

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

1. The plant is operating at 100% power with all systems in NSA **EXCEPT**:
- Power Range Channel N44 has been declared inoperable.
 - Power Range Channel N44 has been removed from service IAW AOP-2.2.1C, Power Range Channel Malfunction.

Power Range Channel N43 **NOW** fails **HIGH**.

All systems function as designed.

No Operator Actions have been taken

Which, of the below listed First Out Annunciators (ANN. A5), will alarm in the **FIRST** 45 seconds **AFTER** N43 fails High?

- (1) A5-1D 2/3 Loops Overtemp ΔT Reactor Trip
- (2) A5-2A Reactor Protection System Train A Trouble
- (3) A5-5G Reactor Trip Due To Turbine Trip
- (4) A5-6B Turbine Anti-Motoring Turbine Trip
- (5) A5-6D Turbine Trip Due To Reactor Trip
- (6) A5-7D Generator Trip Due To Turbine Trip

A. 1, 3, 5 & 6 **ONLY**

B. 2, 4, & 6 **ONLY**

C. 3, 5 & 6 **ONLY**

1, 2, 3 & 4 **ONLY**

Answer C

Explanation/Justification:

- A. Incorrect. N-44 does NOT input into OT Δ T trip setpoint calculation, therefore this alarm will NOT be energized.
- B. Incorrect. Candidate may confuse rod control urgent alarm with protection system trouble. Rod control urgent will energize on the trip. Anti-motoring would alarm if the output breakers did not open. However, stem of the question states that all systems functioned as designed. 3 and 5 will both be alarmed.
- C. Correct. IAW 20M-1.4.ABB, 1.4.AAI, 1.4.AAD 26.4.AAF, 26.4.AAI and 35.4.AAF
- D. Incorrect. N-44 does NOT input into OT Δ T trip setpoint calculation, therefore this alarm will NOT be energized. Candidate may confuse rod control urgent alarm with protection system trouble. Rod control urgent will energize on the trip. Anti-motoring would alarm if the output breakers did not open. However, stem of the question states that all systems functioned as designed. 5 and 6 will both be alarmed.

K/A Sys #	K/A System	K/A Category	K/A Statement
000007	Reactor Trip	Knowledge of the interrelations between a reactor trip and the following:	Reactor trip status panel
K/A #	EK2.03	K/A Importance 3.5	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	1.4.AAD, 26.4.AAI and 35.4.AAF
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR 41.7 / 45.7)

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2. The plant is operating at 100% power with all systems in NSA.
- A PRZR vapor space accident occurs.
 - PRZR pressure drops to 1200 psig.
 - The Highest Steam Generator pressure is 1000 psig.
 - HHSI flow is 800 gpm and stable.
 - All systems functioned as designed.
 - **NO** Orange or Red path conditions exist.
 - The crew is performing the actions of E-1, Loss of Reactor or Secondary Coolant.
 - At Step 2, Check if RCPs should be stopped, the crew is directed to Stop ALL RCPs.

WHY MUST the RCPs be stopped at this time?

The RCPs are tripped to:

- A. prevent possible pump damage by running the RCPs under highly voided conditions in order to save the pumps for potential future use.
- B. prevent excessive depletion of RCS water inventory which might lead to severe core uncover if the RCPs were tripped later in the event.
- C. ensure RCS liquid inventory has depleted to the point where tripping the RCPs will cause the break to immediately uncover.
- D. ensure the RCP seal package is not damaged by the excessive temperature or steam voiding associated with this event.

Answer **B**

Explanation/Justification:

- A. Incorrect. This is the reason they are stopped in FR-C.2
- B. Correct. IAW with E-1 step 2 basis and RCP trip generic issue.
- C. Incorrect. This is what the RCP trip criteria is attempting to prevent, not ensure.
- D. Incorrect. This is the consequence of losing both seal injection and RCP thermal barrier cooling.

