

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	007.EK2.03	
	Importance Rating	3.8	

**Question 1:**

Unit 1 was operating at 100% power when an event occurred. The Reactor Operator reports the following indications immediately after the event:

Bistable Monitoring Panel (BSMP)

- Train R Rx Trip Breaker bistable light is LIT
- Train S Rx Trip Breaker bistable light is OUT

Digital Rod Position Indication

- Control Rods K14 and M2 are at 259 steps
- All other Control Rod bottom lights are lit

Excure Nuclear Instruments

- SUR is slightly negative

Based on these indications, the appropriate FIRST operator action would be to:

- A. Go to 0POP05-EO-FRS1, Response to Nuclear Power Generation – ATWS
- B. Go to 0POP05-EO-EO00, Reactor Trip or Safety Injection
- C. Manually insert control rods K14 and M2
- D. Commence Emergency Boration

**Answer:**         B        

**Explanation** (Optional):

Candidate must analyze conditions and determine that a reactor trip has occurred (only requires 1 of 2 trip breakers to open). Thus, the immediate actions of 0POP05-EO-EO00 must be completed prior to transitioning to another procedure or action. Answer 'B' is the only correct answer.

**Technical Reference:**         0POP05-EO-EO00, Reactor Trip Or Safety Injection (Rev 17)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<b>10</b>
	<b>55.43</b>	<hr/>

**Comments:**

KA: 007 Reactor Trip, EK2.03 – Knowledge of the interrelations between a reactor trip and the following – Reactor trip status panel

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	008.AA1.04	
	Importance Rating	2.8*	

**Question 2:**

Given the following conditions:

- Unit 1 was at 100% power when a Pressurizer PORV opened and stayed open
- AFW Pump 11 has failed to start and cannot be started from the Control Room
- The crew is performing the actions of OPOP05-EO-EO10, Loss of Reactor or Secondary Coolant
- All SG levels are less than 14 % NR

Which ONE of the following describes the required operator actions of OPOP05-EO-EO10 regarding failure of AFW # 11 to start?

- A. Locally start AFW Pump 11 in order to feed SG 1A
- B. Manually start MFW Pump 11 in order to feed SG 1A
- C. Isolate SG 1A while maintaining AFW flow to SGs 1B, 1C, and 1D
- D. Cross connect operating AFW pumps to feed SG 1A

**Answer:**         D        

**Explanation** (Optional):

OPOP05-EO-EO10, Step 8 states IF any AFW fails to start, THEN a) reset all SG LO-LO Level AFW actuations, b) close applicable AFW Reg Valve, c) open applicable AFW cross connects, d) control AFW flow to < 675 gpm per AFW pump.

**Technical Reference:**         OPOP05-EO-EO10, Loss of Reactor or Secondary Coolant (Rev 17, page 8 of 26)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 008 PZR Vapor Space Accident, AA1.04 – Ability to operate and/or monitor the following as they apply to the PZR Vapor Space Accident: Feedwater pumps

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	009.G2.1.25	
	Importance Rating	2.8	

**Question 3:**

A SBLOCA has occurred on Unit 1. Operators have transitioned to 0POP05-EO-ES12, Post LOCA Cooldown and Depressurization, and are currently at Step 5: Shutdown Margin – RCS Cb GREATER THAN OR EQUAL TO SHUTDOWN MARGIN LIMIT PER PLANT CURVE BOOK FIGURE 5.5, 68 °F CURVE

Plant conditions:

- RCS pressure is 450 psig and slowly rising
- Highest core exit thermocouple is 450 °F
- Cycle Burnup is 12,000 MWD/MTU

Using the attached figure, what is the minimum boron concentration (ppm) the RCS should be borated to ensure adequate Shutdown Margin for this step?

- A. 1068 ppm
- B. 1207 ppm
- C. 1259 ppm
- D. 1404 ppm

**Answer:**         D        

**Explanation** (Optional):

- A. Incorrect - this number corresponds to the 500 °F curve, one column to the right of 450 °F
- B. Incorrect - this number corresponds to the 450 °F curve
- C. Incorrect - this number corresponds to the 400 °F curve, one column to the left of 450 °F
- D. Correct - this number corresponds to the 68 °F curve at 12,000 MWD/MTU

**Technical Reference:** 0POP05-EO-ES12, Post LOCA Cooldown and Depressurization  
(Rev 11);  
Unit 1 Plant Curve Book, Figure 5.5 (Unit 1, Cycle 13)

**References to be provided to applicants during examination:**

Unit 1 Plant Curve Book Figure 5.5 (Shutdown Margin Limit Curve) as part of separate reference package.

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_  
**Cognitive Level:** Memory or Fundamental Knowledge \_\_\_\_\_  
Comprehension or Analysis     X      
**10 CFR Part 55 Content:** **55.41**     10      
**55.43** \_\_\_\_\_

**Comments:**

KA: 009 Small Break LOCA, G2.1.25 – Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	011.EA2.08	
	Importance Rating	3.4*	

**Question 4:**

In accordance with OPOP05-EO-EO10, Loss of Reactor or Secondary Coolant, which ONE of the following describes the post-LOCA condition that must be met to enter OPOP05-EO-ES13, Transfer to Cold Leg Recirculation?

- A. RCS pressure < 415 psig with LHSI flow > 500 gpm
- B. Containment Wide Range Water Level > 59"
- C. RWST level less than 14% (75,000 gal.)
- D. Two trains of HHSI/LHSI verified capable of Cold Leg Recirculation

**Answer:**         C        

**Explanation** (Optional):

- A. Incorrect - Step 21 checks RCS pressure to determine if RCS cooldown and depressurization is required.
- B. Incorrect - containment water level not an entry condition to ES13.
- C. Correct - Step 22 states that if this condition is met, then go to ES13
- D. Incorrect - Step 20 states that one train of EITHER HHSI OR LHSI must be verified available but is not used as a transition criteria

**Technical Reference:**         OPOP05-EO-EO10, Loss of Reactor or Secondary Coolant (Rev 17)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 011 Large Break LOCA, EA2.08 – Ability to determine or interpret the following as they apply to a Large Break LOCA: Conditions necessary for recovery when accident reaches stable phase

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		015/017.AA2.08	
Importance Rating		3.4	

**Question 5:**

Given the following conditions:

- Unit 1 is operating at 100% power
- Annunciator 05M2 Window C2, RCP 1B UPPR OIL RSVR LVL HI/LO alarm annunciates
- All other RCP parameters indicate normal values

Which ONE of the following actions should be taken?

- A. Trip the Reactor, then secure RCP 1B to prevent imminent bearing failure.
- B. Continue RCP 1B operation. Start the RCP 1B Oil Lift Pump. No further action is required unless additional alarms occur on RCP 1B.
- C. Reduce reactor power to < 40% in accordance with 0POP04-TM-0005, Rapid Load Reduction, then secure RCP 1B.
- D. Continue RCP 1B operation. Enter 0POP04-RC-0002, Reactor Coolant Pump Off Normal, and monitor RCP 1B parameters until a containment entry can be made.

**Answer:**           D          

**Explanation** (Optional):

0POP09-AN-05M2 has the operator check RCP bearing temps and vibration less than trip setpoints. Since given conditions state all other RCP parameters indicate normal values, then operator is to monitor RCP trip, continue RCP operation, and check oil level as soon as possible.

- A. Incorrect – No RCP trip setpoint has been exceeded
- B. Incorrect – Procedures do not require starting Oil Lift Pump
- C. Incorrect – Since RCP can continue to operate, no power reduction is required
- D. Correct – Actions are correct per annunciator response instructions

0POP04-RC-0002, Reactor Coolant Pump Off Normal (Rev 22)

**Technical Reference:** 0POP09-AN-05M2, Annunciator Lampbox 5M02 Response Instructions (Rev 28, Window C-2)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

<b>Cognitive Level:</b>	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	<u>    X    </u>
<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<u>    10    </u>
	<b>55.43</b>	_____

**Comments:**

KA: 015/017 RCP Malfunctions, AA2.08 – Ability to determine and interpret the following as they apply to the RCP Malfunctions (Loss of RC Flow): When to secure RCPs on high bearing temperature

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		022.AK3.03	
Importance Rating		3.1*	

**Question 6:**

When placing Excess Letdown in service and flushing to the RCDT, in accordance with OPOP02-CV-0004, Chemical and Volume Control Subsystem, why should caution be observed when establishing Excess Letdown flow when RCDT level is NOT low in the band?

- A. To prevent damage to the CCW side of the Excess Letdown Heat Exchanger.
- B. To prevent damage to the Seal Water Return Filter caused from overpressure.
- C. To prevent lifting the RCDT pressure relief valve.
- D. To prevent cavitating the RCDT pump(s).

**Answer:**         C        

**Explanation** (Optional):

The procedure used to place Excess Letdown in service contains a CAUTION that states the RCDT pressure relief valve may lift if the level is **NOT** low in the RCDT band prior to placing Excess Letdown in service. Thus, C is the correct answer.

**Technical Reference:**         OPOP02-CV-0004, CVCS Subsystem (Rev 37, Section 13)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 022 Loss of Reactor Coolant Makeup, AK3.03 – Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: Performance of lineup to establish excess letdown after determining need.

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		026.AA1.06	
Importance Rating		2.9	

**Question 7:**

Unit 2 is operating in Mode 1 with the following CCW pump lineup:

- Pump 2A – running
- Pump 2B – standby
- Pump 2C - tagged out for maintenance

A failure of Pump 2A discharge valve causes it to drift partially closed then stops. Header pressure drops to 85 psig. Which ONE of the following describes the system response an operator would expect? (Assume Normal Letdown is in service.)

- Letdown flow diverts to the Recycle Holdup Tank (RHUT)
- Initial rise then return to normal in letdown temperature downstream of the Letdown Heat Exchanger
- Initial rise then return to normal in letdown temperature downstream of the Seal Water Heat Exchanger
- Letdown flow diverts to the RCDT

**Answer:**     B    

**Explanation** (Optional):

As Pump 2A discharge valve partially closes, discharge header pressure will drop causing reduced CCW flow to the letdown system components cooled by CCW. Since discharge header pressure does not reach the setpoint to start the standby pump (76 psig), the lower flow condition will remain.

A - Incorrect. This would occur if VCT level were to get too high.

B - Correct. Lowering CCW flow will cause letdown temp to rise, then as TV-4494 opens, the temperature will return to normal.

C - Incorrect. A temp controlled valve does not control CCW flow to the Seal Water Heat Exchanger so temp will rise and remain at the higher temperature.

D - Incorrect - Excess Letdown can be diverted to the RCDT but not Normal Letdown.

**Technical Reference:** LOT201.06.HO.01, CVCS Student Handout (Rev 12);  
 LOT201.12.HO.01, CCW Student Handout (Rev 11);  
 P&ID 5R209F05020 Sh 1 (CCW)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # \_\_\_\_\_

Modified Bank # \_\_\_\_\_ (Note changes or attach parent)

New     X    

**Question History:** Last NRC Exam \_\_\_\_\_

**Cognitive Level:** Memory or Fundamental Knowledge \_\_\_\_\_

Comprehension or Analysis     X    

**10 CFR Part 55 Content:** **55.41**     7    

**55.43** \_\_\_\_\_

**Comments:**

KA: 026 Loss of Component Cooling Water, AA1.06 – Ability to operate and/or monitor the following as they apply to the Loss of Component Cooling Water: Control of flow rates to components cooled by the CCWS



**Comments:**

KA: 027 Pressurizer Pressure Control Malfunction, G2.2.24 – Ability to analyze the affect of maintenance activities on LCO status

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		029.EK1.03	
Importance Rating		3.6	

**Question 9:**

A plant transient has occurred. The crew is performing OPOP05-EO-FRS1, Response to Nuclear Power Generation - ATWS. The normal method of Emergency Boration in FRS1 cannot be used. The crew is borating using the normal method of boration.

Complete the following statement: "Negative reactivity will be added to the reactor MORE RAPIDLY if the operator \_\_\_\_\_."

- A. bypasses the letdown demineralizer.
- B. closes one of the RMW non-essential header isolation valves.
- C. increases the boric acid flow controller setpoint.
- D. decreases the boric acid flow controller setpoint.

**Answer:**     C    

**Explanation** (Optional):

The statement in the stem concerning the method of boration is necessary since the way Emergency Boration is done in FRS1 bypasses the boric acid flow controller, thus changing the setpoint for this controller would have no effect in this situation.

Answer A is incorrect because bypassing the demineralizer will have no effect on the rate of boron addition or deletion to the reactor. Answer B is incorrect because closing one of the isolation valves will reduce the chance of a boron dilution event. Answer D is incorrect because decreasing the setpoint will reduce the rate of boron addition to the reactor. Answer C is correct because this will increase the rate of boron addition to the reactor thereby adding negative reactivity at a faster rate.

**Technical Reference:**     OPOP05-E0-FRS1, Response to Nuclear Power Generation – ATWS (Rev 14)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<b>5</b>
	<b>55.43</b>	

**Comments:**

KA: 029 ATWS, EK1.03 - Knowledge of the operational implications of the following concepts as they apply to ATWS: Effects of boron on reactivity.

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		038.EK1.02	
Importance Rating		3.2	

**Question 10:**

Given the following conditions for Unit 1:

- A SGTR has occurred on SG 1A
- The required cooldown has been completed per 0POP05-EO-EO30, Steam Generator Tube Rupture
- RCS Subcooling is 75 °F
- PZR Pressure = 1600 psig
- RCPs are operating
- SG 1A pressure = 1020 psig and slowly rising
- SG 1B, 1C, 1D pressures = 675 psig

What action should now be performed to minimize leakage flow from the RCS to the ruptured SG in accordance with EO30?

- Open one PZR PORV
- Increase feedwater flow to SGs 1B, 1C, and 1D
- Initiate normal PZR spray
- Lower the Steam Dump no-load reference pressure setpoint

**Answer:**         C        

**Explanation** (Optional):

After the required cooldown, EO30, Step 19, directs the operator to depressurize the RCS to minimize break flow and refill the PZR. This is accomplished using normal pressurizer spray if available. If not available, then use Aux Spray. If Aux Spray not available, then use one PZR PORV.

A: Incorrect. The given conditions include RCPs are running thus normal PZR spray is available.

B: Incorrect. AFW flow is maintained to the intact SGs between 22-50% during the cooldown. Increasing AFW flow to the SGs would transfer more heat from the RCS and lower RCS pressure, but this is not the required method.

C: Correct.

D: Incorrect. Lowering the no-load reference setpoint would cooldown the RCS and thus lower RCS pressure, however the stem states the required cooldown is completed.

**Technical Reference:** 0POP05-EO-EO30, SG Tube Rupture (Rev 16, page 20 of 40)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 038 Steam Generator Tube Rupture, EK1.02 – Knowledge of the operational implications of the following concepts as they apply to SGTR: Leak rate vs. pressure drop

One distractor changed to reflect STP procedure guidance and make it more plausible (replaced 'Terminate SI and stop SI pumps' with 'Open one PZR PORV')

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		040.AA1.10	
Importance Rating		4.1	

**Question 11:**

While Unit 1 was operating at 100% power, a main steam line break occurred upstream of the Main Steam Isolation Valve for SG 1D. After completing the applicable steps of 0POP05-EO-EO00, the Shift Supervisor announced transition to 0POP05-EO-EO20, Faulted Steam Generator Isolation.

What operator actions are required to isolate AFW to the faulted SG per 0POP05-EO-EO20?

- A. Reset SI; reset SG LO-LO level AFW actuations; trip turbine driven AFW pump, verify automatic closure of AFW OCIV for SG 1D
- B. Reset SI; reset SG LO-LO level AFW actuations; trip turbine driven AFW pump; manually close AFW OCIV for SG 1D
- C. Verify automatic closure of FWIV, FWIB, FW Preheater Bypass, FRV and LPFRV valves for SG 1D
- D. Manually close FWIV, FWIB, FW Preheater Bypass, FRV and LPFRV valves for SG 1D

**Answer:**           B          

**Explanation** (Optional):

- A. Incorrect - AFW OCIV for SG 1D does not close automatically
- B. Correct - Step 4 of Tech Ref identifies five actions to isolate AFW to affected SG
- C. Incorrect - These steps are required to isolate Main FW to affected SG
- D. Incorrect - Identified valves are for Main FW, and these are closed automatically

**Technical Reference:**           0POP05-EO-EO20, Faulted SG Isolation (Rev 8, Step 4b)          

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:**       55.41             10        
      55.43

**Comments:**

KA: 040 Steam Line Rupture, AA1.10 – Ability to operate and/or monitor the following as they apply to Steam Line Rupture: AFW system

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		054.AA1.04	
Importance Rating		4.4	

**Question 12:**

The control room operators are responding to a RED condition on the heat sink status tree. While they attempt to restore feed flow to a steam generator, conditions degrade to the point that "RCS bleed-and-feed" must be established.

In accordance with 0POPO5-EO-FRH1, Response to Loss of Secondary Heat Sink, which ONE of the following identifies the normal method of "RCS bleed and RCS feed" AND in the correct order they are to be established?

- A. RCS bleed is established via PZR PORVs, then RCS feed is established via HHSI pumps
- B. RCS feed is established by HHSI pumps, then RCS bleed is established via PZR PORVs
- C. RCS bleed is established via Reactor Vessel Head Vents, then RCS feed is established via Coolant Charging Pumps
- D. RCS feed is established via Coolant Charging Pumps, then RCS bleed is established via Reactor Vessel Head Vents

**Answer:**         B        

**Explanation** (Optional):

As explained in LOT504.33, an effective high pressure feed path is needed and at least one HHSI Pump is running before establishing the RCS bleed path. The RCS bleed path should not be established until the RCS feed path is established; otherwise severe core uncover will occur.

**Technical Reference:** 0POPO5-EO-F003, Heat Sink Critical Safety Function Status Tree (Rev 5);  
 0POPO5-EO-FRH1, Response to Loss of Secondary Heat Sink (Rev 14);  
 LOT504.33, Lesson Plan for Response to Loss of Secondary Heat Sink (Rev 9, page 12)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

<b>Cognitive Level:</b>	Memory or Fundamental Knowledge	<u>    X    </u>
	Comprehension or Analysis	<u>          </u>
<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<u>    10    </u>
	<b>55.43</b>	<u>          </u>

**Comments:**

KA: 054 Loss of Main Feedwater, AA1.04 – Ability to operate and/or monitor the following as they apply to Loss of Main Feedwater: HPI, under total feedwater loss conditions

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		055.EK3.02	
Importance Rating		4.3	

**Question 13:**

Unit 1 has experienced a loss of all AC Power. The crew is implementing OPOP05-EO-EC00, Loss of All AC Power, which requires certain actions be accomplished prior to transitioning to the next applicable EOP.

Which ONE of the following actions is required prior to transitioning from OPOP05-EO-EC00 AND why?

