switch in 23 Charging Pump Room.
- B. Transfer 23 Charging Pump to Alternate Feed in the 480 volt switchgear room, place the Local/Remote switch in Local in 23 Charging Pump Room, and start pump using local control switch in 23 Charging Pump Room.
- C. Transfer 23 Charging Pump to Alternate Feed at Bus 6A, place the Local Remote switch in Local at the breaker, and start pump using control switch in breaker cubicle.
- D. Transfer 23 Charging Pump to Alternate Feed using transfer switch in 80' PAB, place the Local/Remote switch in Local, and start pump using control outside 23 Charging Pump room.

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. No transfer switch at Alternate SD panel
- B. Incorrect. Transfer switch is not in switchgear room
- C. Incorrect. Alternate feed is transferred by a switch
- D. Correct

Technical Reference(s): AOI-27.1.9 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)Question Source: Bank # \_\_\_\_\_  
Modified Bank # X (Note changes or attach parent)  
New \_\_\_\_\_

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X  
Comprehension or Analysis \_\_\_\_\_10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	E03 EA1.02	
	Importance Rating		3.9

Ability to operate and/or monitor the following as they apply to the (LOCA Cooldown and Depressurization): Operating behavior characteristics of the facility.

Proposed Question: SRO 96

Given the following:

- A small break LOCA has occurred. The team is in ES-1.2, Post LOCA Cooldown And Depressurization.
- RCS subcooling is adequate. The team has determined that one SI pump can be stopped.

Which ONE (1) of the following explains what will happen to the value of subcooling when the selected SI pump is stopped?

- A. Lowers because break flow remains constant while ECCS flow is reduced. RCS temperature rises and stabilizes at a higher value.
- B. Lowers as RCS pressure lowers in response to reduced ECCS flow. Stabilizes at a lower value when break flow equals ECCS flow.
- C. Remains the same. Flow from the running SI pump rises, reaching a balance with break flow.
- D. Remains the same. RCS temperature rises in response to the reduced ECCS flow, but RCS pressure also rises.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. Temperature is controlled by steam dump and is not expected to rise.
- B. Correct.

- C. Incorrect. Subcooling is reduced as a result of lower ECCS flow.  
D. Incorrect. Temperature does not rise.

Technical Reference(s): ES-1.2 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: EOP-C-012, Objective 4 (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	E04 EK1.3	
	Importance Rating	3.5	

Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment): Annunciators and conditions indicating signals, and remedial actions associated with the (LOCA Outside Containment).

Proposed Question: RO 97

Which ONE (1) of the following Unit 2 Radiation Monitoring System channels in alarm will require action IAW ECA-1.2, LOCA Outside Containment?

- A. R-5, Fuel Storage Building area monitor
- B. R-46, Fan Cooler Service Water monitor
- C. R-45, Condenser Air Ejector effluent process monitor
- D. R-44, Plant Vent Radiogas monitor

Proposed Answer: D

Explanation (Optional):

- A. Incorrect. No connection to ECA-1.2, only fuel handling
- B. Incorrect. No connection to ECA-1.2, is a process alarm for service water
- C. Incorrect. E-3 transition criteria
- D. Correct. Indicates radiation in PAB

Technical Reference(s): ECA-1.2 (Attach if not previously provided)  
E-0



Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:

Level

RO

SRO

Tier #

1

Group #

2

K/A #

033 AA2.10

Importance Rating

3.8

Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Tech Spec limits if both IR channels have failed.

Proposed Question: SRO 97

Given the following conditions:

- Plant startup is in progress.
- Reactor Power is 6%
- The team is responding to a failure of Intermediate Range Channel N-35
- As Channel N-35 is being taken out of service, channel N-36 fails off-scale low

Which ONE (1) of the following actions, if any, is required by Technical Specifications?

- A. Intermediate Range NIs are NOT required. Power ascension may continue.
- B. Maintain reactor power between the  $10^{-10}$  amps and 10% power until at least 1 Intermediate Range channel is declared operable.
- C. Immediately raise power above 10%. Do not reduce power to less than 10% until 1 Intermediate Range channel is operable
- D. Immediately reduce power to below  $10^{-10}$  amps and be in Hot Shutdown with reactor trip breakers open within 6 hours

Proposed Answer: A

Explanation (Optional):

- A. Correct
- B. Incorrect. Lose both channels, must immediately initiate a shutdown
- C. Incorrect. Do not raise power
- D. Incorrect. No statement about IR power, must go to HSD

*Delete question!  
No correct answer  
See post exam  
analysis given 4/10/03*

Technical Reference(s): TS 3.5.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

**Learning Objective:** Not available (As available)

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

**Question History:**

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

10 CFR Part 55 Content:	55.41	
	55.43	X

Comments:

10CFR55.43(b) item 2 because the SRO must apply TS for instrumentation that is required but inoperable

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	E02 EA2.2	
	Importance Rating	3.0	

Ability to determine and interpret the following as they apply to the (Reactor Trip Recovery): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

Proposed Question: RO 98

Given the following conditions:

- A Steam Line Break has occurred.
- All equipment actuated as required.
- The team has isolated the faulted steam generator.
- The CRS has directed transition to ES-1.1, SI Termination.
- SI, CIA, and CIB have been reset.
- RCS pressure is 1775 psig and rising slowly.
- Normal Charging has NOT yet been established
- There are no other indications of RCS leakage.