K/A Sys #	K/A System	K/A Category			K/A Statement
000008	Pressurizer Vapor Space Accident	Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident:			RCP tripping requirements
K/A #	AK3.04	K/A Importance	4.2	Exam Level	RO
Question Source:		New	Question Cognitive Level:		
References provided to Candidate		None	Technical References:		
Objective #:		Task ID#:	10 CFR Part 55 Content:		

Level Of Difficulty: (1-5)

Lower Fundamental

E-1 step 2 bases; 2OM-53B.5.GI-6 page 6
2nd paragraph

(CFR 41.5,41.10 / 45.6 / 45.13

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3. The plant is operating at 100% power with all systems in NSA.
- A small break LOCA occurs coincident with a loss of offsite power.
 - All systems function as designed **EXCEPT** EDG #2 fails to start and **CANNOT** be started.
 - 10 minutes after the event began; the crew is performing recovery actions IAW ES-1.2, Post LOCA Cooledown and Depressurization.
 - IAW ES-1.2 step 1 Reset SI, the RO depresses the Safety Injection Signal Train A **AND** Train B reset pushbuttons.

AFTER the Safety Injection Signal Train A **AND** Train B reset pushbuttons have been depressed, the following plant conditions exist:

- PRZR pressure is 1350 psig and slowly rising.
- RCS Subcooling is 95°F and stable.
- 4KV bus 2DF is de-energized.
- Annunciator A12-1C Auto Safety Injection Blocked is flashing (white then dark).
- Annunciator A12-1D Safety Injection Signal is flashing (white then dark).

Based on these conditions:

What is the current status of the automatic Safety Injection Actuation system **AND** what is the significance of annunciators A12-1C and A12-1D flashing?

- A. **ONLY** one Train of Safety Injection has reset; the flashing annunciators indicate a status difference between the two trains of automatic Safety Injection actuation.
- B. **ONLY** one Train of Safety Injection has reset; the flashing annunciators indicate the Purple Train of electrical power will not respond to an automatic Safety Injection actuation signal.
- C. **BOTH** Trains of Safety Injection have reset; the flashing annunciators indicate pressurizer pressure is still below the low pressure automatic safety injection setpoint.
- D. **BOTH** Trains of Safety Injection have reset; the flashing annunciators indicate automatic safety injection actuation will not occur until the reactor trip breakers are re-closed.

Answer A

Explanation/Justification:

- A. Correct. IAW ES-1.2 step 1 background document page 7
- B. Incorrect. Right status of SI actuation system; Wrong significance of flashing alarms, inoperable electrical trains are indicated by the BISI system NOT the flashing of annunciators A12-1C and 1D.
- C. Incorrect. Only one train of SI has reset. SI will reset even though an SI signal is still present due to the retentive memory circuit and the P-4 contact development.
- D. Incorrect. Only one train of SI has reset. Closing the reactor trip breakers and re-arming automatic SI is indicted when A12-1C goes DARK.

K/A Sys #	K/A System	K/A Category	K/A Statement
000009	Small Break LOCA	Ability to operate and monitor the following as they apply to a small break LOCA:	ESFAS
K/A #	EA1.13	K/A Importance 4.4 Exam Level RO	Level Of Difficulty: (1-5)
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	ES-1.2 step 1 background page 7
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR 41.7 / 45.5 / 45.6)

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4. The plant is operating at 100% power with all systems in NSA.
- Annunciator A2-5C, Reactor Coolant Pump Vibration Alert/Danger Alarms.
 - "B" RCP shaft vibration is 16 mils and stable
 - "B" RCP frame vibration is 1 mil and stable
 - The crew enters AOP-2.6.8, Abnormal RCP Operation.

While performing the actions of AOP-2.6.8, Abnormal RCP Operation, the following additional alarms and indications are received:

- A2-5D, Reactor Coolant Pump Seal Vent Pot Level High/Low (RCP 21B Seal Pot Lvl High, computer address point L0508D)
- A2-4D, Reactor Coolant Pump Seal Trouble (RCP 21B Seal Lk Off CHS-FT155B Low, computer address point F0128D)
- RCP 21B Seal Lk Off CHS-FT155B is .80 gpm and stable

Based on these alarms and indications, which "B" RCP seal has failed?