- A. Faulted SGs are isolated; not to interfere with subsequent recovery actions
- B. RCS isolated; ensures minimum RCS pressure conditions are met for restarting RCPs when power becomes available
- C. RCP seal leakoff flow to the VCT is established from all RCPs; mitigate the loss of RCS inventory
- D. Power restored to any AC ESF bus; all other procedures assume at least one ESF bus energized and equipment has power

**Answer:**         D        

**Explanation** (Optional):

- A. Incorrect – action is incorrect, reason is correct. Faulted SGs are not required to be isolated prior to exiting EC00.
- B. Incorrect – action is correct, reason is incorrect. The basis for checking the RCS intact is that it ensures RCS inventory loss is minimized
- C. Incorrect – action is incorrect, reason is correct. RCP seal leakoff flow is isolated prior to transitioning.
- D. Correct – both action and reason are correct. Power to any AC ESF must occur prior to recovery because all other procedures assume at least one ESF bus energized and equipment has power.

**Technical Reference:** OPOP05-EO-EC00, Loss of All AC Power (Rev 16);  
 LOT504.22, Lesson Plan for Loss of All AC Power (Rev 9)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

**Cognitive Level:** Memory or Fundamental Knowledge         X

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

**10 CFR Part 55 Content:**

**55.41** \_\_\_\_\_ 10

**55.43** \_\_\_\_\_

**Comments:**

Replaced original KA (EK3.01) – answer requires TS bases knowledge that is N/A to RO's

KA: 055 Loss of Offsite and Onsite Power (Station Blackout), EK3.02 – Knowledge of the reasons for the following responses as they apply to Station Blackout: Actions contained in EOP for loss of offsite and onsite power

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	056.AK1.03	
	Importance Rating	3.1*	

**Question 14:**

While operating at 100% power, Unit 1 experienced a reactor trip due to a loss of offsite power. The following plant conditions exist:

- Tavg is 531 °F in all RCS loops
- Tcold is at 527 °F in all RCS loops
- Thot is at 534 °F in all RCS loops
- Average of the five (5) hottest CETs is 538 °F
- Pressurizer pressure is at 2185 psig

Which ONE of the following identifies the Subcooling Margin (SCM)?

- A. 115 °F
- B. 111 °F
- C. 122 °F
- D. 118 °F

**Answer:**         B        

**Explanation** (Optional):

Candidate determines saturation temp for current RCS pressure (add 15 psi to 2185 psig to obtain 2200 psia and resultant sat temp of 649 °F). Candidate must also know that subcooling margin is calculated using CETs, not hot leg, cold leg, or avg temps. Subcooling margin is then 649 - 538 = 111 °F. Answer 'A' uses Thot; 'C' uses Tcold; 'D' uses Tavg.

**Technical Reference:**         Steam Tables        

**References to be provided to applicants during examination:**

Steam Tables as part of separate reference package.

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # \_\_\_\_\_  
 Modified Bank #         STP - 780         (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**         14          
**55.43** \_\_\_\_\_

**Comments:**

KA: 056 Loss of Offsite Power, AK1.03 – Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Definition of subcooling; use of steam tables to determine it

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

**Question 15:**

Unit 1 is in Mode 5 with the following conditions:

- RCS Temperature: 170 °F
- RCS Pressure: 380 psig
- RHR Trains A and B in service

A problem then occurs causing the RCS temperature to decrease. The Primary RO observes:

- Train A RHR Heat Exchanger Bypass Valve (FCV-0851) is full closed
- Train A RHR Heat Exchanger Flow Control Valve (HCV-0864) is full open
- RHR Train B operating normally

Which ONE of the following failures accounts for these indications?

- A. Loss of 125 VDC Bus E1A11
- B. Loss of 125 VDC Bus E1D11
- C. Loss of 480 MCC E1B1
- D. Loss of Instrument Air to Containment

**Answer:**     A    

**Explanation** (Optional):

- A. Correct - See Addendum 1 to POP04-DJ-0001
- B. Incorrect - Loss of this bus does not affect RHR Train A
- C. Incorrect - Loss of this bus affects RHR Train B, not Train A
- D. Incorrect - Loss of IA to containment would affect both trains as described in stem, not just the "A" train

**Technical Reference:** 0POP04-DJ-0001, Loss Of Class 1E 125 VDC Power (Rev 16);  
 LOT201.09.HO.01, RHR System Student Handout (Rev 11, Page 10-11)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #     STP - 358      
 Modified Bank # \_\_\_\_\_ (Note changes or attach parent)

	New	_____
<b>Question History:</b>	Last NRC Exam	2003 _____
<b>Cognitive Level:</b>	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	_____ X
<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	7 _____
	<b>55.43</b>	_____

**Comments:**

KA: 058 Loss of DC Power, AA2.03 – Ability to determine and interpret the following as they apply to Loss of DC Power: DC loads lost; impact on ability to operate and monitor plant systems

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		062.G2.1.28	
Importance Rating		3.2	

**Question 16:**

Unit 1 is operating at 100% power when a Large Break LOCA occurs. Five minutes later, the Primary Operator notices the following:

- ECW Pump 1B is running
- ECW Train 1B Blowdown Isolation Valve is closed
- ECW Train 1B Screen Wash Booster Pump is running
- ECW Pump 1B Discharge Valve indicates intermediate position (red AND green lights lit)
- ECW Trains A and C are operating normally
- The yard watch reports the ECW Pump 1B Discharge Valve is 50% open

Which ONE of the following is true concerning ECW Train 1B?

- Safety Injection Train B was reset prior to the discharge valve reaching full open. The discharge valve will open fully when the control switch is taken to OPEN.
- Safety Injection Train B did not actuate. Manually actuating Safety Injection will open the discharge valve fully.
- ECW Pump 1B did not receive a start signal from the sequencer. The pump was running prior to the Large Break LOCA.
- Safety Injection actuation has blocked the trip of the pump to allow the train to operate. The pump will continue to run even if the discharge valve is partially closed.

**Answer:**         D        

**Explanation** (Optional):

- INCORRECT - If SI was reset after 5 minutes with the discharge valve not full open, the pump would trip
- INCORRECT - If SI was not actuated on Train B, then the pump could not be running due to the partially closed discharge valve
- INCORRECT - The pump could not have been running in this condition prior to the LBLOCA
- CORRECT - An SI actuation will block the trip of an ECW pump from discharge valve position

**Technical Reference:** LOT201.13, ECW & Ventilation System Student Handout (Rev 9);  
Electrical drawings 9E-EW01-01, 9E-EW04-02

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # STP - 19  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam 2001

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

**10 CFR Part 55 Content:** **55.41** 7  
**55.43** \_\_\_\_\_

**Comments:**

Replaced original KA (G2.3.4) – rad exposure limits N/A to ECW system and 2.3.4 is tested in Tier 3, Generic K&A Categories

KA: 062 Loss of Nuclear Service Water, G2.1.28 – Knowledge of the purpose and function of major system components and controls

Note: STP has Essential Cooling Water, not Nuclear Service Water.

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		065.AK3.08	
Importance Rating		3.7	

**Question 17:**

Unit 1 is in Mode 4, coming out of a refueling outage, when a loss of instrument air occurs.

Given the following:

- Narrow Range SG levels; 1A = 49%, 1B = 60%, 1C = 55%, 1D = 52% (all SG levels are stable)
- SG PORVs are all operable
- All motor driven AFW Pumps are operable
- RHR Train 1B is in service and supplying Low Pressure Letdown
- RHR Train 1A and 1C are available
- SI Pumps are in the normal Mode 4 alignment
- Both Pressurizer PORVs are operable
- Vacuum has been established in the Main Condenser
- Three Circulating Water pumps are running

Which ONE of the following identifies the method Control Room operators are directed to use for RCS temperature control in accordance with 0POP04-IA-0001, Loss of Instrument Air, AND the basis for this method?

- A. Cycle the RHR mini-flow valve and/or the LHSI Cold Leg Injection Valve for Train 'B'; provide control of cooldown since RHR Heat Exchanger Outlet valves go closed and RHR Heat Exchanger Bypass valves go full open on loss of IA
- B. Cycling SG PORVs from at least two Steam Generators verified as available for RCS heat removal; decreasing IA pressure will eventually cause the MSIVs and MSIBs to close
- C. Cycle the RHR mini-flow valve and/or the LHSI Cold Leg Injection Valve for Train 'B'; provide control of cooldown since RHR Heat Exchanger Bypass valves go closed and RHR Heat Exchanger Outlet valves go full open on loss of IA
- D. Cycling SG PORVs from at least two Steam Generators verified as available for RCS heat removal; decreasing IA pressure will eventually cause a loss of Main Condenser vacuum

**Answer:**           C          

**Explanation** (Optional):

A: INCORRECT – method is correct; basis is incorrect

B: INCORRECT – method is incorrect since 2 SGs are not available (68-74% level or trending to this band); basis is correct IF 2 SGs were available

C: CORRECT - Per Addendum 2 of OPOP04-IA-0001, this method is directed (detailed in Addendum 6) (both valves can be used depending on the cooldown rate); basis is correct as explained in Addendum 8 of OPOP04-IA-0001

D: INCORRECT – method is incorrect since 2 SGs not available; basis is a correct statement but not the correct basis for cycling SG PORVs.

**Technical Reference:** OPOP04-IA-0001, Loss Of Instrument Air (Rev 11), Addendum 2, 6 and 8)

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**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

Replaced original KA (AK3.04) – IA/SA tested by two systems K&A's (078.K1.02 and 079.A4.01)

KA: 065 Loss of Instrument Air, AK3.08 – Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Actions contained in EOP for loss of instrument air

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		1	
K/A #		W/E11.EK3.2	
Importance Rating		3.5	

**Question 18:**

Which ONE of the following is NOT a major action category of 0POP05-EO-EC11, Loss of Emergency Coolant Recirculation?

- A. Attempt to add makeup to the RCS from alternate sources.
- B. De-pressurize the Steam Generators to cool the RCS.
- C. Conserve/fill the RWST inventory to prevent swap over to the RCB Emergency Sumps.
- D. De-pressurize the RCS to minimize subcooling.

**Answer:**     C    

**Explanation** (Optional):

0POP05-EO-EC11

0POP05-EO-EC11, Loss of Emergency Coolant Recirculation (Rev 13)

**Technical Reference:**

LOT504.27 Lesson Plan, Loss of Emergency Coolant Recirculation (Rev 8)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: W/E11 Loss of Emergency Coolant Recirculation, EK3.2 – Normal, abnormal and emergency operating procedures associated with Loss of Emergency Coolant Recirculation

<b>Examination Outline Cross-reference:</b>	Level	<b>RO</b>	<b>SRO</b>
	Tier #	1	
	Group #	2	
	K/A #	028.AK3.02	
	Importance Rating	2.9	

**Question 19:**

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-465, slowly fails high.

Without operator action, which ONE 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-465, will remain open.
- B. Charging flow will decrease due to the level channel failure, and the letdown isolation valve, LCV-465, will close.
- C. Charging flow will increase due to the level channel failure, and the letdown isolation valve, LCV-465, will remain open.
- D. Charging flow will increase due to the level channel failure, and the letdown isolation valve, LCV-465, will close.

**Answer:**     A    

**Explanation** (Optional):

A. Correct - response of charging correct (LT-465 sends a signal to the Pressurizer Level Master Controller: since LT-465 has failed hi, a close signal is sent to the charging flow control valve (FCV-205)); response of letdown correct (Pressurizer level channel LT-465 controls letdown isolation valve (LCV 465): since LT-465 has failed hi, LCV-465 will remain open)

B. Incorrect – response of charging correct, response of letdown incorrect

C. Incorrect - response of charging incorrect, response of letdown incorrect

D. Incorrect - response of charging incorrect, response of letdown correct

**Technical Reference:**     LOT201.06.HO.01, CVCS Student Handout (Rev 12, page 10);  
 LOT201.14.HO.01, Pressurizer Pressure and Level Control System  
 Student Handout (Rev 12)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_  
**Cognitive Level:** Memory or Fundamental Knowledge \_\_\_\_\_  
 Comprehension or Analysis     X      
**10 CFR Part 55 Content:** **55.41**     7      
**55.43** \_\_\_\_\_

**Comments:**

KA: 028 Pressurizer Level Control Malfunction, AK3.02 – Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunction: Relationships between PZR pressure increase and reactor makeup/letdown imbalance.

Modified distractors (Bank answers A, C, and D) by changing the effect on the letdown system from "in-service letdown orifice isolation valve will close" to "letdown isolation valve will remain open" to be more credible.



<b>Cognitive Level:</b>	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	<u>    X    </u>
<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<u>    2    </u>
	<b>55.43</b>	_____

**Comments:**

KA: 032 Loss of Source Range Nuclear Instrumentation, AK2.01 – Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following: Power supplies, including proper switch positions.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	036.AA2.02	
	Importance Rating	3.4	

**Question 21:**

Assuming the Personnel Air Lock (PAL) doors are closed, which ONE of the following is NOT an entry condition to 0POP04-FH-001, Fuel Handling Accident?

- A. 68 ft RCB Area Monitors alarming
- B. MAB Ventilation Monitors alarming
- C. Gas bubbles rising from the refueling cavity
- D. A Containment Ventilation Isolation (CVI) occurs

**Answer:** B

**Explanation** (Optional):

- A. Incorrect – This is a symptom or entry condition to 0POP04-FH-0001
- B. Correct – This could only occur if the PAL is open, which it is not as stated in the stem
- C. Incorrect – This is a symptom or entry condition to 0POP04-FH-0001
- D. Incorrect – This is a symptom or entry condition to 0POP04-FH-0001

**Technical Reference:** 0POP04-FH-0001, Fuel Handling Accident (Rev 7)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** 55.41 10, 12  
 55.43 \_\_\_\_\_

**Comments:**

KA: 036 Fuel Handling Accident, AA2.02 – Ability to determine and interpret the following as they apply to the following: occurrence of a fuel handling incident

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	037.AK1.01	
	Importance Rating	2.9*	

**Question 22:**

0POP05-EO-EO30, Steam Generator Tube Rupture, is in progress and an RCS cooldown is desired.

- Ruptured SG pressure is 900 psig
- RCPs are running
- Containment pressure = 0.3 psig
- Containment radiation levels are normal

Given the above plant conditions, which ONE of the below is the REQUIRED target temperature for RCS cooldown to ensure approximately 50 °F subcooling during subsequent RCS depressurization AND the specified indication used for determining RCS temperature during the cooldown?

- A. Approximately 486 °F by RCS WR Hot Leg temperature because of adverse containment conditions.
- B. Approximately 486 °F by Core Exit Thermocouples temperature because of normal containment conditions.
- C. Approximately 471 °F by Core Exit Thermocouples temperature because of adverse containment conditions.
- D. Approximately 471 °F by RCS WR Hot Leg temperature because of normal containment conditions.

**Answer:** B

**Explanation** (Optional):

Candidate must convert psig to psia ( $900 + 15 = 915$  psia), and then calculate  $T_{sat}$  for 915 psia using saturated steam tables (534 °F). Given desired subcooling of *approximately* 50 °F, answer is  $534 - 50 = 484$  °F (486 °F is used since that is the value given in the procedure with ruptured SG pressure of 900 psig). Core exit T/Cs are used since no adverse containment condition exists.

- A. Incorrect – correct temp but incorrect temp indicator (471 °F is the value in the procedure that is used for adverse containment conditions)
- B. Correct – both temp indicator and temp are correct
- C. Incorrect – both temp indicator and temp are incorrect
- D. Incorrect – temp indicator is correct, temp is incorrect

**Technical Reference:**

0POP05-EO-EO30, Steam Generator Tube Rupture (Rev 16);  
Steam Tables

**References to be provided to applicants during examination:**

Steam Tables as part of separate reference package.

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # Farley  
(from NRC Reg II)  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41** 10, 14  
**55.43** \_\_\_\_\_

**Comments:**  
KA: 037 Steam Generator Tube Leak, AK1.01 – Knowledge of the operational implications of the following concepts as they apply to SG Tube Leak: Use of steam tables

<b>Examination Outline Cross-reference:</b>	Level	<b>RO</b>	<b>SRO</b>
	Tier #	1	
	Group #	2	
	K/A #	068.AK2.02	
	Importance Rating	3.9	

**Question 23:**

The following plant conditions exist:

- Mode 1, 48% Reactor power
- Power ascension in progress
- A fire occurs requiring an immediate evacuation of the control room
- The Operators are UNABLE to trip the reactor or perform the other IMMEDIATE ACTIONS of 0POP04-ZO-0001, Control Room Evacuation, before exiting the Control Room

Which ONE of the following actions will cause the Solid State Protection System (SSPS) to initiate a reactor trip?

- A. Tripping the main turbine from the ASP
- B. Locally de-energizing 480V Bus 1K1
- C. Locally de-energizing 118 VAC Vital Instrumentation Bus I (DP 1201)
- D. Tripping any of the RCP breakers at Aux Bus 1F, 1G, 1H, or 1J

**Answer:** D

**Explanation** (Optional):

- A. Incorrect – Since below P-9 (> 50% power), turbine trip will NOT cause Rx trip
- B. Incorrect – No automatic trip would occur on loss of just one Rod Drive MG set (and 480 V Bus 1L1 would continue to power the other rod drive MG set)
- C. Incorrect because no trip signal is generated from a loss of NB02. NE02 would energize the bus.
- D. Correct – Since Rx power > P-8 (40%), loss of flow in one loop will generate a Rx trip

**Technical Reference:**

LOT201.20.HO.01, SSPS Student Handout (Rev 16)  
 LOT201.05.HO.01, RCP Student Handout (Rev 12)  
 0POP04-ZO-0001, Control Room Evacuation (Rev 25)  
 LOT201.18.HO.01, Rod Control System Student Handout (Rev 9)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

**Cognitive Level:** Memory or Fundamental Knowledge \_\_\_\_\_

Comprehension or Analysis X

**10 CFR Part 55 Content:**

**55.41** 7

**55.43**           

**Comments:**

KA: 068 Control Room Evacuation, AK2.01 – Knowledge of the interrelations between the Control Room Evacuation and the following: Reactor trip system

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	069.G2.4.16	
	Importance Rating	3.0	

**Question 24:**

Unit 1 experienced a Large Break LOCA. The crew just started performing 0POP05-EO-FRZ1, Response To High Containment Pressure, due to an ORANGE path on Containment Pressure.

- 1M02/D1, RWST LO-LO/EMPTY, has just actuated

Which ONE of the following should be performed?

- A. CONTINUE in FRZ1 until completed, then transition to 0POP05-EO-ES13, Transfer To Cold Leg Recirculation. Upon completion, transition to 0POP05-EO-EO10, Loss Of Reactor or Secondary Coolant, if containment pressure is < 9.5 psig.
- B. CONTINUE in FRZ1 until Steps 1-6 are completed, then transition to 0POP05-EO-ES13, Transfer To Cold Leg Recirculation. Complete ES13 Steps 1-6, then transition back to FRZ1 if containment pressure is > 9.5 psig.
- C. GO TO 0POP05-EO-ES13, Transfer To Cold Leg Recirculation. Complete ES13 Steps 1-6, then transition to 0POP05-EO-EO10, Loss Of Reactor or Secondary Coolant, if containment pressure is < 9.5 psig.
- D. GO TO 0POP05-EO-ES13, Transfer To Cold Leg Recirculation. Complete ES13 Steps 1-6, then return to FRZ1 if containment pressure is > 9.5 psig.