Which ONE (1) of the following describes the sequence of steps that will stop SI pumps?

- A. Stop SI and RHR pumps  
Establish Charging  
Verify SI flow not required
- B. Stop 1 SI pump  
Check RCS pressure stable and establish Charging  
Stop 1 RHR pump. Ensure RCS pressure remains stable, then stop the second RHR pump
- C. Establish Charging  
Check RCS pressure stable and stop 1 SI pump  
Verify SI flow not required and stop BOTH RHR pumps
- D. Establish Charging  
Check RCS pressure stable and stop 1 SI pump  
Stop 1 RHR pump. Ensure RCS pressure remains stable, then stop the second RHR pump

Proposed Answer: A

Explanation (Optional):

- A. Correct. All pumps stopped, charging established, verification after
- B. Incorrect. Describes part of an SI flow reduction sequence
- C. Incorrect. Flow reduction sequence out of order
- D. Incorrect. Flow reduction sequence out of order

Technical Reference(s): ES-1.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 X  
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	037 G2.2.22	
	Importance Rating		4.1

Equipment Control: Knowledge of limiting conditions for operations and safety limits.

Proposed Question: SRO 98

Given the following conditions:

- A plant startup is in progress.
- The latest RCS leak rate data indicates the following:
  - 0.98 UNIDENTIFIED leakage to Containment atmosphere
  - 2.4 gpm total Pressure Isolation Valve leakage. The maximum leakage from one valve is 0.39 gpm.
  - 21 SG - 0.091 gpm
  - 22 SG - 0.098 gpm
  - 23 SG - 0.088 gpm
  - 24 SG - 0.118 gpm

Using the attached Technical Specification reference, which ONE (1) of the following leakage limits, if any, is being exceeded?

- A. Unidentified
- B. Primary-to-Secondary
- C. Pressure Isolation Valve
- D. All leakage is less than Technical Specification limits

Proposed Answer: B

**Explanation (Optional):**

- A. Incorrect. Unidentified leakage limit is 1 gpm.
- B. Correct. 24 SG leakage is greater than 150 gpd (.118 gpm)
- C. Incorrect. PIV leakage is 5 gpm. Action starts at 0.5 gpm per inch of diameter. At this leakage, no valve exceeds that amount.
- D. Incorrect. 24 SG is above the leakage limit.

Technical Reference(s): T.S. 3.1.F (Attach if not previously provided)

**Proposed References to be provided to applicants during examination: T.S. 3.1.F**

**Learning Objective:** Not available (As available)

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

Question History: Vendor Bank Previous NRC

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

10 CFR Part 55 Content:	55.41	
	55.43	X

**Comments:**

10CFR55.43(b) item 2 because the SRO must know and apply TS entry conditions for RCS leakage

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	058 AK3.02	
	Importance Rating	4.0	

Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Actions contained in EOP for loss of DC power.

Proposed Question: RO 99

Given the following conditions:

- Battery Charger 21 is de-energized.
- The Battery is supplying power to DC Bus 21
- A TFC is being prepared to align a Unit 1 Battery Charger to DC Bus 21

Which ONE (1) of the following describes the reason for aligning a Unit 1 Charger to a Unit 2 DC Bus?

- A. Allows for isolation of a fault on the DC bus without affecting an operable charger
- B. Prevents degradation of a battery supplying power to a DC bus
- C. Maintains Technical Specification operability requirements for DC power systems if a Unit 2 charger is out of service
- D. Provided for use only when both the Battery and Charger are inoperable and there is no other power available to the DC bus

Proposed Answer: B

Explanation (Optional):

- E. Incorrect. Would not connect it to a faulted bus
- F. Correct
- G. Incorrect. Does not satisfy TS requirements
- H. Incorrect. Provided when charger may be OOS for extended period to preserve battery life



Technical Reference(s): AOI-27.1.11 (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: NONELearning Objective: Not available (As available)Question Source: Bank #   
Modified Bank #  (Note changes or attach parent)  
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X  
Comprehension or Analysis 10 CFR Part 55 Content: 55.41 X  
55.43 

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	_____	1
	Group #	_____	2
	K/A #	E11 EK1.2	_____
	Importance Rating	_____	4.1

Knowledge of the operational implications of the following concepts as they apply to the (Loss of Emergency Coolant Recirculation):  
Normal, abnormal and emergency operating procedures associated with (Loss of Emergency Coolant Recirculation).