- A. #1 seal
- B. #2 seal
- C. #3 seal
- D. Low pressure seal

Answer B

Explanation/Justification:

- A. Incorrect. If #1 seal had failed seal leak-off flow would be high NOT low.
Correct. IAW 2OM-7.4.AAH, 6.4.AAE and AOP-2.6.8
- C. Incorrect. If #3 seal had failed the seal vent pot level low would be indicated NOT high.
- D. Incorrect. The low pressure seal is not functional when the motor is coupled to the pump.

K/A Sys #	K/A System	K/A Category	K/A Statement
000015/17	RCP Malfunctions	Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following:	RCP seals
K/A #	AK2.07	K/A Importance	2.9
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Higher Analysis
Objective #:	Task ID#:	Technical References:	2OM-7.4.AAH, 6.4.AAE
		10 CFR Part 55 Content:	(CFR 41.7 / 45.7)

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5. The plant is in Mode 6.
- Preparations to flood the refueling cavity are underway.
 - RCS water level is ONE (1) foot below the top of the reactor vessel flange and stable.
 - All RCS loop isolation valves are CLOSED.
 - RCS temperature is 100°F and stable.
 - RCS is vented to atmosphere.
 - It has been 175 hours since the reactor was shutdown.
 - RHR Pump 2RHS*P21A is operating and RHR Pump 2RHS*P21B is in Standby.

RHR Pump 2RHS*P21A **TRIPS** and RHR Pump 2RHS*P21B **WILL NOT** start.

The crew enters AOP-2.10.1, Residual Heat Removal System Loss.

At step 11 of AOP-2.10.1, Residual Heat Removal System Loss, the crew is directed to estimate the time to RCS saturation.

Using the attached AOP-2.10.1 figures and attachments, **ESTIMATE** the time to RCS saturation.

The estimated time to RCS saturation is _____.

- A. 16 minutes
- B. 25 minutes
- C. 37.5 minutes
- D. 38.6 minutes

Answer B

Explanation/Justification:

- A. Incorrect. This is the number for 140°F starting temperature.
- B. Correct. IAW figure 1C and attachment 1
- C. Incorrect. If candidate uses figure 1B instead of figure 1C they will calculate this value.
- D. Incorrect. If candidate uses figure 2B instead of figure 2C they will calculate this value.

K/A Sys #	K/A System	K/A Category	K/A Statement			
000025	Loss of RHR System	N/A	Knowledge of abnormal condition procedures.			
K/A #	2.4.11	K/A Importance	4.0	Exam Level	RO	Level Of Difficulty: (1-5)
Question Source:	New	Question Cognitive Level:		Higher	Application	
References provided to Candidate	AOP-2.10.1 figures 1A, 1B, 1C, 2A, 2B, 2C, 3, & att. 1		Technical References:		AOP- 2.10.1 figure 1C and Attachment	
Objective #:	Task ID#:		10 CFR Part 55 Content:		(CFR: 41.10 / 43.5 / 45.13)	

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6. The plant is operating at 100% power with all systems in NSA.
- Primary Component Cooling Water Pump 2CCP*P21C is on clearance and unavailable.
 - Primary Component Cooling Water Pump 2CCP*P21A is running.
 - Primary Component Cooling Water Pump 2CCP*P21B is in Standby.
- 2CCP*P21A **TRIPS** and cannot be re-started.
 - 2CCP*P21B **FAILS** to automatically start and cannot be manually started.
 - The crew enters AOP-2.15.1, Loss of Primary Component Cooling Water **AND** is instructed to **TRIP** the reactor and enter E-0, Reactor Trip Or Safety Injection.