**Answer:** D

**Explanation** (Optional):

EOP User’s Guide states certain contingency EOPs take precedence over the FRPs due to specific initiating events. One of these events is RWST level reaching the switchover point to cold leg recirc. (Thus ‘A’ and ‘B’ are incorrect). Answer ‘C’ is incorrect since ES13 must be completed prior to returning to EO10. Answer ‘D’ is correct because ES13 contains a note before Step 7 that states, “Function Restoration procedures may now be implemented.” Therefore, if Containment pressure is > 9.5 psig, operators would transition back to FRZ1.

**Technical Reference:** 0POP01-ZA-0018, Emergency Operating Procedure User’s Guide (Rev 17, Section 7.6);  
0POP05-EO-ES13, Transfer to Cold Leg Recirculation (Rev 8)

**References to be provided to applicants during examination:**

None

**Learning Objective:** LOT 504.04, CRO 92283 (As available)

**Question Source:** Bank # STP - 151  
Modified Bank # (Note changes or attach parent)

	New	_____
<b>Question History:</b>	Last NRC Exam	_____
<b>Cognitive Level:</b>	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	<u>    X    </u>
<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<u>    10    </u>
	<b>55.43</b>	_____

**Comments:**

Replaced original KA (G2.3.2) – duplicate KA in Tier 3 (Question 72)

KA: G2.4.16 - Knowledge of EOP implementation hierarchy and coordination with other support procedures.

Replaced Exam Bank Q151 Distractor 'C' since it is a combination of 'B' and some of 'D' (now Distractor B). Also, changed second sentence in Q151 Distractor 'B' from "Complete ES13 Steps 1-6, then transition back to E0" to "Complete ES13 Steps 1-6, then transition to OPOP05-EO-EO10, Loss Of Reactor or Secondary Coolant" (now Distractor C). Also added containment pressure condition to answer and distractors.

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		2	
K/A #		W/E02.EA2.1	
Importance Rating		3.3	

**Question 25:**

Given the following Unit 2 conditions:

- A Small Break LOCA has occurred
- SI has been reset
- Operators have just completed Step 1 of 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant

The Shift Technical Advisor reports the following:

- RCS pressure - 1830 psig and stable
- RCS temperature – 550 °F and stable
- RCS subcooling - 60 °F
- Pressurizer level - 15%
- SG 2A, 2B, 2C and 2D NR Levels are 8%, 10%, 17% and 19% respectively
- Total AFW flow - 400 gpm
- Adverse containment conditions do NOT exist

Which ONE of the following actions will the operators perform?

- Manually actuate SI and transition to 0POP05-EO-EO00, Reactor Trip or Safety Injection
- Transition to 0POP05-EO-ES11, SI Termination
- Transition to 0POP05-EO-FRP2, Response to Anticipated Pressurized Thermal Shock Condition
- Transition to 0POP05-EO-FRH1, Response to Loss of Secondary Heat Sink

**Answer:**

B

**Explanation** (Optional):

- INCORRECT - Given conditions do not meet the requirements for SI reinitiation, and if it did, SI is reinitiated by manually starting SI pumps, not manually actuating SI.
- CORRECT - The given conditions would allow transition to ES11, which would be the expected action.
- INCORRECT - Given conditions do not meet the entry requirements for FRP2
- INCORRECT - Total SG flow can be less than 576 gpm if one SG level is greater than 14% NR

**Technical Reference:**

0POP05-EO-EO10, Loss of Reactor or Secondary Coolant (Rev 17, Conditional Information Page)

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**References to be provided to applicants during examination:**

None

**Learning Objective:** 81103 (As available)

**Question Source:** Bank # STP - 52  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: W/E02 SI Termination, EA2.1 – Ability to determine and interpret the following as they apply to SI Termination: Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

<b>Examination Outline Cross-reference:</b>	Level	<b>RO</b>	<b>SRO</b>
	Tier #	1	
	Group #	2	
	K/A #	W/E13.EA1.2	
	Importance Rating	3.0	

**Question 26:**

Operators are performing OPOP05-EO-FRH2 in response to a Steam Generator Overpressure event. Due to plant conditions, the Unit Supervisor has directed steam to be dumped from the affected SG via local operation of its PORV.

A CAUTION preceding Step 1 of the SG PORV Local Operation Addendum states SG PORVs should NOT be opened GREATER THAN 50%.

Which ONE of the following identifies the reason for this CAUTION?

- A. To prevent exceeding the maximum cooldown rate of < 100 °F / HR.
- B. Too large of a release of steam will cause SG levels to rise rapidly and cause damage to piping from water hammer.
- C. The PORV hydraulic unit accumulators only contain sufficient stored energy for one and one-half strokes.
- D. To prevent a Main Steam Isolation signal due to high steam pressure rate drop.

**Answer:** C

**Explanation** (Optional):

- A. Incorrect – While the procedure does direct cooldown to < 100 °F/HR if necessary, it is not the basis for restricted motion of the PORV.
- B. Incorrect – Water hammer can occur if SG level rises too high, but it is not the basis for restricted motion of the PORV.
- C. Correct.
- D. A High Steam Pressure Rate ESFAS initiation signal can occur if step decrease of 100 psi or ramp decrease of > 2 psi/sec on 2/3 channels on 1/4 steamline and < P-11 and low compensated steamline pressure blocked, but it is not the basis for restricted motion of the PORV.

**Technical Reference:** OPOP05-EO-FRH2, Response to Steam Generator Overpressure (Rev 5, Addendum 1, SG PORV Local Operation)

**References to be provided to applicants during examination:**

None

**Learning Objective:** T50434 (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

<b>Cognitive Level:</b>	Memory or Fundamental Knowledge	<u>    X    </u>
	Comprehension or Analysis	<u>          </u>
<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<u>    4, 10    </u>
	<b>55.43</b>	<u>          </u>

**Comments:**

KA: W/E13 Steam Generator Overpressure, EA1.2 – Ability to operate and/or monitor the following as they apply to the Steam Generator Overpressure: Operating behavior characteristics of the facility.

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		1	
Group #		2	
K/A #		W/E08.EA2.2	
Importance Rating		3.5	

**Question 27:**

Procedure OPOP05-EO-FRP1, "Response to Imminent Pressurized Thermal Shock Condition", contains less restrictive SI termination criteria than other procedures.

Why is it more desirable to terminate SI when in this procedure?

- A. SI flow may have contributed to the RCS cooldown.
- B. LHSI pump discharge pressure may have contributed to the overpressure condition of the RCS.
- C. RCS heat removal is via the steam generators and SI flow is NOT required.
- D. To conserve water in the RWST.

**Answer:** A

**Explanation** (Optional):

- A. Correct.
- B. Incorrect. HHSI pumps can be a source of pressurized thermal shock at low temperatures but not LHSI
- C. Incorrect. RCS heat removal may or may not be provided by the SGs (feed and bleed). SI flow may be required for heat removal, and in those cases, the appropriate CSF status tree will dictate priority (and thus SI termination criteria).
- D. Incorrect. RWST inventory does not factor into SI termination criteria in FRP1.

**Technical Reference:** OPOP05-EO-FRP1, Response to Imminent Pressurized Thermal Shock Condition (Rev 10)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # STP - 1191  
 Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: W/E08 Pressurized Thermal Shock, EA2.2 – Ability to determine and interpret the

following as they apply to the Pressurized Thermal Shock: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

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

**Question 28:**

Which ONE of the following describes the purpose of the RCP thermal barrier?

- A. Prevents a large temperature differential across the lower pump casing assembly.
- B. Prevents cooler seal injection water from creating thermal stresses in the pump impeller assembly.
- C. Limits the amount of cooler seal injection water reaching the RCS.
- D. Limits heat flow from the RCS water to the radial bearing and Thermal Barrier Heat Exchanger.

**Answer:**     D    

**Explanation** (Optional):

**Technical Reference:**     LOT201.05.HO.01, RCP Student Handout (Rev 12, page 4)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     3      
**55.43** \_\_\_\_\_

**Comments:**

KA: 003 Reactor Coolant Pump System, K4.04 – Knowledge of RCPS design feature(s) and/or interlocks which provide for the following: Adequate cooling of RCP motor and seals

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		2	
Group #		1	
K/A #		003.A2.03	
Importance Rating		2.7	

**Question 29:**

While operating at full power a high RCP Motor Stator Winding Temperature Alarm is received. Assuming this is a valid alarm, what operator action is required per 0POP04-RC-0002, Reactor Coolant Pump Off Normal AND what is the concern for a high stator winding temperature?

- Trip the reactor, then stop the affected RCP. Concern is breakdown of winding insulation resistance resulting in shorts/grounds.
- Stop the RCP, then trip the reactor. Concern is breakdown of winding insulation resistance resulting in shorts/grounds.
- Trip the reactor, then stop the affected RCP. Concern is reduced clearances leading to motor bearing damage.
- Stop the RCP, then trip the reactor. Concern is reduced clearances leading to motor bearing damage.

**Answer:**     A    

**Explanation** (Optional):

Procedure states if valid alarm for motor stator winding temp, trip Reactor then RCP. Student Handout states if the motor stator is overheated an electrical fault will occur.

**Technical Reference:** 0POP04-RC-0002, RCP Off Normal (Rev 22)  
 LOT201.05.HO.01, RCP Student Handout (Rev 12)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     3, 10      
**55.43** \_\_\_\_\_

**Comments:**

KA: 003 Reactor Coolant Pump System, A2.03 – Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Problems associated with RCP motors, including faulty motors and current, and

winding and bearing temperature problems

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	004.A1.06	
	Importance Rating	3.0	

**Question 30:**

Given the following:

- Unit 1 is operating steady state at 93% power
- VCT LEVEL HI/LO annunciator alarms on 04M8
- LI-112, VCT Level, indicates 35% and decreasing (CP-004)
- LI-113, VCT Level, indicates 100% (ICS)

Which ONE the following describes the expected plant response?

- A. Pressurizer level will lower to 17% resulting in letdown isolation.
- B. Auto makeup will initiate to the VCT when VCT level lowers to 28% and raise VCT level back to 48%.
- C. VCT level will continue to lower until the Operator manually aligns Divert valve LCV-112A, to the VCT position.
- D. VCT level will continue to lower until it causes the operating CCP suction to automatically align to the RWST at 3%.

**Answer:**         B        

**Explanation** (Optional):

LCV-112A is controlled by VCT level instrument LT-112. As a backup, VCT level instrument LT-113 will override the control signal from channel LT-112 to place LCV-112A in the full divert position if the VCT level increases to 95%. As long as LT-112 is working, normal VCT operations will result. Under steady states ops as stated in the question stem, VCT auto makeup will begin at 28% and decreasing.

**Technical Reference:**         LOT201.06.HO.01, CVCS Student Handout (Rev 12)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #         STP - 675          
 Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<b>5</b>
	<b>55.43</b>	

**Comments:**

KA: 004 CVCS, A1.06 – Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CVCS controls including: VCT level

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	005.K2.01	
	Importance Rating	3.0	

**Question 31:**

Unit 1 is in Mode 4 with the following conditions:

- RCS temp is 335 °F and lowering
- RCS pressure is 330 psig
- All RHR train suction valves are open
- 'A' train 4.16 KV / 480V ESF transformer has failed

Which ONE of the following RHR pumps would be available for continued plant cooldown?

- A. 1A and 1B only
- B. 1B and 1C only
- C. 1A and 1C only
- D. 1A and 1B and 1C

**Answer:**         B        

**Explanation** (Optional):

RHR Pump 1A is powered from LC E1A2. Therefore, loss of this load center due to a transformer failure would make pumps 1B and 1C available for plant cooldown.

RHR train suction valves are cross-train powered, thus if power is lost on one train (as stated in the question stem), 2 trains of RHR would be rendered inoperable if the valves were initially closed. It's not expected for the operators to know specifically which train powers which valves so adding this condition to the stem will establish that loss of power to these valves won't affect RHR train availability. All suction valves are normally opened when placing RHR in service to allow availability of all trains.

**Technical Reference:**         LOT201.09.HO.01, RHR System Student Handout (Rev 11, page 6)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

**Cognitive Level:** Memory or Fundamental Knowledge         X

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

**10 CFR Part 55 Content:**

**55.41** \_\_\_\_\_ **7** \_\_\_\_\_

**55.43** \_\_\_\_\_

**Comments:**

KA: 005 RHR System, K2.01 – Knowledge of bus power supplies to the following: RHR pumps

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	006.K5.08	
	Importance Rating	2.9*	

**Question 32:**

Unit 1 was operating at 100% power when a LBLOCA occurred. All equipment functioned as designed.

Which ONE of the following correctly describes the operating configuration of the HHSI AND/OR LHSI pumps during this accident condition?

- A. During Cold Leg Injection the HHSI pumps are operating in a series configuration with one another, but they will be operating in a parallel configuration during Cold Leg Recirculation.
- B. During Cold Leg Recirculation both the HHSI pumps and the LHSI pumps are operating in a series configuration with one another ('Piggyback' mode).
- C. During Cold Leg Recirculation and Hot Leg Recirculation the HHSI pumps are operating in a parallel configuration with one another.
- D. During Hot Leg Recirculation the HHSI pumps are operating in a series configuration with one another, but the LHSI pumps are operating in a parallel configuration with one another.

**Answer:**           C          

**Explanation** (Optional):

- A: Incorrect – HHSI pumps always operate in parallel with each other
- B: Incorrect – HHSI and LHSI pumps operate in parallel during Cold Leg Recirc
- C: Correct – HHSI pumps operate in parallel in both Cold Leg and Hot Leg Recirc
- D: Incorrect – HHSI pumps always operate in parallel with each other

**Technical Reference:**   LOT201.10, ECCS.ppt (slide 31)  

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**       8        
**55.43** \_\_\_\_\_

**Comments:**

KA: 006 ECCS, K5.08 – Knowledge of the operational implications of the following concepts as they apply to ECCS: Operation of pumps in parallel

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		2	
Group #		1	
K/A #		006.A2.04	
Importance Rating		3.4	

**Question 33:**

Unit 2 is in Mode 3 with Pressurizer pressure = 2050 psig. The ACC TK 2B PRESS HI/LO alarm has actuated on 1M02. Accumulator 2B pressure is 610 psig and level is normal.

What would be the effect on plant safety if Accumulator 2B pressure were allowed to decrease below its Tech Spec limit AND how is pressure restored to the allowable operating range?

- A. The Accumulator injection rate cannot be assumed to provide adequate core cooling during a LOCA; pressurize accumulator using HHSI pump.
- B. A sufficient volume of water cannot be assumed to reach the core during a LOCA; pressurize accumulator using HP Nitrogen.
- C. The Accumulator injection rate cannot be assumed to provide adequate core cooling during a LOCA; pressurize accumulator using HP Nitrogen.
- D. A sufficient volume of water cannot be assumed to reach the core during a LOCA; pressurize accumulator using HHSI pump.

**Answer:**     B    

**Explanation** (Optional):

TS 3.5.1, Accumulators

**Technical Reference:** LOT201.10, ECCS Student Handout (Rev 11)

0POP02-SI-0001, SI Accumulators (Rev 22)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     7      
**55.43** \_\_\_\_\_

**Comments:**

KA: 006 ECCS, A2.04 – Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Improper discharge pressure

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	007.K4.01	
	Importance Rating	2.6	

**Question 34:**

Unit 1 is in Mode 4 with RCS pressure at 1400 psig. If a Pressurizer PORV inadvertently opened, at what temperature would the operator expect the fluid entering the PRT to be at assuming the PRT pressure is 5 psig AND what would be the fastest method of cooling the PRT?

- A. 228 °F, feed Reactor Makeup Water and bleed to LWPS
- B. 228 °F, recirculation through RCDT Heat Exchanger
- C. 263 °F, feed Reactor Makeup Water and bleed to LWPS
- D. 263 °F, recirculation through RCDT Heat Exchanger

**Answer:**     C    

**Explanation** (Optional):

Candidate must recognize that use of Mollier Diagram is required to solve for fluid temperature entering the PRT since the fluid will be superheated, not saturated. Fluid will exit the Pressurizer at a constant enthalpy process. Therefore, 1400 psig corresponds to 1174 BTU/lb and when pressure is reduced to 5 psig (20 psia), the corresponding temperature is approximately 263 °F.

2. 228 °F is the saturation temp for 5 psig (20 psia)

3. Feed and bleed reduces water temp from 200 °F to 120 °F in approx 1 hour while using the RCDT heat exchanger takes approx 8 hrs

**Technical Reference:**     LOT20104.HO.01, PZR, PRT, and RCDT Student Handout (Rev 7)    

**References to be provided to applicants during examination:**

Steam Tables as part of separate reference package.

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     3      
**55.43** \_\_\_\_\_

**Comments:**

KA: 007 PZR Relief Tank / Quench Tank System, K4.01 – Knowledge of PRTS design feature(s) and/or interlock(s) which provide for the following: Quench tank cooling

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	008.A4.07	
	Importance Rating	2.9*	

**Question 35:**

Unit 1 is operating at 100% power when a leak develops in the Component Cooling Water System. Level in the CCW Surge Tank is 65% and decreasing slowly. 0POP04-CC-0001, Loss of Component Cooling Water, is entered.

The operator determines CCW Surge Tank Makeup Valve LV-4501 is NOT open. In accordance with 0POP04-CC-0001, Loss of Component Cooling Water, what action is required?

- Verify LV-4501 opens automatically when CCW Surge Tank level reaches its full open setpoint.
- If the valve cannot be opened, take actions to initiate makeup from the Chemical Addition Tank.
- If the valve cannot be opened, take actions to initiate makeup from the Reactor Makeup Water System.
- Trip the reactor, then trip the RCPs due to loss of CCW cooling to the RCPs.

**Answer:**     C    

**Explanation** (Optional):

POP04-CC-0001 states if surge tank level cannot be maintained between 69-74% using LV-4501, an operator is to be dispatched to maintain level using CCW SURGE TANK 1A REACTOR MAKEUP WATER SUPPLY VALVE and to ensure a Reactor Makeup Water pump is operating.

**Technical Reference:** POP04-CC-0001, Loss of CCW (Rev 13, page 3)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 008 CCWS, A4.07 – Ability to manually operate and/or monitor in the control room:

Control of minimum level in the CCWS surge tank

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	008.G2.1.27	
	Importance Rating	2.8	

**Question 36:**

Which ONE of the following is an ESF load cooled by CCW?

- A. ESF DG Jacket Cooling Water
- B. Reactor Containment Fan Coolers (RCFCs)
- C. Spent Fuel Pool Heat Exchangers
- D. HHSI Pump lube oil coolers

**Answer:**         B        

**Explanation** (Optional):

- A: Incorrect. This load is an ESF component that's cooled by ECW, not CCW
- B: Correct
- C: Incorrect. This is a non-ESF load cooled by CCW
- D: Incorrect. This is an ESF pump, but has no lube oil cooler.