Proposed Question: SRO 99

Given the following conditions:

- A LOCA has occurred.
- While performing E-1, Loss of Reactor Coolant, the crew determines that recirculation capability is NOT available
- The crew enters ECA-1.1, Loss of Emergency Coolant Recirculation.
- A cooldown has been initiated as directed in ECA-1.1.

Based on current plant conditions, which ONE (1) of the following conditions requires transition from ECA-1.1?

- A. An ORANGE condition on the Core Cooling CSF Status Tree.
- B. RWST level has DECREASED to less than 2 feet.
- C. RWST LO-LO Level alarm actuates.
- D. RCPs have been started and CET's are lowering.

Proposed Answer: A

Explanation (Optional):

A is correct. Although ES-1.3 has instructions not to implement FRPs ECA-1.1 lifts the restriction. RED and orange path procedures are required to be implemented. B,C,D are all incorrect. They are actions or action initiating but do not result in transition out of ECA-1.1.

Technical Reference(s): ECA-1.1 (Attach if not previously provided)  
Proposed References to be provided to applicants during examination: NoneLearning Objective: Not available (As available)Question Source: Bank # X  
Modified Bank #  (Note changes or attach parent)  
New 

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or AnalysisX10 CFR Part 55 Content: 55.41 X  
55.43 

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	E05 G2.4.6	
	Importance Rating	3.1	

Emergency Procedures/Plan: Knowledge of symptom based EOP mitigation strategies.

Proposed Question: RO 100

A reactor trip has occurred due to a loss of feedwater.

The following conditions exist:

- The team has entered FR-H.1, Response To Loss of Secondary Heat Sink.
- RCS pressure is 2240 psig.
- SG pressure is 1040 psig.
- SG levels are 65% wide range and slowly trending down.
- Total AFW flow is 0 gpm.

Which ONE (1) of the following actions is performed next?

- A. Attempt to establish AFW flow.
- B. Trip RCPs and establish bleed and feed cooling of the RCS.
- C. Return to E-1, Loss Of Reactor Or Secondary Coolant for the LOCA in progress.
- D. Depressurize SG's and initiate feed using the condensate pumps.

Proposed Answer: A

Explanation (Optional):

- A. Correct.

- B. Incorrect. Action only required if average of 3 lowest SG WR levels are less than 45%  
C. Incorrect. No LOCA indicated. RCS pressure is greater than SG pressures.  
D. Incorrect. Action may be taken if AFW cannot be restarted and MFW cannot be started.

Technical Reference(s): FR-H.1 (Attach if not previously provided)

\_\_\_\_\_  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 694 (As available)

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

Question History: Vendor Bank, Previous NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge  
Comprehension or Analysis

X

10 CFR Part 55 Content: 55.41 X  
55.43 \_\_\_\_\_

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		3
	K/A #	036 G2.2.28	
	Importance Rating		3.5

Equipment Control: Knowledge of new and spent fuel movement procedures.

Proposed Question: SRO 100

Given the following:

- Unit 2 is in a refueling shutdown
- As the Refueling SRO you are on the refueling bridge in containment directing fuel movement operations
- The spent fuel assembly in the mast has just been pulled from the core and is being moved toward the upender.
- SPENT FUEL PIT LEVEL 6" (SGF 2-2) has actuated
- The control room operator informs you that the alarm has been verified as a low level in the Spent Fuel Pit

What is the proper location for storing the assembly currently in the mast?

- A. Place it in any safe location on the Refueling Cavity floor.
- B. Place it in the containment upender, in the horizontal position.
- C. Place it in any vacant location in the Spent Fuel Pool.
- D. Place it in the RCC Change fixture.

Proposed Answer: B

Explanation (Optional):

- A. Incorrect. The assembly would be difficult to recover, and may become uncovered.
- B. Correct. AOI-17.0.5 and 17.0.3 require that the assembly be place in an appropriate storage location. In this condition the upender is the most appropriate storage location.
- C. Incorrect. With level decreasing, the immediate concern is to lower the assembly and isolate containment from SFP if possible.
- D. Incorrect. Assembly could become uncovered in this location.

Technical Reference(s): AOI-17.0.5 (Attach if not previously provided)  
AOI-17.0.3  
\_\_\_\_\_

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 319 (As available)

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

Question History: Facility Bank Previous NRC

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 X

Comments:

10CFR55.43(b) item 6, 7 because the SRO must know the requirements for procedure use during fuel handling accidents