Based on these conditions, how will the loss of CCP cooling to the RCPs **NOW** be addressed?

Immediately Trip ALL RCPs:

- A. **THEN** complete the immediate operator actions of E-0.
- B. **AFTER** completing the immediate operator actions of E-0.
- C. **THEN** manually trip the reactor and enter E-0.
- D. **AFTER** the transition is made out of E-0 to ES-0.1, Rx Trip Response.

Answer **B**

Explanation/Justification:

- A. Incorrect. The directions given in AOP-2.15.1 specifically instruct the operators to complete the IOAs of E-0 before tripping the RCPs.
- B. Correct. IAW AOP-2.15.1 step 2 RNO. AT BVPS the topic of AOP use in conjunction with EOP use has been addressed by providing the actions to be completed within the AOP. This is done by providing **WHEN** statements within the AOP. (2.6.8.2.15.1, 2.6.7)
- C. Incorrect. The directions given in AOP-2.15.1 specifically instruct the operators to complete the IOAs of E-0 before tripping the RCPs. Manually tripping the reactor would not be necessary since RCP breaker trip would cause an automatic reactor trip.
- D. Incorrect. The directions given in AOP-2.15.1 specifically instruct the operators to complete the IOAs of E-0 before tripping the RCPs. Candidate may believe that the E-0 EOP have a higher priority and must be completed before taking additional non-EOP actions.

K/A Sys #	K/A System	K/A Category	K/A Statement		
000026	Loss of Component Cooling Water	N/A	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.		
K/A #	2.4.8	K/A Importance	3.8	Exam Level	RO
Question Source:		New	Question Cognitive Level: Lower Fundamental		
References provided to Candidate		None	Technical References: AOP-2.15.1 step 2 RNO		
Objective #:		Task ID#:	10 CFR Part 55 Content: (CFR: 41.10 / 43.5 / 45.13)		

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7. A Plant startup is in progress. All systems are in normal alignment for this power level.
- All four Power Range channels are indicating 4% and stable.
 - Both Intermediate Range channels are indicating 2.1×10^{-5} amps and stable.
 - Both Intermediate Range SUR channels are indicating Zero DPM and stable.

PRZR pressure begins to drop rapidly, and the Unit Supervisor directs you to manually trip the reactor. You attempt to trip the reactor from all available control room reactor trip switches **HOWEVER**; both reactor trip breakers remain **CLOSED**. An operator is dispatched to locally trip the reactor trip breakers.

Assuming no other operator actions are taken, what will be the status of the Nuclear instrumentation system one minute **AFTER** the reactor trip breakers are locally opened?

Power Range indication will be _____ (1) _____; Intermediate Range indication will be _____ (2) _____; Intermediate Range SUR indication will be _____ (3) _____.

- A. (1) 4% and slowly dropping; (2) 1.7×10^{-5} amps and slowly dropping; (3) -.1 DPM and stable.
- B. (1) 2% and slowly dropping; (2) 1.7×10^{-5} amps and slowly dropping; (3) -.1 DPM and stable.
- C. (1) 0% and stable; (2) 1.0×10^{-6} amps and slowly dropping; (3) -.33 DPM and stable.
- D. (1) 0% and stable; (2) 1.0×10^{-10} amps and slowly dropping; (3) -.33 DPM and stable.

Answer C

Explanation/Justification:

- A. Incorrect. PR and IR power are too high. SUR is not low enough. Borating and driving rods inward could produce these indications but this would NOT be indicative of the reactor being tripped.
- B. Incorrect. PR and IR power are too high. SUR is not low enough. Borating and driving rods inward could produce these indications but this would NOT be indicative of the reactor being tripped.
- C. Correct. Opening the trip breakers from 4% power will result in PR indication going to zero, IR power will drop ~ 1 decade and SUR will be stable at -.33 DPM due to rod absorption of the prompt neutrons.
- D. Incorrect. PR indication is correct, IR power is too low. Candidate may believe that trips from low power will stabilize at 1.0×10^{-10} amps which is below the point of adding heat and the setpoint for blocking SR during startup. SUR is correct.