**Technical Reference:**         LOT201.12.HO.01, CCW System Student Handout (Rev 11)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**         7          
**55.43** \_\_\_\_\_

**Comments:**

KA: 008 CCWS, G2.1.27 – Knowledge of system purpose and / or function

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	010.A2.02	
	Importance Rating	3.9	

**Question 37:**

The following plant conditions exist:

- Unit 1 is performing a plant startup and power ascension
- Reactor power is at 22%
- Pressurizer Spray Valve PCV-0655B has failed open

How is pressurizer pressure trending AND what action is required in accordance with OPOP04-RP-0001, Loss of Automatic Pressurizer Pressure Control?

- A. Remains constant; trip the reactor and stop RCP 1A only
- B. Decreasing; trip the reactor and stop RCP 1D only
- C. Remains constant; trip the reactor and stop RCPs 1A & 1D
- D. Decreasing; trip the reactor and stop RCPs 1A & 1D

**Answer:**         D        

**Explanation** (Optional):

Procedure directs reactor trip, turbine trip, stopping RCP 1A and 1D (Step 4)

**Technical Reference:**         POP04-RP-0001, Loss of Auto PZR Pressure Control (Rev 12)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # \_\_\_\_\_  
 Modified Bank #         STP - 742         (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 010 PZR Pressure Control System, A2.02 – Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Spray valve failures

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

**Question 38:**

Which ONE of the following Reactor trips is NOT designed to protect the reactor core from Departure from Nucleate Boiling (DNB)?

- A. Overpower  $\Delta T$  (OP $\Delta T$ )
- B. Pressurizer low pressure
- C. Overtemperature  $\Delta T$  (OT $\Delta T$ )
- D. Reactor Coolant Pump undervoltage

**Answer:**     A    

**Explanation** (Optional):

A: CORRECT – OP $\Delta P$  assures fuel integrity, limits required range for OT $\Delta T$  protection, and provides a backup to the high neutron flux trip

B: INCORRECT – This trip provides protection against DNB due to a low pressure condition

C: INCORRECT – This trip provides core protection to prevent DNB for all combinations of pressure, power, coolant temperature and axial power distribution

D: INCORRECT – This trip provides reactor core protection against DNB as a result of undervoltage in more than one RCP

**Technical Reference:**     LOT201.20.HO.01, SSPS Student Handout (Rev 16, Section 3.7)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # \_\_\_\_\_  
 Modified Bank #     STP - 812     (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     14      
**55.43** \_\_\_\_\_

**Comments:**

KA: 012 Reactor Protection System, K5.01 – Knowledge of the operational implications of the following concepts as they apply to the RPS: DNB

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		2	
Group #		1	
K/A #		012.K6.10	
Importance Rating		3.3	

**Question 39:**

Which ONE of the following describes the effect that a loss of compensating voltage to NI-35 will have on the Solid State Protection System (SSPS)?

- A. On a plant shutdown, when P-10 resets an IR High Level Trip will occur.
- B. At high power, it will cause an IR/PR Rod Withdrawal Block.
- C. On a reactor shutdown, P-6 will clear early and a SR High Flux Trip will occur.
- D. On a reactor shutdown, P-6 will NOT clear and reenergize the SR detectors.

**Answer:**         D        

**Explanation** (Optional):

A: Incorrect. Above 1E-8 amps loss of compensating voltage should not cause a visible change in output of the detector/indication, therefore when P-10 resets there should be no consequence.

B: Incorrect. IR/PR Rod Withdrawal Block is not a function processed through the RPS; this function goes between NI to Rod Control. Also above 1E-8 amps loss of compensating voltage should not cause a visible change in output of the detector/indication

C: Incorrect. IR NI-35 will remain above 1E-10 amps therefore P-6 will not reset (2/2 channels < 1E-10 amps)

D: Correct. P-6 requires 2/2 IR < 1E-10 amps to reenergize the SR Hi Voltage power supplies and remove the SR High Flux Trip Bypasses. With IR NI-35 undercompensated, it will remain above 1E-10 amps, therefore the SR high Flux Trip will not activate

LOT201.16, Excore Nuclear Instrumentation Student HO (Rev 12);

**Technical Reference:** 0POP09-AN-05M3 (Rev 23), Window F1;  
0POP04-NI-0001, (Rev 4 Addendum 2 step 6)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #         STP - 14          
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**         2          
**55.43** \_\_\_\_\_

**Comments:**

KA: 012 Reactor Protection System, K6.10 – Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Permissive circuits

The student must know the Intermediate Range NIs use Compensated Ion Chambers and understand the effect gamma has on their operation and the operating range affected. The student must also understand the operation/logic of the permissive interlocks and bypasses to conclude that loss of compensating voltage only impacts operation at low levels of the IR.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	013.K1.16	
	Importance Rating	2.9*	

**Question 40:**

Which ONE of the following groups of setpoints AND coincidences will cause a Steam Line Isolation Signal?

- A. Steam line pressure less than 735 psig, 2/3 channels on 1/4 steam lines with Low Steam Line Pressure Safety Injection NOT blocked.
- B. Containment HIGH-II pressure greater than 3 psig on 1/3 channels.
- C. Steam line pressure less than 735 psig, 2/3 channels on 2/4 steam lines with Low Steam Line Pressure Safety Injection NOT blocked.
- D. Containment HIGH-I pressure greater than 5 psig on 2/3 channels.

**Answer:**     A    

**Explanation** (Optional):

The following provide a main steam isolation signal:

- 1. Containment High Pressure (HI-2) - 3.0 psig - 2/3 - no permissive
- 2. High Steam Pressure Rate - step decrease of 100 psi or ramp decrease of >2 psi/sec - 2/3 channels on 1/4 steamlines - < P-11 & low compensated steamline pressure blocked
- 3. Manual - operator - 1/2 - no permissive
- 4. Low Steamline Pressure - 735 psig (lead - lag comp.) - 2/3 channels on 1/4 steamlines - > P-11 or reset/not blocked

**Technical Reference:**     LOT201.20.HO.02, SSPS Study Guide (Rev 15, page 7)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #     STP - 150      
 Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     7      
**55.43** \_\_\_\_\_

**Comments:**

KA: 013 ESF Actuation System, K1.16 – Knowledge of the physical connections and/or cause-effect relationships between ESFAS and the following systems: MRSS (main and reheat steam system)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	022.K4.04	
	Importance Rating	2.8	

**Question 41:**

Which ONE of the following conditions is the CRDM cooling fans analyzed to mitigate during a Natural Circulation cooldown in accordance with OPOP05-EO-ES02?

- A. Damage to the CRDM coils resulting from overheating.
- B. Damage to the ex-core NIS resulting from overheating.
- C. Brittle fracture to the reactor vessel head flange welds resulting from exceeding nil ductility temperature limits.
- D. Void formation in the reactor upper head area that degrades RCS cooldown capability.

**Answer:**     D    

**Explanation** (Optional):

**Technical Reference:** LOT504.25.HO.01, Natural Circ Cooldown Student Handout (Rev 7, page 7);  
OPOP05-EO-ES02, Natural Circ Cooldown (Rev 9, Step 6)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #     STP - 1026      
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam     2001    

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

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

**Comments:**

KA: 022 Containment Cooling System, K4.04 – Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Cooling of control rod drive motors



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

**Comments:**

KA: 026 Containment Spray System, G2.4.11 – Knowledge of abnormal condition procedures

Objective: FRZ.XH5.OB402, distractors modified. Also, question is from CPSES bank, but reworded by STP

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	039.K3.05	
	Importance Rating	3.6	

**Question 43:**

Unit 2 is at End Of Life (EOL) and is in Mode 3 at normal operating temperature and pressure. A major steam line break occurs upstream of an MSIV. According to the accident analysis for a main steamline break, which ONE of the below depicts the correct sequence of events for this accident analysis?

- RCS average temperature decreases, pressurizer pressure decreases, core attains criticality, SI injection water reaches the core and shuts down the reactor.
- Pressurizer pressure decreases, RCS average temperature decreases, core attains criticality, SI injection water reaches the core and shuts down the reactor.
- Pressurizer pressure decreases, RCS average temperature decreases, SI injection water reaches core, core attains criticality.
- RCS average temperature decreases, pressurizer pressure decreases, SI injection water reaches core, core attains criticality.

**Answer:**     A    

**Explanation** (Optional):

The decreasing Tave causes Pzr pressure to decrease (0-8 sec). The loop colder water starts entering the core and core average temperature decreases (8-24.8 sec). The core attains criticality and core average temperature decreases at a slower rate (24.8 sec). 2800 ppm boron starts to reach the core slowing the amount of positive reactivity inserted (37.8 sec).

**Technical Reference:**     LOT501.16.HO.01, Increase In Heat Removal By The Secondary System Student Handout (Rev 1, page 10)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     5      
**55.43** \_\_\_\_\_

**Comments:**

KA: 039 Main and Reheat Steam System, K3.05 – Knowledge of the effect that a loss or

malfunction of the MRSS will have on the following: RCS

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	059.K1.02	
	Importance Rating	3.4*	

**Question 44:**

Unit 2 is in Mode 2 with AFW NOT in service. Which ONE of the following correctly identifies the feed flow path downstream of the Low Power FRV?

- A. Feedwater Isolation Bypass Valve, auxiliary feed ring
- B. Feedwater Isolation Bypass Valve, main feed ring
- C. Preheater Bypass Valve, auxiliary feed ring
- D. Preheater Bypass Valve, main feed ring

**Answer:**     C    

**Explanation** (Optional):

The Preheater Bypass Valves (PBVs) are used to provide a feedwater flow path to the S/Gs during fill and low power operation. The PBV line runs from downstream of the FRVs to the AFW line and ties into it just downstream of the AFW OCIV. Thus 'C' is the only correct answer.

**Technical Reference:** OPOP03-ZG-0003, Secondary Plant Startup (Rev 21)  
 LOT202.13.HO.01, Feedwater System Student Handout (Rev 10, page 31)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     4      
**55.43** \_\_\_\_\_

**Comments:**

KA: 059 Main Feedwater System, K1.02 – Knowledge of the physical connections and/or cause-effect relationships between the MFW and the following systems: AFW system





Examination Outline Cross-reference:	Level	RO	SRO
Tier #		2	
Group #		1	
K/A #		062.K1.03	
Importance Rating		3.5	

**Question 46:**

Which ONE of the following statements describes the effect of a loss of DC control power to the 4160 VAC bus normal feeder breaker supplying the 4160 VAC bus E1A?

The breaker will:

- A. remain in its current position, and can be tripped but not closed from its Control Room Panel.
- B. remain in its current position, and cannot be tripped or closed from its Control Room Panel.
- C. trip open, and cannot be closed but can be tripped from its Control Room Panel.
- D. trip open, and cannot be tripped or closed from its Control Room Panel.

**Answer:**     B    

**Explanation** (Optional):

Class 1E 125 VDC Electrical Distribution System supplies Class 1E 4.16 KV and 480 VAC breaker control power. Without breaker control power, the breaker remains in its current position and cannot be remotely tripped or closed. Thus 'B' is the only correct answer.

**Technical Reference:**     LOT201.37 Class 1E 125 VDC Electrical Distribution System  
Student Handout (Rev 7, Page 79)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #     STP - 960      
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam     2003    

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

**10 CFR Part 55 Content:** **55.41**     7      
**55.43** \_\_\_\_\_

**Comments:**

KA: 062 AC Electrical Distribution, K1.03 – Knowledge of the physical connections and/or cause-effect relationships between the AC distribution system and the following: DC distribution



55.43

**Comments:**

KA: 063 DC Electrical Distribution System, A3.01 – Ability to monitor automatic operation of the DC electrical system, including: meters, annunciators, dials, recorders, and indicating lights



<b>Cognitive Level:</b>	Memory or Fundamental Knowledge	_____
	Comprehension or Analysis	<u>    X    </u>
<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<u>    8    </u>
	<b>55.43</b>	_____

**Comments:**

KA: 064 Emergency Diesel Generator System, K6.07 – Knowledge of the effect of a loss or malfunction of the following will have on the EDG system: Air receivers

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	064.A2.11	
	Importance Rating	2.6	

**Question 49:**

ESF DG #13 has been operating at full load for a period of time to satisfy surveillance requirements. 0POP02-DG-0003, Emergency Diesel Generator 13 (23), contains recommended Unloading Rates. Based on the Notes/Precautions of 0POP02-DG-0003, these rates are based on which of the following?

- A. Optimum engine life and reliability
- B. Capability of the Diesel Generator governor system
- C. Maintaining frequency stability on 4160 V Bus E1C
- D. Maintaining load stability on 4160 V ESF Bus E1C

**Answer:**     A    

**Explanation** (Optional):

Section 4, Notes and Precautions (0POP02-DG-0003), Step 4.45: In order to ensure optimum engine life and reliability, it is important to operate an engine, whenever possible, in a manner that allows for gradual temperature changes and stabilization periods. Thus 'A' is the only correct answer.

**Technical Reference:**     0POP02-DG-0003, Emergency Diesel Generator 13 (23) (Rev 40)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 064 Emergency Diesel Generator System, A2.11 – Ability to (a) predict the impacts of the following malfunctions or operations on the EDG system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Conditions (minimum load) required for unloading an EDG

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	073.K4.01	
	Importance Rating	4.0	

**Question 50:**

What is the control function of Reactor Containment Building Ventilation System effluent radiation monitors RT-8012 & 8013?

- A. Sends a signal to the SSPS for Containment Ventilation Isolation (CVI).
- B. Sends a signal to the GWPS shutdown circuitry to close the intake and exhaust valves.
- C. Sends a signal to initiate Control Room/EAB emergency ventilation.
- D. Sends a signal to initiate FHB exhaust filtration.

**Answer:**     A    

**Explanation** (Optional):

- A. Correct - Containment Building Ventilation System RT-8012 & 8013 - High radiation in the RCB Purge System Exhaust sends a signal to the Solid State Protection System (SSPS) for Containment Ventilation Isolation (CVI). (Normal and supplementary purge)
- B. Incorrect - Gaseous Waste Processing System (GWPS) - RT-8032 High radiation as measured at the GWPS discharge or a monitor failure condition results in the shutdown of the GWPS. The High Rad or Monitor Failure sends a signal to the GWPS shutdown circuitry to close the discharge valve, inlet valve, and the BRS vent valve, and to secure the Bellows Compressor.
- C. Incorrect - Electrical Auxiliary Building and Control Room Envelope (HVAC) – RT-8033 & 8034 High radiation level at the EAB air intake initiates Control Room/EAB emergency ventilation.
- D. Incorrect - Fuel Handling Building HVAC System – RT-8035 & 8036 High radiation at the exhaust initiates FHB exhaust filtration.

**Technical Reference:**     LOT202.41.HO01, Radiation Monitoring System Student Handout (Rev 13, page 26)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:**     55.41         7

55.43

**Comments:**

Original K&A replaced (073.K4.02) – CVCS PRM does not auto isolate letdown at STP

KA: 073 Process Radiation Monitoring (PRM) System, K4.01 – Knowledge of PRM system design feature(s) and/or interlocks which provide for the following: Release termination when radiation exceeds setpoint

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	076.K2.08	
	Importance Rating	3.1*	

**Question 51:**

Given the following conditions:

- Unit 1 is at 100% power
- 'A' and 'C' ECW Trains are in service
- A reactor trip and Safety Injection occur
- Train 'A' ESF Load Sequencer does NOT automatically load ANY equipment.

Which ONE of the following correctly describes the operation of Train 'A' Essential Cooling Water (ECW) System?

- A. ECW Pump 'A' is operating; its discharge valve is open because it's powered directly from a 480 VAC LOAD CENTER that was not stripped by the ESF Load Sequencer.
- B. ECW Pump 'A' is operating; its discharge valve is open because it's powered directly from a 480 VAC MOTOR CONTROL CENTER that was not stripped by the ESF Load Sequencer.
- C. ECW Pump 'A' is not operating; its discharge valve is de-energized because it's powered directly from a 480 VAC LOAD CENTER that hasn't been re-energized by the ESF Sequencer.
- D. ECW Pump 'A' is not operating; its discharge valve is de-energized because it's powered directly from a 480 VAC MOTOR CONTROL CENTER that hasn't been re-energized by the ESF Load Sequencer.

**Answer:**           B          

**Explanation** (Optional):

- A. Incorrect. Although 'A' ECW Pump will be operating because it's not stripped on an SI condition, the discharge valve is powered from a 480 VAC Motor Control Center.
- B. Correct.
- C. Incorrect. 'A' ECW Pump will be operating because it's not stripped on an SI condition. Also, the valve is powered from a 480 VAC Motor Control Center.
- D. Incorrect. 'A' ECW Pump will be operating because it's not stripped on an SI condition.

**Technical Reference:** NLO100.29.HO.1, Essential Cooling Water (ECW) and Ventilation System Student Handout (Rev 9);  
LOT201.41.HO.01, ESF Load Sequencer Student Handout (Rev 6)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # \_\_\_\_\_  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New X \_\_\_\_\_  
**Question History:** Last NRC Exam \_\_\_\_\_  
**Cognitive Level:** Memory or Fundamental Knowledge \_\_\_\_\_  
Comprehension or Analysis X \_\_\_\_\_  
**10 CFR Part 55 Content:** 55.41 7 \_\_\_\_\_  
55.43 \_\_\_\_\_

**Comments:**

KA: 076 Service Water System, K2.08 – Knowledge of bus power supplies to the following:  
ESF-actuated MOVs

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	076.A4.01	
	Importance Rating	2.9	

**Question 52:**

Which ONE of the following is NOT an auto start signal for an Essential Cooling Water pump?

- A. SI actuation signal (Mode 1).
- B. Auto start of the same-train ESF DG.
- C. Low CCW header pressure < 76 psig.
- D. ECW pressure in the other two ECW Trains < 30 psig.

**Answer:**     B    

**Explanation** (Optional):

A. Incorrect. An ESF Sequencer start signal will start the ECW pumps after a time delay (Modes I, II, and III).

B. Correct. This is NOT an auto start signal for an ECW pump.

C and D. Incorrect. With the control switches for a non-running Train in the "AUTO" and "CONT RM" positions and the associated ECW/CCW Train Selector Switch in the "STANDBY" position, the ECW/CCW pumps in that Train will automatically start and annunciator "CCW TRAIN AUTO START" will be actuated on the train's ESF Control Panel after a 15 second time delay if either of two conditions occur: ECW pressure in the other two ECW Trains goes below 30 PSIG, or CCW common header pressure goes below 76 PSIG.

**Technical Reference:**     NLO100.29.HO.1, Essential Cooling Water (ECW) and Ventilation System Student Handout (Rev 9, pages 10 and 11)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     7      
**55.43** \_\_\_\_\_

**Comments:**

KA: 076 Service Water System, A4.01 – Ability to manually operate and/or monitor in the control room: ECW pumps



<b>Examination Outline Cross-reference:</b>	Level	<b>RO</b>	<b>SRO</b>
	Tier #	2	
	Group #	1	
	K/A #	078.K1.02	
	Importance Rating	2.7*	

**Question 53:**

Which ONE of the following accurately reflects the correct sequence of events as Instrument Air pressure drops from the normal operating value?

- A. Air Compressor 14 (24) starts/loads, Service Air Isolation Valve PV-9785 closes, Instrument Air to Yard Valve PV-8568 closes, Instrument Air Dryer Bypass Valve PV-9983 opens.
- B. Instrument Air to Yard Valve PV-8568 closes, IA Compressor 14 (24) starts/loads, Instrument Air Dryer Bypass Valve PV-9983 opens, Service Air Isolation Valve PV-9785 closes.
- C. Air Compressor 14 (24) starts/loads, Instrument Air Dryer Bypass Valve PV-9983 opens, Service Air Isolation Valve PV-9785 closes, Instrument Air to Yard Valve PV-8568 closes.
- D. Service Air Isolation Valve PV-9785 closes, IA Compressor 14 (24) starts/loads, Instrument Air Dryer Bypass Valve PV-9983 opens, Instrument Air to Yard Valve, PV-8568 closes

**Answer:**     A    

**Explanation** (Optional):

(Remote Control)	LOAD	IDLE
First Compressor	117 psi	127 psi
Second Compressor	115 psi	125 psi
Third Compressor	113 psi	123 psi

- 100 psig - SAS Isolation Valve closes
- 90 psig - IA to Yard isolates
- 90 psig - IAS HDR PRESS LO alarm
- 88 psig - LP FRVs drift closed
- 85 psig - SAS HDR PRESS LO alarm
- 80 psig - Letdown Orifice HDR Isolation Valves drift closed
- 80 psig - IA Dryer Bypass opens
- 67 psig - Main FRVs drift closed
- 60 psig - manual reactor trip

**Technical Reference:** NLO200.15.HO.1, Service and Instrument Air Student Handout (Rev 7, page 12 of 23);  
 OPOP04-IA-0001, Loss Of Instrument Air (Rev 11)  
 OPOP02-IA-0003, Instrument Air System Operation (Rev 6)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     7      
**55.43** \_\_\_\_\_

**Comments:**

KA: 078 Instrument Air, K1.02 – Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Service Air



Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	103.A2.04	
	Importance Rating	3.5*	

**Question 55:**

Which ONE of the following identifies required actions regarding containment as listed in OPOP04-FH-0001, Fuel Handling Accident?

- A. PA announcement to evacuate the RCB; check at least one door in each containment air lock clear of all obstructions and capable of being closed
- B. Check FHB HVAC operating in Emergency Mode; close at least one door in each containment air lock
- C. Check both doors capable of being closed in each containment air lock, check equipment hatch in place and secured
- D. Check containment ventilation isolation; close at least one door in each containment air lock

**Answer:**           D          

**Explanation** (Optional):

A - Incorrect. At least one door is required to be closed in each air lock, not just capable of being closed

B - Incorrect. FHB HVAC operating in Emergency Mode is action for Fuel Handling Accident in FHB

C - Incorrect. One door in each air lock is required to be closed, not just capable of being closed

D - Correct.

**Technical Reference:**   OPOP04-FH-0001, Fuel Handling Accident (Rev 7)  

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 103 Containment System, A2.04 - Ability to (a) predict the impacts of the following

malfunctions or operations on the containment system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Containment evacuation (including recognition of the alarm)

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

**Question 56:**

To recover a dropped Control Bank 'B' rod, the Rod Bank Selector Switch must be in the Control Bank 'B' position to allow \_\_\_\_\_.

- A. the Lift Coils of the affected bank to be de-energized so only the dropped rod will move when the Control Bank is commanded to move.
- B. rods in other Control Banks to move (when commanded) using logic in the Bank Overlap Unit so they maintain their overlap alignment.
- C. the dropped rod to move without moving rods in other Control Banks by defeating the logic in the Bank Overlap Unit.
- D. rods in the other Control Banks to move (when commanded) using logic in the Reactor Control Unit to maintain automatic rod programming.

**Answer:**         C        

**Explanation** (Optional):

- A: Incorrect – position of the Rod Bank Selector Switch (RBSS) does not affect the Lift Coil Disconnect Switches
- B: The bank overlap feature is disabled when the RBSS is out of either AUTO or MANUAL so only the rod bank selected will move when commanded.
- C: Correct -
- D: Incorrect – the RCU does not function when the RBSS is not in AUTO

**Technical Reference:**         LOT201.18.HO.01, Rod Control System Student Handout (Rev 9)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**         2          
**55.43** \_\_\_\_\_

**Comments:**

KA: 001 Control Rod Drive System, K4.02 – Knowledge of the CRDS design feature(s) and/or interlock(s) which provide for the following: Control rod mode select control (movement control)

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		2	
Group #		2	
K/A #		014.A1.04	
Importance Rating		3.5	

**Question 57:**

Unit 1 is operating at full power when a transient occurs that necessitates a rapid power reduction. During the power reduction the BANK INSRT LO-LO alarm is received. Which ONE of the below correctly describes the operator action that should be taken in accordance with OPOP09-AN-05M3 AND the effect on core power distribution?

- A. Commence emergency boration of the RCS. Only axial power distribution is impacted by the current control rod positions.
- B. Place rods in MANUAL and withdraw rods to clear the alarm. Only axial power distribution is impacted by the current control rod positions.
- C. Commence emergency boration of the RCS. Both axial and radial power distribution are impacted by the current control rod positions.
- D. Place rods in MANUAL and withdraw rods to clear the alarm. Both axial and radial power distribution are impacted by the current control rod positions.

**Answer:**     A    

**Explanation** (Optional):

Annunciator Response Instructions contain immediate actions to COMPARE rod bank positions on DRPI with Rod Insertion Limits. IF any RCCA bank is positioned below the Rod Insertion Limits for the current reactor power, THEN GO TO OPOP04-CV-0003, Emergency Boration. BANK INSRT LO-LO alarm is annunciated when rods are at the Rod Insertion Limit. BANK INSRT LO alarm is annunciated when rods are 10 steps above the Rod Insertion Limit. Rod height affects only axial power distribution. Thus, 'A' is the only correct answer.

**Technical Reference:** LOT201.19, Rod Position Indicating System Student Handout (Rev 11);  
OPOP09-AN-5M03, Annunciator Lampbox 5M03 Response Instructions (Rev 23), Window E4

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<b>5</b>
	<b>55.43</b>	

**Comments:**

KA: 014 Rod Position Indication System, A1.04 – Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RPIS controls, including: Axial and radial power distribution

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		2	
Group #		2	
K/A #		015.K5.15	
Importance Rating		3.3	

**Question 58:**

Unit 1 is at 90% power with Delta-I stable at -2 %. If Control Bank 'D' is inserted while diluting to maintain Tavg on program, the operator would expect which ONE of the following to occur?

- A. Delta-I will get LESS NEGATIVE, Xenon will INCREASE in the top of the core.
- B. Delta-I will get LESS NEGATIVE, Xenon will DECREASE in the top of the core.
- C. Delta-I will get MORE NEGATIVE, Xenon will INCREASE in the top of the core.
- D. Delta-I will get MORE NEGATIVE, Xenon will DECREASE in the top of the core.

**Answer:**         C        

**Explanation** (Optional):

Insertion of control rods reduces the flux in the top region of the core thus less leakage of fast neutrons at the upper detectors thus a MORE negative Delta-I. Reduced power in the top region of the core will reduce Xe burnout causing Xe concentration to INCREASE.

**Technical Reference:**         LOT201.16.HO.01, Excore Nuclear Instrumentation Student Handout (Rev 12, page 33)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**         1, 5          
**55.43** \_\_\_\_\_

**Comments:**

KA: 015 Nuclear Instrumentation System, K5.15 – Knowledge of the operational implications of the following concepts as they apply to the NIS: Effects of xenon on local flux, and factors affecting xenon concentrations



operation during inadequate core cooling (i.e., if applicable, average of five highest values)

Note from exam bank: Candidates must analyze the conditions and determine that inadequate core cooling is  $> 1200$  degrees  $^{\circ}\text{F}$  and that once SI pumps are started, superheated steam is forced out of the core area past the CETs causing temperature indication to initially increase. During the Facility validation of the written exam the SROs who were taking the exam felt that the question was hard but was a very good question.

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		2	
Group #		2	
K/A #		028.A1.01	
Importance Rating		3.4	

**Question 60:**

Given the following:

- Unit 1 was at 100% power when it tripped due to a LOCA
- Containment Hydrogen concentration is 2 %
- A Hydrogen Recombiner is being placed in service in accordance with OPOP02-CG-0001, Electric Hydrogen Recombiners

Which ONE of the following is NOT an indication that Recombiner operation is occurring after having placed the Hydrogen Recombiner in service?

- A. Recombiner temperature is above the threshold for hydrogen recombination.
- B. Recombiner power consumption is indicated by a sufficient KW output level on the associated CP002 wattmeter.
- C. Hydrogen concentration level is lowering as indicated on the containment hydrogen recorder on CP018.
- D. Containment pressure decreases after the Hydrogen Recombiner is placed in service.

**Answer:**         D        

**Explanation** (Optional):

OPOP05-EO-EO10 requires a Hydrogen Recombiner to be placed in service if H2 > 0.5 % IAW OPOP02-CG-0001. Section 6.0 contains a note that identifies three independent means of verifying Recombiner operation (Answers A-C above). Answer D is a correct statement if H2 concentration decreases or remains constant, but it is not by itself an indication of Recombiner operation.

**Technical Reference:**         OPOP02-CG-0001, Electric Hydrogen Recombiners (Rev 5)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 028 Hydrogen Recombiner and Purge Control System (HRPS), A1.01 – Ability to predict and/or monitor changes in parameter (to prevent exceeding design limits) associated with operating the HRPS controls including; Hydrogen concentration

CPSES Exam Bank, Objective: SYS.CY1.OB900. Modified stem and changed distractors by having applicant identify the INCORRECT means to verify recombiner operation.

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		2	
Group #		2	
K/A #		029.K3.01	
Importance Rating		2.9	

**Question 61:**

Unit 2 Containment pressure is 0.4 psig and the crew has decided to conduct a containment purge. The following conditions exist:

- Mode 4
- Supplementary Purge Supply Fan 21A is out of service
- Supplementary Purge Inlet and Outlet Dampers are opened
- A Supplementary Purge Exhaust Fan is started
- Supplementary Purge Supply Fan 21B fails to start.

Which ONE of the following describes the effect the given conditions have on Containment pressure?

- A. Will remain at 0.4 psig until two of three trains of RCFC's can be started.
- B. Will eventually equalize with atmospheric pressure without either Supplementary Purge Supply Fan running.
- C. Will remain at 0.4 psig until one of the two Supplementary Purge Supply Fans can be started.
- D. Will become negative without either Supplementary Purge Supply Fan running.

**Answer:**     D    

**Explanation** (Optional):

- A. Incorrect - containment pressure will not remain at .4 psig regardless of RCFC's.
- B. Incorrect - containment pressure will not equalize given current conditions
- C. Incorrect - containment pressure will not remain at .4 psig
- D. Correct - running an Exhaust Fan without a running Supply Fan will cause a negative pressure in the RCB

**Technical Reference:**     OPOP02-HC-0003, Supplementary Containment Purge (Rev 17, Section 6.0)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

**Cognitive Level:** Memory or Fundamental Knowledge \_\_\_\_\_

Comprehension or Analysis X

**10 CFR Part 55 Content:**

**55.41** 7

**55.43**           

**Comments:**

KA: 029 Containment Purge System, K3.01 – Knowledge of the effect that a loss or malfunction of the Containment Purge System will have on the following: Containment parameters



KA: 041 Steam Dump System and Turbine Bypass Control, G2.1.2 – Knowledge of operator responsibilities during all modes of plant operation.

From CPSES Exam Bank, KSA: 041.020.K4.09 (3.0, 3.3)

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

**Question 63:**

Given the following conditions:

- Plant is in Mode 6
- SSPS is in a normal Mode 6 configuration
- Fuel movement is in progress
- Supplementary purge is in service

RT-8013, RCB Purge Exhaust Monitor, spuriously goes into HIGH alarm.

Which ONE of the following describes the response of the Supplementary Purge System?

- A. Continues to operate normally.
- B. All Supplementary Purge isolation valves close with subsequent trip of the running fans.
- C. Only Train A powered Supplementary Purge isolation valves close
- D. Only Train B powered Supplementary Purge isolation valves close.

**Answer:**         B        

**Explanation** (Optional):

- A: INCORRECT - SSPS is required to be in "Operate" if supplementary purge is in progress which will result in a CVI signal being generated.
- B: CORRECT - A CVI signal will be generated and all valves will close and fans will stop.
- C: INCORRECT - All valves will close and fans will stop.
- D: INCORRECT - All valves will close and fans will stop.

**Technical Reference:** LOT202.33.HO.01, RCB HVAC Student Handout (Rev 6);  
 OPOP04-RA-0001, Rad Monitoring Sys Alarm Response (Rev 16, pages 17-18);  
OPOP08-FH-0009, Core Refueling (Rev 27, page 23)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #         STP - 72          
 Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

<b>Cognitive Level:</b>	Memory or Fundamental Knowledge	<u>          </u>
	Comprehension or Analysis	<u>    X    </u>
<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<u>    11    </u>
	<b>55.43</b>	<u>          </u>

**Comments:**

Original K&A replaced (072.K4.03) – ARM system has no interface with plant ventilation

KA: 072 Area Radiation Monitoring System, A3.01 – Ability to monitor automatic operation of the ARM system, including: Changes in ventilation alignment

The candidate must have knowledge that a CVI signal will not be generated unless SSPS is in ""Operate"" and that we are required to be in ""Operate"" in Mode 6 while moving fuel. The candidate must also have an understanding of how a CVI signal is generated from the Rad Monitoring system and how it interacts with the Supplementary Purge system. By analyzing the given conditions and each distractor, and then applying the knowledge, the correct response can be determined.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	075.A2.02	
	Importance Rating	2.5	

**Question 64:**

Unit 1 is operating at 100% power. Three Circulating Water Pumps are operating when a CWP TRIP/FAIL START alarm is received. Indications show CWP 11 has tripped for an unknown reason.

According to 0POP04-CW-0001, Loss of Circulating Water Flow, which ONE of the below correctly describes the Control Room actions to take (sequence is NOT important)?

- A. Trip the reactor, trip the turbine, and go to 0POP05-EO-EO00, Reactor Trip or Safety Injection.
- B. Ensure CWP 11 discharge valves closes, start the standby CWP and commence a load reduction to maintain condenser vacuum.
- C. Close CWP 11 discharge valve using it's control switch on CP-009, start the standby CWP and commence a load reduction to maintain condenser vacuum.
- D. Immediately attempt to restart CWP 11 one time, if it fails to start then start standby CWP, and commence load reduction to maintain condenser vacuum.

**Answer:**         B        

**Explanation** (Optional):

- A. Incorrect. Trip not required
- B. Correct.
- C. Incorrect. There is no switch for the CWP discharge valves in the Control Room.
- D. Incorrect. Starting affected pump is only allowed if cause is known and corrected.

**Technical Reference:**         0POP04-CW-0001, Loss of Circulating Water Flow (Rev 1)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: 075 Circulating Water System, A2.02 – Ability to (a) predict the impacts of the following malfunctions or operations on the circulating water system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	079.A4.01	
	Importance Rating	2.7	

**Question 65:**

Unit 2 is operating at 85% power when SAS ISOL VLV CLOSE annunciates. The operator notes the following header pressures:

- IA header pressure = 98 psig
- SA header pressure = 99 psig

While reviewing 0POP09-AN-08M3 for instructions, the operator notes the following header pressures:

- IA header pressure = 100 psig and increasing
- SA header pressure = 90 psig and decreasing

Given that all systems operate as designed, which ONE of the following describes the status of the IA and SA systems?

- A significant leak in the IAS has occurred, and automatic closure of Service Air Isolation Valve (PV-9785) has successfully isolated the SAS.
- A significant leak in the SAS has occurred and automatic closure of Service Air Isolation Valve (PV-9785) has successfully isolated the SAS.
- A minor leak in the IAS has occurred, and automatic closure of Instrument Air to Yard Valve (PV-8568) has successfully isolated the IAS.
- The size or location of the leak cannot be determined from given information.

**Answer:**         B        

**Explanation** (Optional):

Candidate must analyze the change in IAS/SAS header pressures and combine with the knowledge that SAS Isolation Valve automatically closes at 100 psig and all four air compressors are running at 113 psig IA pressure. Since it was given that all systems operate as designed, the SAS Isolation Valve closed at 100 psig (indicated by an decreasing SAS header pressure and increasing IAS header pressure) and successfully isolated the SAS. SA header pressure is decreasing at a significant rate thus the leak is significant (not minor).

**Technical Reference:** 0POP09-AN-08M3, Annunciator Lampbox 1(2)-08M-3 Response Instructions (Rev 31);  
0POP04-IA-0001, Loss Of Instrument Air (Rev 11)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:** **55.41**     7      
**55.43** \_\_\_\_\_

**Comments:**

KA: 079 Station Air System (SAS), A4.01 – Ability to manually operate and/or monitor in the control room: Cross-tie valves is IAS

Examination Outline Cross-reference:	Level	RO	SRO
Tier #		3	
Group #		1	
K/A #			G2.1.21
Importance Rating		3.1	

**Question 66:**

Which ONE of the following methods is NOT an approved way to assure that a working copy of a procedure is current?

- A. Inquiry in Oracle RMS or any Level 1 computer database.
- B. The procedure is verified against a Level 1 Station Controlled hardcopy procedure.
- C. Conduct a review of the daily listing of procedure changes for continual use operational procedures.
- D. Verify the working copy is the same revision and contains the same Field Changes as the last completed copy of the procedure.

**Answer:**     D    

**Explanation** (Optional):

Working copies or controlled copies of PROCEDURES other than from a Level 1 Station are verified to be current revision with all effective amendments included PRIOR TO USE by:

- Inquiry in Oracle RMS/ECM or any Level 1 computer-database. (preferred)
- OR
- Comparison to a Level 1 Station Controlled hardcopy PROCEDURE.
- OR
- Review of daily listing of PROCEDURE changes for continual use operational PROCEDURES.
- OR
- Inquiry to Document Control.
- OR
- Cognizant Managers Signature verified on new revision.

Therefore, D is the only correct answer.

**Technical Reference:**     0PGP03-ZA-0010, Performing and Verifying Station Activities (Rev 26, page 7 of 29)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # \_\_\_\_\_  
 Modified Bank #     STP - 165     (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

**10 CFR Part 55 Content:**                    **55.41**    10

**55.43**              

**Comments:**

KA: G2.1.21 – Ability to obtain and verify controlled procedure copy.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #		G2.1.14
	Importance Rating	2.5	

**Question 67:**

In accordance with Conduct of Operations guidance for use of the Public Address (PA) System, which ONE of the below plant/system conditions should NOT be announced using the PA?