K/A Sys #	K/A System	K/A Category			K/A Statement
000029	ATWS	Ability to determine or interpret the following as they apply to a ATWS:			Reactor nuclear instrumentation
K/A #	EA2.01	K/A Importance	4.4	Exam Level	RO
Question Source:		New		Level Of Difficulty: (1-5)	
References provided to Candidate		None		Question Cognitive Level:	
Objective #:		Task ID#:		Technical References:	
				10 CFR Part 55 Content:	
				LP GO-GPF-R3 slide 150	
				(CFR 43.5 / 45.13)	

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8. The plant is operating at 100% power with all systems in NSA.
- A Steam Generator Tube Rupture occurs.
 - The crew enters the EOP network.
 - The crew is currently implementing E-3, Steam Generator Tube Rupture.
 - The RCS has been cooled to 500°F in preparation for equalizing RCS pressure with the ruptured SG pressure.

The Unit Supervisor directs you to depressurize the RCS **AND** while maintaining a minimum of 20 °F of Subcooling.

At the current RCS temperature, what is the lowest RCS pressure can be without violating the 20°F of Subcooling requirement?

- A. ~666 psig
- B. ~695 psig
- C. ~798 psig
- D. ~827 psig

Answer C

Explanation/Justification:

- A. Incorrect. Plausible This would be the saturation pressure for 500°F. (680.86 psia - 14.7psi)
- B. Incorrect. Plausible, if candidate attempts to determine pressure for 500°F and mistakenly adds 14.7 psi to 680.86 psia.
- C. Correct. Saturation pressure for 520°F is 812.53 minus 14.7 psi yields 797.83.
- D. Incorrect. Plausible if candidate mistakenly adds 14.7 psi to the saturation pressure.

/A Sys #	K/A System	K/A Category	K/A Statement	
000038	Steam Gen. Tube Rupture	Knowledge of the operational implications of the following concepts as they apply to the SGTR:	Use of steam tables	
K/A #	EK1.01	K/A Importance	3.1	Exam Level RO
Question Source:	New	Level Of Difficulty: (1-5)		
References provided to Candidate	Steam tables	Question Cognitive Level: Higher Comprehension		
Objective #:	Task ID#:	Technical References: E-3, Steam tables		
		10 CFR Part 55 Content: (CFR 41.8 / 41.10 / 45.3)		

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9. The plant is operating at 100% power with all systems in NSA.
- A Steamline break outside containment occurs.
 - The MSIVs fail to close and they cannot be manually closed.
 - All other systems functioned as designed.
 - All 3 SGs depressurize to atmospheric pressure.
 - All RCS cold leg temperatures stabilize at 220°F
 - RCS Subcooling is 200°F.
 - It has been 30 minutes since the steam break occurred.

The operating crew has entered FR-P.1, Response to Imminent Pressurized Thermal Shock Condition due to the excessive cooldown rate and all RCS cold leg temperatures being below the Reference Transition Nil Ductility Temperature (RT_{NDT}) of 245°F.

Which One (1) of the below listed actions will limit the overall stress on the Reactor Vessel?

- A. Depressurize the RCS
- B. Commence an RCS cooldown
- C. Maximize safety injection flow
- D. Stop all running RCPs

Answer A

Explanation/Justification:

- A. Correct. IAW FR-P.1 bases page 4 one of the major actions to limit the RPV stress is to depressurize the RCS.
- B. Incorrect. IAW FR-P.1 bases page 4 one of the major actions is to stop any cooldown and allow temperature to soak before re-commencing. Most of the EOP strategies include cooldowns to get on RHR and achieve Mode 5 status. The situation presented by exceeding RT_{NDT} is an exception to most EOP strategies.
- C. Incorrect. IAW FR-P.1 bases page 4 one of the major actions is to terminate SI when the criteria are met. Terminating is done to minimize the cold water effects on the vessel downcomer region. Large break LOCA strategies include maximizing SI flow. The situation presented by exceeding RT_{NDT} is an exception to Large break LOCA strategies.
- D. Incorrect. Stopping RCPs would potentially increase overall vessel stress by allowing the cold SI water contact the vessel downcomer region without any mixing. Therefore, RCPs are left running in FR-P.1 until support conditions are no longer available, and then they are secured.

K/A Sys #	K/A System	K/A Category	K/A Statement
000040	Steam Line Rupture	Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture:	Nil ductility temperature
K/A #	AK1.04	K/A Importance 3.2	Exam Level RO
Question Source: New		Level Of Difficulty: (1-5)	
References provided to Candidate		Question Cognitive Level: Higher Comprehension	
Objective #:		Technical References: FR-P.1 bases page 4	
Task ID#:		10 CFR Part 55 Content: (CFR 41.8 / 41.10 / 45.3)	

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10. The plant is operating at 100% power with all systems in NSA.
- An inadvertent Reactor trip occurs **WITH** a coincidental loss of all 4KV AC power.
 - All other systems operate as designed.

Twenty minutes after the trip, which ONE (1) of the following sets of parameters indicate that natural circulation of the RCS has been established?

	SG Pressures	Core Exit TC's	T_{cold}
A.	1060 psig and rising	590 °F and rising	558 °F and dropping
B.	1060 psig and stable	577 °F and stable	558 °F and stable
C.	1035 psig and dropping	590 °F and rising	550 °F and stable
D.	1035 psig and dropping	577 °F and stable	550 °F and dropping

Answer **D**

Explanation/Justification:

- A. Incorrect. SG Press and CET's are rising and Tcold above Tsat of SG. (Tsat for 1060 psig = 553F)
- B. Incorrect. Tcold above Tsat of SG. (Tsat for 1060 psig = 553F)
- C. Incorrect. CETs rising.
- D. Correct. All parameters stable or dropping and Tcold at Tsat of SG.

NOTE:

See SRO question #80 explanation as to why this question has been evaluated to be different enough from SRO question #80 to be used on the same exam.

K/A Sys #	K/A System	K/A Category	K/A Statement
00055	Station Blackout	Ability to determine or interpret the following as they apply to a Station Blackout:	RCS core cooling through natural circulation cooling to S/G cooling
K/A #	EA2.02	K/A Importance 4.4	Level Of Difficulty: (1-5)
Question Source:	New	Exam Level RO	Question Cognitive Level: Higher Comprehension
References provided to Candidate	Steam Tables	Technical References:	Steam Tables; EOP Attachment A-1.7
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR 43.5 / 45.13)

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11. The plant is operating at 100% power with all systems in NSA.
- An inadvertent Reactor trip occurs **WITH** a coincidental loss of offsite power.
 - All other systems operate as designed.
 - Both Emergency 4KV Buses are being powered by their respective diesel generators.
 - The crew performs the actions of E-0, Reactor Trip or Safety Injection, and transitions into ES-0.2, Natural Circulation Cooldown.

IAW ES-0.2, Natural Circulation Cooldown, what is the **MINIMUM** required steam generator water level that must be maintained to provide a stable heat sink during the natural circulation cooldown?

- A. WR level of at least 14%
- B. NR level of at least 12%
- C. NR level of least 35%
- D. NR level of at least 50%

Answer C

Explanation/Justification:

- A. Incorrect. This is the minimum water level for loss of heat sink in FR-H.1.
- B. Incorrect. This is the minimum water level for maintaining the thermal blanket during SGTR recovery.
- C. Correct. IAW step 5 of ES-0.2 and step 5 bases.
- D. Incorrect. This is the Maximum water level for natural circulation cooldown in ES-0.2.