- A. Entering a mid-loop condition
- B. Starting a Reactor Coolant Pump (RCP)
- C. Entering Mode 3
- D. Shifting a Battery Charger lineup

**Answer:**     D    

**Explanation** (Optional):

The paging system should be used to update plant personnel of the status of abnormal or emergency conditions, notification of change in plant status, or major plant events or evolutions in progress or anticipated.

**Technical Reference:**     Conduct of Operations Chapter 3, Section 3.2.3.1    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: G2.1.14 – Knowledge of system status criteria which require the notification of plant personnel.

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

**Question 68:**

Which ONE of the following is the correct sequence for paralleling the main generator to the grid?

- A. 1) Adjust voltage until the INCOMING VOLTS is slightly higher than the RUNNING VOLTS  
 2) Place the GEN BKR SYNC SW in the ON position  
 3) Adjust Main Turbine speed so the SYNCHROSCOPE needle is rotating slowly in the clockwise direction  
 4) Close the Main Generator Exciter Field Breaker  
 5) Close the Main Generator Breaker
- B. 1) Close the Main Generator Exciter Field Breaker  
 2) Adjust Main Turbine speed so the SYNCHROSCOPE needle is rotating slowly in the clockwise direction  
 3) Adjust voltage until the INCOMING VOLTS is slightly higher than the RUNNING VOLTS  
 4) Place the GEN BKR SYNC SW in the ON position  
 5) Close the Main Generator Breaker
- C. 1) Place the GEN BKR SYNC SW in the ON position  
 2) Adjust Main Turbine speed so the SYNCHROSCOPE needle is rotating slowly in the clockwise direction  
 3) Adjust voltage until the INCOMING VOLTS is slightly higher than the RUNNING VOLTS  
 4) Close the Main Generator Exciter Field Breaker  
 5) Close the Main Generator Breaker
- D. 1) Close the Main Generator Exciter Field Breaker  
 2) Place the GEN BKR SYNC SW in the ON position  
 3) Adjust Main Turbine speed so the SYNCHROSCOPE needle is rotating slowly in the clockwise direction  
 4) Adjust voltage until the INCOMING VOLTS is slightly higher than the RUNNING VOLTS  
 5) Close the Main Generator Breaker

**Answer:**         D        

**Explanation** (Optional):

A: INCORRECT - The field breaker must be closed in order to adjust the generator voltage or get a synchroscope output.

B: INCORRECT - The synch switch must be on in order to get a reading on the incoming and running voltmeters and to get a synchroscope output.

C: INCORRECT - Voltage cannot be adjusted until the synch switch is turned on and the field breaker closed.

D: CORRECT - Per the plant startup procedure, the field breaker is closed, then the synch switch turned on, then speed and voltage adjusted and finally the output breaker closed.

**Technical Reference:** 0POP03-ZG-0005, Plant Startup to 100% (Rev 48, pages 49-52)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # STP - 103  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: G2.2.2 – Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.

Noted on the question from the exam bank: Difficulty Justification - The candidate must have a basic understanding of generator theory and the design of the generator controls. By knowing what must be done to parallel a generator and understanding how the system works, the candidate can determine the correct sequence for performing these steps.



**Comments:**

KA: G2.2.22 – Knowledge of limiting conditions for operations and safety limits.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.27	
	Importance Rating	2.6	

**Question 70:**

Which ONE of the following correctly identifies the sequence of events for Non-Rapid Refueling Operations following entry into Mode 6?

- A. Establish 2 operable trains of RHR, detension reactor head bolts, uncouple control rod drive shafts, fill refueling cavity, remove reactor vessel head, remove upper internals, conduct core alterations
- B. Uncouple control rod drive shafts, remove reactor vessel head, remove upper internals, conduct core alterations, install upper internals, recouple control rods, tension reactor head bolts
- C. Establish RCS boron concentration > 2800 ppm, fill refueling cavity, uncouple control rod drive shafts, remove vessel head, refuel core, install reactor head, recouple control rods
- D. Remove reactor vessel head, uncouple control rod drive shafts, remove upper internals, refuel core, install reactor upper internals, recouple control rods, install reactor vessel head

**Answer:**         D        

**Explanation** (Optional):

- A. INCORRECT - 2 trains RHR operable is a requirement to enter Mode 6 and detensioning reactor head bolts transitions plant from Mode 5 to Mode 6
- B. INCORRECT - Vessel head is removed prior to uncoupling control rod drive shafts and tensioning reactor head bolts transitions plant to Mode 5
- C. INCORRECT - Boron concentration > 2800 ppm is a requirement to enter Mode 6 and control rod drive shafts are uncoupled after vessel head removal
- D. CORRECT – this sequence of events is detailed in ZG-0010

**Technical Reference:**         0POP03-ZG-0010, Refueling Operations (Rev 39)        

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam \_\_\_\_\_

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

<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<b>10</b>
	<b>55.43</b>	

**Comments:**

KA: G2.2.27 – Knowledge of the refueling process

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

**Question 71:**

Given the following:

- During a mid-cycle reactor startup the Reactor Containment Building (RCB) CNTMT PRESS HI/LO alarm annunciates with RCB pressure at +0.4 psig
- T.S. 3.6.1.4 for Containment Systems Internal Pressure is entered.
- It is determined a Supplementary Purge will be performed to lower RCB pressure
- Four RCFC's are in operation
- The Unit Supervisor notes that there is no Form 1, RCB Purge Notification Levels, in the Control Room.

In accordance with 0POP02-HC-0003, Supplementary Containment Purge, which ONE of the following describes the action(s) to be taken to lower RCB pressure?

- The purge may be started provided Chemistry concurs that a purge can be initiated without Form 1, RCB Purge Notification Levels.
- The purge may be started provided Chemistry continuously samples during the purge.
- The purge may NOT be started until a valid Form 1, RCB Purge Notification Levels, is in the Control Room.
- The purge may NOT be started until additional RCFC's are started.

**Answer:**         A        

**Explanation** (Optional):

A: CORRECT: Procedure identifies as a prerequisite that Chemistry has provided a completed copy of 0PCP09-HC-0001 Form 1, RCB Purge Notification Levels, OR Chemistry concurrence has been obtained to initiate a purge without notification levels for the rad monitors.

B: INCORRECT: see 'A' above.

C: INCORRECT: see 'A' above.

D: INCORRECT: Current procedure does not identify a requirement for RCFC's.

**Technical Reference:** 0POP02-HC-0003, Supplementary Containment Purge (Rev 17);  
T.S. 3.6.1.4; Containment Systems - Internal Pressure

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** \_\_\_\_\_ Bank #         STP - 445

Modified Bank # \_\_\_\_\_ (Note changes or attach parent)

New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

**Cognitive Level:** Memory or Fundamental Knowledge \_\_\_\_\_

Comprehension or Analysis     X    

**10 CFR Part 55 Content:** **55.41**     10    

**55.43** \_\_\_\_\_

**Comments:**

KA: G2.3.9 – Knowledge of the process for performing a containment purge

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #		G2.3.2
	Importance Rating	2.5	

**Question 72:**

A point source in the RCA is reading 500 mrem/hr at 1 foot. There are two tasks being considered in the area.

Task #1: Two operators working together are capable of completing the task in 20 minutes at 4 feet from the source.

Task #2: One operator can complete the task in 80 minutes at 8 feet from the source.

Which ONE of the following is the preferred task AND consistent with the goals of the ALARA program?

- A. Task #1 - each operator's exposure is 10.0-10.5 mrem
- B. Task #2 - the operator's exposure is 13.0-13.5 mrem
- C. Task #2 - the operator's exposure is 10.0-10.5 mrem
- D. Task #1 - each operator's exposure is 18.0-18.5 mrem

**Answer:**     C    

**Explanation** (Optional):

- A: INCORRECT: Does not support ALARA person-rem limit concept.
- B: INCORRECT: Option 2 exposure is 10 mrem.
- C: CORRECT: Accurate exposure and supports ALARA person-rem limit concept.
- D: INCORRECT: Option 1 exposure is 10 mrem to each operator.

**Technical Reference:** OPGP03-ZR-0052, ALARA Program (Rev 7);  
GET002.19.01

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #     STP - 425      
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<u>12</u>
	<b>55.43</b>	<u>          </u>

**Comments:**

KA: G2.3.2 – Knowledge of facility ALARA program

Difficulty Justification: The exposure for each operator for the job is the same (10.0-10.5 mrem depending on places carried in the hour multiplier). The ALARA program stresses the need to limit not only individual exposure but also total person-rem. For Option #1 the total exposure to both workers (10 + 10 = 20mrem) would be greater than that of Option #2 (10 mrem). This item requires the candidate to understand the ALARA concept, calculate the exposures and apply the results in choosing the best option.

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

**Question 73:**

An operator is scheduled to complete a valve lineup in an area where the radiation level is 50 mrem/hour and loose surface contamination is 500-750 dpm/cm<sup>2</sup> (50-75 net counts per minute beta/gamma using a pancake frisker probe).

If the operator's current Total Effective Dose Equivalent (TEDE) is 1400 mrem, how long can he work in this area and not exceed STP's Administrative Action Level (AAL) AND what protective clothing requirements are required to be identified on the RWP?

- A. 12 hours; hood, coveralls, cotton liners, booties, gloves, rubber booties
- B. 2 hours; hood, coveralls, cotton liners, booties, gloves, rubber booties
- C. 12 hours; no protective clothing is required
- D. 2 hours; no protective clothing is required

**Answer:**     D    

**Explanation** (Optional):

A - INCORRECT. 12 hours is determined using old AAL of 2000 mrem/yr and area is not a contamination area as defined by OPGP03-ZR-0044 (100 net counts per minute).

B - INCORRECT. Stay time is correct but area is not a contamination area

C - INCORRECT. Stay time is incorrect

D - CORRECT. The current STP AAL is 1500 mrem/year. 1500-1400 = 100 mrem remaining. 100/50 mrem/hr = 2 hours remaining. No protective clothing is required since area is not a contamination area.

**Technical Reference:** OPGP03-ZR-0044, Contamination Control Program (Rev 14, Section 3.1);  
OPGP03-ZR-0050, Radiation Protection Program (Rev 7, Section 5.5.2)

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # \_\_\_\_\_  
Modified Bank #     STP - 581     (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

<b>10 CFR Part 55 Content:</b>	<b>55.41</b>	<b>12</b>
	<b>55.43</b>	<hr/>

**Comments:**

KA: G2.3.4 – Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

<b>Examination Outline Cross-reference:</b>	Level	<b>RO</b>	<b>SRO</b>
	Tier #	3	
	Group #	4	
	K/A #		G2.4.20
	Importance Rating	3.3	

**Question 74:**

In accordance with OPOP01-ZA-0018, Emergency Operating Procedure (EOP) User’s Guide, which ONE of the following statements describes the proper use of CAUTIONS and NOTES?

CAUTIONS and NOTES within an EOP \_\_\_\_\_.

- A. that are applicable to the ENTIRE procedure will appear on the Conditional Information Page (CIP).
- B. always PRECEDE the step OR steps to which they apply.
- C. are to be reviewed by the Unit Supervisor BEFORE beginning with step 1 of the procedure.
- D. ONLY apply to the "Action/Expected Response" column items within a step.

**Answer:**     B    

**Explanation** (Optional):

Section 4.3 states "Observe all CAUTIONS and NOTES which precede EOP step:

- Cautions and notes always precede the step OR steps to which they apply.
- Cautions and notes that precede the first step in an EOP may apply to the entire procedure.
- Cautions and notes should be read aloud to the control room operators."

**Technical Reference:**     OPOP01-ZA-0018, Emergency Operating Procedure User’s Guide (Rev 17, page 8 of 40, Section 4.3)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #     STP - 801      
 Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: G2.4.20 – Knowledge of operational implications of EOP warnings, cautions, and notes.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #		G2.4.32
	Importance Rating	3.3	

**Question 75:**

The following conditions exist in Unit 1:

- Power is at 28% and being reduced to take the Unit offline for a short maintenance outage and being reduced in accordance with OPOP03-ZG-0006, Plant Shutdown from 100% to Hot Standby.
- The oncoming shift, when testing the annunciator panels, notes that approximately 50% of safety system annunciator panels and their associated ICS Lampbox Mimic will NOT illuminate.

Which ONE of the following actions should be taken in accordance with OPOP04-AN-0001, Loss of Control Room Annunciator Alarms?

- Trip the reactor and enter OPOP05-EO-EO00, Reactor Trip or Safety Injection.
- Continue the power reduction, but reduce the rate to less than 5% per hour.
- Stabilize the plant at the current power level.
- Prepare to place the Unit in Mode 3 within the next 6 hours.

**Answer:**     C    

**Explanation** (Optional):

Step 8 states “*MAINTAIN* Current Plant Conditions Until Control Room Annunciator Alarms Are Restored.”

**Technical Reference:**     OPOP04-AN-0001, Loss Of Control Room Annunciator Alarms (Rev 13, Step 8)    

**References to be provided to applicants during examination:**

None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank #     STP - 357      
 Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
 New \_\_\_\_\_

**Question History:** Last NRC Exam \_\_\_\_\_

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

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

**Comments:**

KA: G2.4.32 – Knowledge of operator response to loss of all annunciators.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	1
	Group #	1
	K/A #	008.AA2.28
	Importance Rating	3.9

**Question 76:**

While Unit 2 was operating at 100% power, a reactor trip and safety injection occurred. The operators observe the following plant conditions when they reach the steps in 0POP05-EO-EO00, Reactor Trip or Safety Injection, that diagnose for procedure transition criteria:

- RCS WR Pressure 1800 psig, slowly decreasing
- RCS NR T<sub>hot</sub> 560 °F, slowly decreasing
- SG NR Levels 16%, slowly increasing
- SG Pressures 1100 psig, stable
- Main Steamline Radiation Level Normal
- PRT Pressure 3 psig, increasing
- PZR Level 28%, increasing
- RCP Seal Injection Flow Normal
- RCB Temperature 140 °F, slowly increasing
- RCB Pressure 0.5 psig, slowly increasing
- RCB Humidity Increasing

Which ONE of the following actions will the operators perform?

- A. Transition to 0POP05-EO-EO20, Faulted Steam Generator Isolation
- B. Transition to 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant
- C. Transition to 0POP05-EO-ES11, SI Termination
- D. Transition to 0POP05-EO-EO30, Steam Generator Tube Rupture

**Answer:**           \_\_B\_\_

**Explanation (Optional):**

Candidate should determine that a PZR Code Safety Valve is stuck open (and not a PZR PORV since PZR PORVs are checked CLOSED at Step 9 of EO00). Either way, a loss of primary coolant requires entry into EO10.

A: INCORRECT. All SG pressures are stable therefore there is no faulted SG.

B: CORRECT.

C: INCORRECT. SI would not be terminated since RCS pressure is not stable or rising.

D: INCORRECT. Main steamline radiation levels are normal.

QDPS provides the following indications: RCS WR pressure, RCS NR T<sub>hot</sub>, SG NR levels, SG pressures, PZR level, RCB pressure.

**Technical Reference(s):** 0POP05-EO-EO00, Reactor Trip or Safety Injection

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_5\_\_\_\_\_

**Comments:**

KA: 008 Pressurizer Vapor Space Accident, AA2.28 – Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Safety parameter display system indications.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	1
	Group #	1
	K/A #	022.G2.4.30
	Importance Rating	3.6

**Question 77:**

According to 10CFR50.72, Immediate Notification Requirements for Operating Nuclear Power Reactors, which ONE of the following situations would require the NRC be notified within one hour?

- A. An SRO declares a Site Area Emergency as a result of complications that occurred during a loss of RCP seal injection flow.
- B. A valid ECCS actuation results in water being injected into the RCS.
- C. A valid actuation of the Solid State Protection System (SSPS) results in a reactor trip from 100% power.
- D. A plant shutdown is commenced under Tech Spec 3.0.3.

**Answer:**            \_\_A\_\_

**Explanation (Optional):**

According to the referenced CFR, an immediate notification (not later than one hour) is required after the time the licensee declares one of the Emergency Classes; 'B' and 'C' require the NRC be notified within 8 hours, and 'D' requires notification within 4 hours.

**Technical Reference(s):** 10CFR50.72(b);  
Conduct of Operations Manual, Chapter 2, Emergency Operations  
Outside of Design Basis

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41         
55.43   1  

**Comments:**

KA: 022 Loss of Reactor Coolant Makeup, G2.4.30 – Knowledge of which events related to system operations/status should be reported to outside agencies.

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Examination Outline <b>Cross-Reference:</b>	Level	SRO
	Tier #	1
	Group #	1
	K/A #	026.AA2.01
	Importance Rating	3.5

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**Question 78:**

Unit 1 is operating at 100% power when the “CCW SURGE TK LVL LO” annunciator alarms. A Control Room operator notes the surge tank level steadily decreasing. Actions by dispatched in-plant operators do not identify the source of the leak or restore surge tank level prior to CCW Surge Tank Low Level Non-Vital Supply Valves Isolation. Subsequent to this isolation, Control Room operators report surge tank level is at 63% and continues to slowly decrease.

Which ONE of the following identifies a possible leak location and the correct action for the Unit Supervisor based on the EXISTING plant conditions?

- A. A leak in the Letdown Heat Exchanger. Ensure makeup has been initiated to the CCW Surge Tank, then enter 0POP04-TM-0005, Rapid Load Reduction.
- B. A leak in an RCP Motor Cooler. Trip the Reactor, trip RCPs and go to 0POP05-EO-EO00, Reactor Trip or Safety Injection.
- C. A leak in an RCP Motor Cooler. Ensure makeup has been initiated to the CCW Surge Tank, and enter 0POP04-CC-0001, Loss of Component Cooling Water.
- D. A leak in the Letdown Heat Exchanger. Trip the Reactor, do NOT trip RCPs, and enter 0POP05-EO-EO00, Reactor Trip or Safety Injection.

**Answer:**            \_\_C\_\_

**Explanation (Optional):**

- A: Incorrect: CCW is secured to Letdown HX on non-vital supply valve isolation
- B: Incorrect: Reactor trip is not required as a result of a CCW leak in an RCP motor cooler
- C: Correct:
- D: Incorrect: CCW is secured to Letdown HX on non-vital supply valve isolation

**Technical Reference(s):**    0POP04-CC-0001, Loss of Component Cooling Water (Rev 13)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43  5

**Comments:**

Original KA (026.AA2.06 – Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: Length of time after the loss of CCW flow to a component before that component may be damaged) was rejected because this information is not readily available to operators at STP. Action steps in procedures are not contingent upon time after loss of CCW flow.

KA: 026 Loss of Component Cooling Water, AA2.01 – Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: Location of a leak in the CCWS

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<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	1
	Group #	1
	K/A #	057.AA2.19
	Importance Rating	4.3

**Question 79:**

Unit 1 is conducting a plant startup. At 25% power, a loss of 120 VAC Vital Distribution Panel DP-1201 occurs.

The automatic response of the plant to this failure would require the Unit Supervisor to immediately:

- A. Enter 0POP04-RC-0002, Reactor Coolant Pump Off Normal, and re-start an RCP.
- B. Enter 0POP04-NI-0001, Nuclear Instrument Malfunction, and de-energize Source Range High Voltage.
- C. Order a reactor trip and enter 0POP05-EO-EO00, Reactor Trip or Safety Injection.
- D. Enter 0POP04-VA-0001, Loss of 120 VAC Class Vital Distribution, and establish manual control of Steam Generator water levels.

**Answer:**            \_\_D\_\_

**Explanation (Optional):**

- A. Incorrect – Loss of DP-1201 defeats automatic Train “A” actuation trip of RCPs from an underfrequency trip but won’t cause a RCP to trip.
- B. Incorrect – Loss of DP-1201 disables Permissive P-13, not P-6.
- C. Incorrect – The loss of one Class 1E 120 VAC distribution panel will not directly trip the unit but prompt action is required to preclude key control parameters from exceeding their reactor trip setpoints.
- D. Correct – This immediate action is required regardless of what 120 VAC distribution panel failed.

**Technical Reference(s):** 0POP04-VA-0001, Loss Of 120 VAC Class Vital Distribution (Rev 18)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_5\_\_\_\_\_

**Comments:**

Original KA (057.AA2.09 – Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: Tave and Tref chart recorder) was rejected because this is not an SRO level topic at STP.

KA: 057 Loss of Vital AC Instrument Bus, AA2.19 – Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: The plant automatic actions that will occur on the loss of a vital ac instrument bus.



**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43   5  

**Comments:**

Original KA (W/E04 - LOCA Outside Containment, G2.3.9 – Knowledge of the process for performing a containment purge) was rejected because it is not applicable during a LOCA outside of containment.

KA: W/E04 LOCA Outside Containment, G2.4.24 – Knowledge of loss of cooling water procedures.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	1
	Group #	1
	K/A #	W/E05.G2.4.8
	Importance Rating	3.7

**Question 81:**

A Loss of Secondary Heat Sink event has developed requiring the SRO to enter the EOP's. During the implementation of the EOP's, abnormal indications develop involving the Reactor Coolant Pumps (RCPs) and the potential for a loss of forced core cooling flow.

In accordance with 0POP01-ZA-0018, EOP User's Guide, in this situation, the SRO:

- A. Must complete the EOP's actions and then implement the RCP Off-Normal Procedure.
- B. Must concurrently implement the EOP's and the RCP Off-Normal Procedure.
- C. Should concurrently implement the RCP Off-Normal Procedure if resources permit and it does not conflict with the EOP's.
- D. Should concurrently implement the EOP actions if resources permit and they do not conflict with the actions of the RCP Off-Normal procedure.

**Answer:**            \_\_C\_\_

**Explanation (Optional):**

Per procedure 0POP01ZA0018, 4.25.4 states actions should be taken per Off Normal Operating Procedures and Annunciator Response Procedures that DO **NOT** conflict with the actions of the EOPs if adequate resources are available. The Off Normal Operating Procedure or Annunciator Response Procedure should be entered and procedure steps followed. (e.g., IF during the performance of the EOPs there are indications of abnormal RCP conditions, THEN the RCP Off Normal Operating Procedure SHOULD be entered.)

**Technical Reference(s):**   0POP01ZA0018, EOP Users Guide (Rev 17, Section 4.25.4)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_5\_\_\_\_\_

**Comments:**

KA: W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink, G2.4.8 – Knowledge of how the event-based emergency/abnormal operating procedures are used in conjunction with the symptom-based EOP's.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	1
	Group #	2
	K/A #	005.AA2.03
	Importance Rating	4.4

**Question 82:**

Given the following for Unit 1 at 100% power:

- 0100: A Shutdown Bank control rod was discovered to be stuck in the fully withdrawn position due to some type of mechanical interference. The rod is declared inoperable.
- 0200: A second Shutdown Bank rod dropped into the core.

Which ONE of the below actions is the Unit Supervisor required to take?

- A. Trip the Reactor and enter OPOP05-EO-EO00, Reactor Trip or Safety Injection.
- B. Enter Tech Spec 3.0.3 and commence a plant shutdown within 1 hour.
- C. Perform a load reduction to below 45% power within 1 hour in accordance with OPOP04-TM-0005, Fast Load Reduction.
- D. Initiate a plant shutdown to be in Hot Standby by 0700.

**Answer:**            \_\_D\_\_

**Explanation (Optional):**

In this situation, TS 3.1.3, Movable Control Assemblies – Group Height, applies. With one rod inoperable due to mechanical interference, LCO action statement 3.1.3.1.a must be entered. It requires the plant be in hot standby (Mode 3) within 6 hours. Since the rod was declared inoperable at 0100, the plant must be in Mode 3 no later than 0700 making 'D' the correct answer.

**Technical Reference(s):**    Technical Specification 3/4.1.3

**References to be provided to applicants during examination:** TS 3/4.1.3 to be provided as part of separate reference package.

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_2\_\_\_\_\_

**Comments:**

KA: 005 Inoperable/Stuck Control Rod, AA2.03 – Determine and interpret required actions if more than one rod is stuck or inoperable.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	1
	Group #	2
	K/A #	061.AA2.06
	Importance Rating	4.1

**Question 83:**

Given the following:

- Unit 1 is operating at 100% power
- Personnel are in Containment for inspections
- The Rad Monitor panel (RM-11) sounds an audible alarm
- The Reactor Operator reports the status display for RT-8050 (RCB High Range Monitor) shows MAGENTA and the status display for RT-8051 (RCB High Range Monitor) shows GREEN.
- Containment Ventilation Isolation (CVI) did NOT occur

Which ONE of the below correctly describes the action the Unit Supervisor is required to take?

- A. Initiate a Containment evacuation.
- B. Initiate a Containment evacuation and manually initiate a CVI.
- C. Enter Tech Spec 3.3.3.6, Accident Monitoring Instrumentation.
- D. Enter Tech Spec 3.3.3.6, Accident Monitoring Instrumentation and manually initiate a CVI.

**Answer:**            \_\_C\_\_

**Explanation (Optional):**

Per the Tech Ref, a Magenta color designates a Communication Problem thus there is no valid alarm condition. Without a valid alarm, answers 'A' and 'B' and 'D' are incorrect. 'C' is the only correct answer.

**Technical Reference(s):**    LOT202.41.HO01, Radiation Monitoring System Student Handout

(Rev 13)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_12\_\_\_\_\_

**Comments:**

Original KA (061.AA2.03 – Ability to determine and interpret the following as they apply to the ARM system alarms: Setpoints for alert and high alarms) was rejected because it is not possible to write a SRO level question. Also, STP operators are not required to memorize setpoints.

KA: 061 Area Radiation Monitoring (ARM) System Alarms, AA2.06 – Ability to determine and interpret the following as they apply to the ARM system alarms: Required actions if alarm channel is out of service

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	1
	Group #	2
	K/A #	068.AA2.08
	Importance Rating	4.1

**Question 84:**

The Control Room is being evacuated due to a fire in the Relay Room.

Which ONE of the following identifies the basis for isolating the Main Steam system in response to a Control Room evacuation AND how the Main Steam system is isolated?

- A. To prevent spurious operation of MSIVs due to circuitry affected in the Control Room; operators initiate Main Steam Isolation from the Auxiliary Shutdown Panel
- B. To ensure that an uncontrolled RCS cooldown does not occur; operators initiate Main Steam Isolation from the Control Room
- C. To prevent spurious operation of MSIVs due to circuitry affected in the Control Room; operators initiate Main Steam Isolation from the Control Room
- D. To ensure that an uncontrolled RCS cooldown does not occur; operators initiate Main Steam Isolation from the Auxiliary Shutdown Panel

**Answer:**           \_\_B\_\_

**Explanation (Optional):**

The main steam system is isolated prior to exiting the CR to ensure that an uncontrolled cooldown does not occur. The procedure directs operators to initiate Main Steam Isolation from CP005 or CP006, thus Answer B is the only correct answer.

**Technical Reference(s):**    OPOP04-ZO-0001, Control Room Evacuation (Rev. 25, Page 5 of 205) and Addendum 20 Basis (Basis Page 4 of 78)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_5\_\_\_\_\_

**Comments:**

KA: 068 Control Room Evacuation, AA2.08 – Ability to determine and interpret the following as they apply to the Control Room Evacuation: S/G pressure

Candidate must recognize that any escape of steam from the SGs reduces SG pressure, thus lowering Tsat. Lowering secondary temperature will increase the heat transfer rate from the primary to the secondary, thus causing a cooldown of the primary.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	1
	Group #	2
	K/A #	W/E03 G2.4.21
	Importance Rating	4.3

**Question 85:**

Unit 2 has experienced a small break LOCA. Operators have just transitioned from 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant to 0POP05-EO-ES12, Post LOCA Cooldown and Depressurization, Step 1. The STA reports the following conditions as read from QDPS:

- RCS Loop cold leg temperature changes over the last hour:
  - Loop A – 102 °F
  - Loop B – 98 °F
  - Loop C – 100 °F
  - Loop D – 85 °F
- Current WR Loop Tcold temperatures are:
  - Loop A – 210 °F
  - Loop B – 235 °F
  - Loop C – 245 °F
  - Loop D – 250 °F
- RCS Pressure = 1000 psig

Which ONE of the following identifies the correct Integrity CSF Status Tree color AND what procedure will the Unit Supervisor be required to implement?

- A. RED; Go To 0POP05-EO-FRP1, Response to Imminent Pressurized Thermal Shock Condition.
- B. ORANGE; Go To 0POP05-EO-FRP1, Response to Imminent Pressurized Thermal Shock Condition.
- C. YELLOW; Go To 0POP05-EO-FRP2, Response to Anticipated Pressurized Thermal Shock Condition.

D. GREEN; Continue with OPOP05-EO-ES12, Post LOCA Cooldown and Depressurization.

Answer:   B  

**Explanation (Optional):**

Candidate must analyze current conditions and compare them to decision points in the Integrity CSF Status Tree using Addendum 1 as a reference.

A: Incorrect. Since all RCS Cold Leg temperatures are to the right of Limit A (on Addendum 1), a RED path is not correct.

B: Correct. Since all RCS Cold Leg temperatures are NOT above 244 °F, the ORANGE path is selected.

C: Incorrect. Since all RCS Cold Leg temperatures are NOT above 244 °F, a YELLOW path is not correct.

D: Incorrect. Since all RCS Cold Leg temperatures are NOT above 244 °F, a GREEN path is not correct.

**Technical Reference(s):** OPOP05-EO- FO04, Integrity Critical Safety Function Status Tree (Rev 3)

**References to be provided to applicants during examination:** OPOP05-EO- FO04, Integrity Critical Safety Function Status Tree, Page 2 of 2, Addendum 1 and Addendum 2 to be provided as part of separate reference package.

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43   5

**Comments:**

KA: W/E03 LOCA Cooldown and Depressurization, G2.4.21 – Knowledge of the parameters and logic used to assess the status of safety functions including:

1. Reactivity control
2. Core cooling and heat removal
3. Reactor coolant system integrity
4. Containment conditions
5. Radioactivity release control

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	2
	Group #	1
	K/A #	012.A2.02
	Importance Rating	3.9

**Question 86:**

Given the following:

- Unit 2 is operating at 30% steady state reactor power
- An I&C technician receives permission to perform a calibration on Power Range Channel N41
- The I&C technician mistakenly pulls the control power fuses on Power Range Channel N42; then, realizing his mistake, he re-inserts the fuses for N42 and pulls the control power fuses for the correct channel, N41.

Which procedure should the Unit Supervisor implement AND what is the correct reason?

- A. 0POP05-EO-EO00, Reactor Trip or Safety Injection, because an automatic reactor trip has occurred on Power Range High Flux, High Setpoint Trip
- B. 0POP05-EO-EO00, Reactor Trip or Safety Injection, because an automatic reactor trip has occurred on Power Range Positive Rate.
- C. 0POP04-NI-0001, Nuclear Instrument Malfunction, to ensure PR N42 is in service and operable.
- D. 0POP04-NI-0001, Nuclear Instrument Malfunction, to realign SSPS input logic to account for PR N41 being removed from service.

**Answer:**            \_\_B\_\_

**Explanation (Optional):**

0POP04-NI-0001, Nuclear Instrument Malfunction, Addendum 3, PR NI Malfunction (Step 15.g) has the control power fuses pulled, then checks the bistables tripped per Addendum 6. Addendum 6 lists 4 bistables that will trip: PR LO (reduced high flux trip setpoint when P < P-10), PR HI (normal High Flux trip that's enabled at P > P-10), Positive Rate, and OTDT Loop 1.

When the control power fuses for N42 are reinstalled, clears all the trip signals except for the positive rate trip. There's a reset switch for this trip on the NI cabinets in the control room. Thus, when control power fuses for N41 are pulled, 2 of 4 trip signals are present for Positive Rate.

**Technical Reference(s):** LOT201.16.HO.01, Excore Nuclear Instrumentation Student Handout (Rev. 12, page 23)  
0POP04-NI-0001, Nuclear Instrument Malfunction (Rev 11)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

**Question Source:** Bank # STP - 905  
Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43   5  

**Comments:**

KA: 012 Reactor Protection System, A2.02 – Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of instrument power.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	2
	Group #	1
	K/A #	026.G2.1.7
	Importance Rating	4.4

**Question 87:**

Unit 1 is operating at power when the following occur in sequence:

- A Loss of Coolant Accident (LOCA) occurs
- All ESF equipment is functioning as designed
- Containment Phase 'A' Isolation is reset
- ESF Load Sequencers are reset in the Control Room only
- Containment Pressure increases to 9.8 psig.
- 0POP05-EO-EO00, Reactor Trip or Safety Injection, is complete including Addendum 5.
- A Reactor Operator reports that no Containment Spray Pumps are running, but their discharge valves are open.

Based on these conditions, what actions would the Unit Supervisor be required to implement?

- In accordance with 0POP05-EO-FRZ1, Response to High Containment Pressure, direct the Reactor Operator to manually start the Containment Spray Pumps using their respective pump control switches.
- In accordance with 0POP05-EO-FRZ1, Response to High Containment Pressure, direct the Reactor Operator to manually actuate Containment Spray by using the Containment Spray Manual Actuation Switches.
- In accordance with 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant, direct the Reactor Operator to manually actuate Containment Spray by using the Containment Spray Manual Actuation Switches.
- In accordance with 0POP05-EO-EO10, Loss of Reactor or Secondary Coolant, direct the Reactor Operator to manually start the Containment Spray Pumps using their respective pump control switches.

**Answer:**            \_\_A\_\_

**Explanation (Optional):**

The student must recognize that the ESF Load Sequencers were reset before Containment

pressure increased to above the Containment Spray actuation setpoint thereby disabling the actuation logic both automatically and manually. Thus the Containment Spray Pumps would have to be started manually with their control switches. Candidate must also know the applicable procedure that directs the actions to be taken.

**Technical Reference(s):** 0POP05-EO-FRZ1, Response to High Containment Pressure (Rev 6, Step 3)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_5\_\_\_\_\_

**Comments:**

KA: 026 Containment Spray, G2.1.7 – Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	2
	Group #	1
	K/A #	059.A2.07
	Importance Rating	3.3*

**Question 88:**

Given the following:

- Unit 1 is operating at 80% power
- All 3 SGFPT's are in service
- SUFP is in AUTO
- SGFPT 12 trips

Which ONE of the following correctly describes the impact on the Main Feedwater System and the appropriate action for the Unit Supervisor to take?

- A. Trip of SGFPT 12 will result in inadequate feed flow for the current steam demand (reactor power). The Unit Supervisor should enter 0POP04-FW-0002, Steam Generator Feed Pump Trip, and commence a rapid load reduction.
- B. Trip of SGFPT 12 will NOT result in inadequate feed flow for the current steam demand (reactor power). The Unit Supervisor should enter 0POP04-FW-0002, Steam Generator Feed Pump Trip, but NOT commence a rapid load reduction.
- C. Trip of SGFPT 12 will NOT result in inadequate feed flow for the current steam demand (reactor power). The Unit Supervisor should enter 0POP04-FW-0001, Loss of Steam Generator Level Control, but NOT commence a rapid load reduction.
- D. Trip of SGFPT 12 will result in inadequate feed flow for the current steam demand (reactor power). The Unit Supervisor should enter 0POP04-FW-0001, Loss of Steam Generator Level Control, and commence a rapid load reduction.

**Answer:**            \_\_B\_\_

**Explanation (Optional):**

A feed pump trip causes an immediate reduction in the capability to supply feedwater to the Steam Generators. Each turbine driven pump is capable of pumping approximately 40% of the required feed flow at full power, and the startup feed pump is capable of pumping approximately 25% of the required feed flow at full power. Tripping of ONE SGFPT (two remaining) will NOT result in inadequate feed flow for 80% power. Also, a trip of a turbine driven pump should automatically start the startup feed pump since it's in AUTO. Since adequate feed flow exists, a

load reduction is not required and a loss of SG water level is not expected so the correct procedure to enter is FW-0002.

**Technical Reference(s):** 0POP04-FW-0002, Steam Generator Feed Pump Trip (Rev 14)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43   5  

**Comments:**

Original KA (059.A2.04 – Feeding a dry S/G) was rejected because it is not applicable at STP. A dry SG would be fed using AFW, not MFW. Also, no operations procedure exists for feeding a dry SG.

KA: 059 Main Feedwater (MFW) System, A2.07 – Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Tripping a MFW pump turbine.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	2
	Group #	1
	K/A #	062.A2.01
	Importance Rating	3.9

**Question 89:**

A loss of all AC power has occurred.

- The crew has completed the immediate actions of 0POP05-EO-EC00, Loss of All AC Power.
- Buses 1G5 and 12K3 are energized
- NO other busses are energized

Based on these conditions, the SRO should direct the crew to:

- Exit 0POP05-EO-EC00 because some buses have AC power and attempt to restore the 1G8 bus per 0POP02-DB-0003, Balance of Plant Diesel Generator.
- Continue with 0POP05-EO-EC00 and attempt to restore the 1G8 bus per 0POP02-DB-0003, Balance of Plant Diesel Generator.
- Exit 0POP05-EO-EC00 because some buses have AC power and attempt to restore the 1G8 bus per 0POP02-DB-0005, Technical Support Center Diesel Generator.
- Continue with 0POP05-EO-EC00 and attempt to restore the 1G8 bus per 0POP02-DB-0005, Technical Support Center Diesel Generator.

**Answer:**            \_\_D\_\_

**Explanation (Optional):**

The next step in procedure 0POP05-E0-EC00 is step 3, which is to establish RCP flow using the PDP pump. The PDP pump is powered from bus 1G8 via the TSC diesel generator, which did not start as implied in the stem. This makes "D" correct. "A" and "C" are incorrect because you cannot exit procedure 0POP05-E0-EC00 until several steps later (when vital power is restored, etc.). The PDP is on 1G8, not 1G5, and so "B" is also incorrect because the BOP generator powers 1G5.

**Technical Reference(s):**    0POP05-E0-EC00, Loss of All AC Power (Rev 16, page 5);  
0POP02-DB-0005, Technical Support Center Diesel Generator  
(Rev 27)

References to be provided to applicants during examination: None

Learning Objective: \_\_\_\_\_ (As available)

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

Question History: Last NRC Exam N/A

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_5\_\_\_\_\_

**Comments:**

Original KA (062 AC Electrical Distribution, A2.14 – Performance of ground isolation procedures: determination of their effect on interface systems) was rejected because STP does not have ground isolation procedures.

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

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	2
	Group #	1
	K/A #	073.G2.3.11
	Importance Rating	3.2

**Question 90:**

Given the following:

- Unit 1 is operating at 100% power with a normal at-power lineup
- CCW Radiation Monitor RT-8040 goes into ALERT alarm

Which ONE of the actions below should the Unit Supervisor order to isolate the release of activity?

- A. Close Seal Return Isolation Valves MOV-0077 and MOV-0079
- B. Isolate Excess Letdown
- C. Shift Spent Fuel Pool Cooling Heat Exchangers
- D. Isolate Steam Generator Blowdown

**Answer:**            \_\_C\_\_

**Explanation (Optional):**

The candidate must know that RT-8040 is the CCW Liquid Monitor. For it to alarm, activity must have entered the CCW system. Components operating at a higher pressure than CCWS include the following:

- |                                     |   |
|-------------------------------------|---|
| ·RHR heat exchanger (if in service) | ·RCDT heat exchanger (if in service)    |
| ·RCP thermal barrier heat exchanger | ·Primary sample coolers                 |
| ·Letdown heat exchanger             | ·Spent Fuel Pool Cooling heat exchanger |
| ·Excess letdown heat exchanger      |   |

Since excess letdown is NOT in service (as stated in the stem), only the SPF HX could cause in-leakage to the CCW system. Therefore, only 'C' is correct.

**Technical Reference(s):**    LOT201.12.HO.01, Component Cooling Water Student Handout (Rev 11)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43   5  

**Comments:**

KA: 073 Process Radiation Monitoring System, G2.3.11 – Ability to control radiation releases.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	2
	Group #	2
	K/A #	011.A2.11
	Importance Rating	3.6

**Question 91:**

Given the following:

- Unit 1 is at 100% power
- Pressurizer Level Control is selected to 467/466
- Pressurizer Level Channel LT-0465 fails low

Which ONE of the below correctly describes the required action by the Unit Supervisor to mitigate this failure AND the results IF NO operator action were taken?

- Order charging flow isolated and Excess Letdown placed in service; Pressurizer level will increase approximately 1% every 1.5-2.0 minutes.
- Order Letdown Stop Valve LCV-0465 bypassed and seal injection flow reduced to 6 gpm/RCP; Pressurizer level will increase approximately 1% every 1.5-2.0 minutes.
- Order Letdown Stop Valve LCV-0465 bypassed and seal injection flow reduced to 6 gpm/RCP; Pressurizer level will increase approximately 1% every 2.5-3.0 minutes.
- Order charging flow isolated and Excess Letdown placed in service; Pressurizer level will increase approximately 1% every 2.5-3.0 minutes.

**Answer:**            \_\_A\_\_

**Explanation (Optional):**

LT-0465 is an input to letdown isolation even when not selected as a controlling channel. When 465 fails low, the < 17% signal initiates letdown isolation. RP-0002 directs Excess letdown to be placed in service.

Plant Curve Book, Figure 10.7 shows 2% level = 274 gal (1%=137 gal). With letdown isolated and no operator action, actual PZR level will rise as indicated by LT-467/466 due to charging flow and seal return. Charging flow will reduce to 50 gpm (minimum flow when FCV-205 in AUTO) and RCP seal return is 20 gpm. Thus, PZR level will increase at the rate of 137 gal / 70 gpm = 1.95 min per 1% level. Distractor of 2.5-3.0 min was chosen if candidate forgets seal return (137 gal / 50 gpm = 2.74 min)

**Technical Reference(s):** OPOP04-RP-0002, Loss Of Automatic Pressurizer Level Control (Rev 17);  
LOT201.14.HO.01, Pressurizer Pressure and Level Control System Student Handout (Rev 12);  
Unit 1 Plant Curve Book, Figure 10.7, Pressurizer (Rev 4);  
LOT201.06, CVCS Lesson Plan (Rev 14)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43   5  

**Comments:**

Original KA (011 Pressurizer Level Control System, A2.08 – Loss of level compensation) was rejected because STP does not have level compensation for PZR level.

KA: 011 Pressurizer Level Control System, A2.11 – Ability to (a) predict the impacts of the following malfunctions or operations on the PZR Level Control System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of PZR Level Instrument-low.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	2
	Group #	2
	K/A #	029.A2.04
	Importance Rating	3.2

**Question 92:**

Given the following:

- Plant is at 100% power steady state operation.
- Preparations for performing a containment purge are in progress.
- Noble gas concentration inside the RCB is 5.2E-04  $\mu\text{Ci/cc}$ .

Which ONE of the following identifies the procedure that should be used for the purge AND the actions that should be taken to prevent the actuation of an ESF Containment Ventilation Isolation (CVI) during the containment purge?

- A. 0POP02-HC-0002, "NORMAL CONTAINMENT PURGE"; Increase the High alarm setpoint of RT-8012 & 8013 (RCB Purge Monitors).
- B. 0POP02-HC-0003, "SUPPLEMENTARY CONTAINMENT PURGE"; Increase the High alarm setpoint of RT-8012 & 8013 (RCB Purge Monitors).
- C. 0POP02-HC-0002, "NORMAL CONTAINMENT PURGE"; Increase the High alarm setpoint on RT-8011 (Containment atmosphere radiation monitor).
- D. 0POP02-HC-0003, "SUPPLEMENTARY CONTAINMENT PURGE"; Increase the High alarm setpoint on RT-8011 (Containment atmosphere radiation monitor).

**Answer:**           \_\_B\_\_

**Explanation (Optional):**

0POP02-HC-0003, "SUPPLEMENTARY CONTAINMENT PURGE" is the procedure to be used during purge of containment at power, eliminating 'A' and 'C' choices. To prevent CVI isolation, the high alarm setpoint for 8012/8013 must be increased IAW procedure 0POP02-HC-0003, eliminating choice 'D'.

**Technical Reference(s):**   0POP02-HC-0003, Supplementary Containment Purge (Rev 17)  
0POP02-HC-0002, Normal Containment Purge (Rev 10)

References to be provided to applicants during examination: None

Learning Objective: \_\_\_\_\_ (As available)

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

Question History: Last NRC Exam N/A

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

10 CFR Part 55 Content: 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_5\_\_\_\_\_

**Comments:**

KA: 029 Containment Purge System, A2.04 – Ability to (a) predict the impacts of the following malfunctions or operations on the Containment Purge System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Health physics sampling of containment atmosphere.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	2
	Group #	2
	K/A #	033.G2.4.37
	Importance Rating	3.5

**Question 93:**

A severe hurricane initiated a plant transient that has resulted in a complete loss of Spent Fuel Pool Cooling during a Unit 1 outage. Pool boiling over the last few hours has resulted in a loss of water inventory and fuel damage is now beginning to occur. The Shift Supervisor has assumed the role of Emergency Director and does not anticipate being relieved for the next few hours due to the weather conditions. Based on the radiological release now in progress, the Emergency Director has declared a Site Area Emergency.

In accordance with 0ERP01-ZV-SH01, Shift Supervisor, the Emergency Director may delegate the authority to \_\_\_\_\_.

- A. approve required notifications to the state and county.
- B. approve exposures in excess of those contained in 10CFR20, Standards for Protection Against Radiation.
- C. authorize the use of potassium iodide (KI) pills.
- D. request federal assistance.

**Answer:**            \_\_D\_\_

**Explanation (Optional):**

According to the South Texas Project Emergency Plan, answers 'A', 'B', and 'C' may not be delegated. Answer 'D' may be delegated making it the only correct answer.

**Technical Reference(s):**    0OERP01-ZV-SH01, Shift Supervisor, steps 5.5 and 5.6.

**References to be provided to applicants during examination:** None

**Learning Objective:**            \_\_\_\_\_ (As available)

**Question Source:**            Bank #            \_\_\_\_\_

Modified Bank # \_\_\_\_\_ (Note changes or attach parent)  
New \_\_\_\_\_X\_\_\_\_\_

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_5\_\_\_

**Comments:**

KA: 033 Spent Fuel Pool Cooling System, G2.4.37 – Knowledge of the lines of authority during an emergency.



Comprehension or Analysis

\_\_\_\_\_

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_1\_\_

**Comments:**

KA: Conduct of Operations, G2.1.5 - Ability to locate and use procedures and directives related to shift staffing and activities.



New

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41   
55.43

**Comments:**

KA: Conduct of Operations, G2.1.22 – Ability to determine Mode of Operation.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	3
	Group #	
	K/A #	2.2.26
	Importance Rating	3.7

**Question 96:**

A refueling is in progress when the audible count rate indication in the Control Room fails.

During the next hour, the following evolutions were expected to take place:

- Move the secondary source from one core location to another
- Remove 4 fuel assemblies from the core
- Reposition the shoehorn
- Reposition an underwater camera

What is your direction as the Core Loading supervisor regarding the evolutions listed above?

- A. Only allow movement of the secondary source, underwater camera, and shoehorn as long as the boron concentration is verified within 12 hours.
- B. Allow ALL of the evolutions to occur after boron concentration is verified adequate.
- C. Only allow movement of the shoehorn and underwater camera until the audible count rate indication in the Control Room is again operable.
- D. Allow NONE of the evolutions to occur until the audible count rate indication in the Control Room is again operable.

**Answer:**            \_\_C\_\_

**Explanation (Optional):**

0POP08-FH-0009, Core Refueling, Section 5.5 identifies conditions where the Core Load Supervisor should suspend Core Alterations and includes if either Core Monitoring NI becomes INOP. Thus as given in the stem, the candidate should recognize that Core Alterations should be suspended.

0POP03-ZG-0010, Refueling Operations, is the administrative procedure for these activities and Core Alterations are defined in Sections 4.12 and 4.13. Per this procedure, moving the secondary source from one core location to another and remove fuel assemblies from the core are considered Core Alterations, and therefore are not allowed to be conducted until the audible

count rate indication in the control room is again operable. Thus, "C" is the only correct answer.

**Technical Reference(s):** OPOP03-ZG-0010, Refueling Operations (Rev 39, Sections 4.12, 4.13, and 5.15);  
OPOP08-FH-0009, Core Refueling (Rev 27, Section 5.5)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43   7  

**Comments:**

Original KA (G2.2.13 – Knowledge of tagging and clearance program) was rejected due to an SRO only question could not be constructed from this KA.

KA: Equipment Control, G2.2.26 – Knowledge of refueling administrative requirements.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	3
	Group #	
	K/A #	G2.2.23
	Importance Rating	3.8

**Question 97:**

Unit 1 is in Mode 1. The following series of events occur:

- November 11, 0800: Only one offsite transmission network is available to the onsite Class 1E distribution system due to a fault in the Switchyard.
- November 12, 1600: ESF DG 'A' is declared INOPERABLE
- November 13, 0200: ESF DG 'A' is declared OPERABLE
- November 14, 0600: ESF DG 'C' is declared INOPERABLE

Which ONE of the following correctly identifies the most limiting required Tech Spec actions?

- A. Be in Hot Shutdown by November 14, 2000, be in Cold Shutdown by November 15, 2000.
- B. Be in Hot Shutdown by November 15, 0000, be in Cold Shutdown by November 16, 0600.
- C. Be in Hot Standby by November 15, 0000, be in Cold Shutdown by November 16, 0600.
- D. Be in Hot Standby by November 14, 1800, be in Cold Shutdown by November 15, 1800.

**Answer:**            \_\_A\_\_

**Explanation (Optional):**

Only one offsite transmission network puts Unit in LCO 3.8.1.1.a, (applicable in Modes 1-4) and Action 'a' is entered at 0800, Nov 11<sup>th</sup>. Action 'a' time limits are to restore offsite circuit within 72 hours or be at least in HOT SHUTDOWN within next 12 hours and in COLD SHUTDOWN within the following 24 hrs.

ESF DG 'A' going INOP on Nov 12<sup>th</sup> puts unit in LCO 3.8.1.1.a and 3.8.1.1.c, and Action 'c' is entered at 1600. Since ESF DG 'A' is declared OPERABLE before the 12 hour time limit, Action 'c' is exited at 0200 on Nov 13<sup>th</sup>. (Action 'a' is still in effect with its original start time).

When ESF DG 'C' is declared INOP, Action 'c' is again entered at 0600 on Nov 14. Action 'c' time limits are to restore at least one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Action 'a' time limit is to be in at least HOT SHUTDOWN by 2000 on Nov 14, and Action 'c' time limit is to be in at least HOT STANDBY by midnight on Nov 14, therefore Action 'a' is most limiting and must be complied with.

A: Correct. Action 'a' is most limiting

B: Incorrect. This distractor is calculated using Action 'c' time requirements, but lists HOT SHUTDOWN, not HOT STANDBY as identified in the TS.

C: Incorrect. This distractor is calculated using Action 'c' time requirements.

D: Incorrect. This distractor is calculated using Action 'a' time requirements, but is applied to the date and time ESF DG 'C' was declared INOP.

**Technical Reference(s):** TS 3.8.1, A.C. Sources

**References to be provided to applicants during examination:** TS 3.8.1 as part of separate reference package.

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43   2  

**Comments:**

KA: Equipment Control, 2.2.23 – Ability to track limiting conditions for operations.



<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	3
	Group #	
	K/A #	G2.3.1
	Importance Rating	3.0

**Question 98:**

At STP, what are the MINIMUM controls required by the Tech Specs for an area in which an individual could receive 0.5 Rem in 1 hour in addition to an access RWP?

- A. Barricaded and conspicuously posted as a High Radiation Area.
- B. Barricaded and conspicuously posted as a High Radiation Area and have a control device that, upon entry into the area, causes the level of radiation to be reduced below a level in which an individual could receive 0.1 Rem in 1 hour.
- C. Barricaded and conspicuously posted as a High Radiation Area and have a control device that energizes a conspicuous visible or audible alarm upon entry.
- D. Barricaded and conspicuously posted as a High Radiation Area and is locked except for periods of access.

**Answer:**            \_\_A\_\_

**Explanation (Optional):**

Tech Spec 6.12.1 provides requirements for areas with radiation fields between 100 mr/hr and 1000 mr/hr. This range encompasses the 500 mr/hr field cited in the question.

The word 'MINIMUM' was used in the question to establish the requirements cited in this TS section as those that apply as a minimum, thus anything in addition would be an incorrect answer. The distracters all use the TS info, but also include other controls cited in 10CFR20. These other controls aren't used at STP and this fact provides the basis of this TS as the first sentences indicates STP takes exception to the 10CFR20 controls, but provide the specified alternate means of control.

**Technical Reference(s):**   Tech Spec 6.12.1

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_\_\_5\_\_\_\_\_

**Comments:**

KA: Radiation Control, G2.3.1 – Knowledge of 10CFR20 and related facility radiation control requirements.

<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	3
	Group #	
	K/A #	2.3.4
	Importance Rating	3.1

**Question 99:**

Given the following:

- Unit 1 is under a Site Area Emergency.
- An individual has life-threatening injuries in an area where the radiation level is 70 Rem/Hr.
- It will take 15 minutes in this area to attend to the individual's injuries and transport him out of the area.

In accordance with Emergency Plan Procedure OERP01-ZV-IN06, Radiological Exposure Guidelines, who can authorize the needed exposure for assistance personnel and which range of dose should be authorized?

- A. Only Emergency Director, 5-10 Rem
- B. Only Emergency Director, 10-25 Rem
- C. Radiological Director or Emergency Director, 5-10 Rem
- D. Radiological Director or Emergency Director, 10-25 Rem

**Answer:**            \_\_B\_\_

**Explanation (Optional):**

Given the radiation level of 70 Rem/hr and 15 minutes required, assistance personnel can expect to receive approx 17.5 Rem. According to OERP01-ZV-IN06, Addendum 1 Emergency Cumulative Exposure Limits, the Emergency Director approval is required for TEDE in the range of 10-25 Rem and authorization can be given since it is based on life saving activities

**Technical Reference(s):**    OERP01-ZV-IN06, Radiological Exposure Guidelines (Rev 5, Addendum 1)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_4\_\_\_

**Comments:**

Original KA (G2.3.5 - Knowledge of use and function of personnel monitoring equipment) was rejected due to an SRO only question could not be constructed from this KA.

KA: Radiation Control, G2.3.4 - Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

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<b>Examination Outline Cross-Reference:</b>	Level	SRO
	Tier #	3
	Group #	
	K/A #	2.4.18
	Importance Rating	3.6

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**Question 100:**

Given the following:

- A reactor trip occurred coincident with a loss of offsite power.
- 0POP05-EO-ES03, Natural Circulation Cooldown with Steam Void in Vessel, is in progress.
- Steps 1 through 4 initiate RCS cooldown and depressurization.
- Step 5 states "CHECK RVWL indication – GREATER THAN OR EQUAL TO 85%"

Which ONE of the following is the basis for verifying RVWL Plenum indication is at least 85%?

- A. Ensures thermal stresses to the vessel flange are minimized.
- B. Ensures RCS total mass does not drop below minimum conditions assumed in FSAR analysis for natural circulation cooldown.
- C. Ensures that the steam void in the Reactor Vessel does not enter the hot legs and disrupt natural circulation flow.
- D. Ensures that steam collection in the RCP impeller is minimized prior to pump start attempts in subsequent procedure steps.

**Answer:**            \_\_C\_\_

**Explanation (Optional):**

Lesson Plan for this EOP states the basis for verifying RVWL Plenum indication at least 85% is as follows: "BASIS: Alerts the operators to monitor void growth to prevent any of the void from entering the hot legs which could disrupt natural circulation flow."

**Technical Reference(s):** 0POP05-EO-ES03, Natural Circulation Cooldown With Steam Void in Vessel;  
LOT504.26.LP, Lesson Plan for 0POP05-EO-ES03 (Rev 5, Section 2.9)

**References to be provided to applicants during examination:** None

**Learning Objective:** \_\_\_\_\_ (As available)

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

**Question History:** Last NRC Exam N/A

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

**10 CFR Part 55 Content:** 55.41 \_\_\_\_\_  
55.43 \_\_\_1\_\_\_

**Comments:**

KA: Emergency Procedures / Plans, G2.4.18 – Knowledge of the specific bases for EOPs.