K/A Sys #	K/A System	K/A Category			K/A Statement
000056	Loss of Off-site Power	Ability to determine and interpret the following as they apply to the Loss of Offsite Power:			Necessary S/G water level for natural circulation
IA #	AA2.88	K/A Importance	4.1	Exam Level	RO
Question Source: New		Question Cognitive Level:		Lower	Fundamental
References provided to Candidate		Technical References:		ES-0.2 step 5 and step 5 bases.	
Objective #:		Task ID#:		10 CFR Part 55 Content: (CFR: 43.5 / 45.13)	

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12. The plant is operating at 100% power with all systems in NSA.
- A loss of Vital Bus 2 has occurred as a result of a failure in the inverter.
 - The static switch has **FAILED** to automatically transfer to the backup power supply (MCC:2-E06).

The Unit Supervisor has directed you to restore power to Vital Bus 2 using the Manual Bypass Switch. In order to accomplish this manual transfer, the Manual Bypass Switch must be placed in the _____ position?

- A. Normal Operation
- B. Alternate Source To Load
- C. Bypass (Standby)
- D. Bypass (Isolate)

Answer B

Explanation/Justification:

- A. Incorrect. Normal Operation position is the position it was in when the static switch failed to make the transfer.
- B. Correct. IAW AOP-2.38.1B step 6e RNO.
- C. Incorrect. This is the correct manual transfer switch position for Unit 1 NOT Unit 2.
- D. Incorrect. This is the incorrect manual transfer switch position for Unit 1.

K/A Sys #	K/A System	K/A Category			K/A Statement
000057	Loss of Vital AC Inst. Bus	Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus:			Manual inverter swapping
K/A #	AA1.01	K/A Importance	3.7	Exam Level	RO
Question Source: New				Question Cognitive Level:	Lower Fundamental
References provided to Candidate		None	Technical References: AOP-2.38.1B step 6e RNO		
Objective #:		Task ID#:	10 CFR Part 55 Content: (CFR 41.7 / 45.5 / 45.6)		

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13. The plant is operating at 100% power with all systems in NSA.
- A loss of 125VDC Bus 2-1 has occurred.

Step 2 of AOP-2.39.1A, Loss Of 125VDC Bus 2-1 instructs the operating crew to control RCS temperature and pressure using the Steam Generator Atmospheric Steam Dump Control valves [2SVS*PCV101A(B)(C)] **OR** the Residual Heat Release Valve [2SVS*HCV104].

Under these conditions, **WHY** are **THESE** valves used to control RCS temperature?

Because:

- A. The condenser will NOT be available due to loss of all cooling tower pumps.
- B. The condenser will NOT be available due to closure of all steam generator MSIVs.
- C. Rod control will NOT be available due to an URGENT failure alarm.
- D. Rod control will NOT be available due to a NON-URGENT failure alarm.

Answer B

Explanation/Justification:

- A. Incorrect. Loss of DC control power to 4KV breakers will not cause the breaker to trip; it will render the automatic trip circuit inoperable.
- B. Correct. IAW AOP 2.39.1A step 2 and Automatic actions listed on page 1.
- C. Incorrect. Urgent failure alarms will block all automatic and manual rod motion. However, rod control power is not powered by this DC bus AND the reactor will be tripped by the closing of the MSIVs.
- D. Incorrect. Non-Urgent failure alarms will NOT block rod motion. However, Non-urgent alarms are generated from a loss of any 24VDC power but the DC power is not provided by this DC bus AND the reactor will be tripped by the closing of the MSIVs.

K/A Sys #	K/A System	K/A Category			K/A Statement
0058	Loss of DC Power	Knowledge of the reasons for the following responses as they apply to the Loss of DC Power:			Actions contained in EOP for loss of DC power
K/A #	AK3.02	K/A Importance	4.0	Exam Level	RO
Question Source:		New	Question Cognitive Level:		
References provided to Candidate		None	Technical References:		
Objective #:		Task ID#:	10 CFR Part 55 Content:		

Level Of Difficulty: (1-5)

Lower Memory

AOP 2.39.1A step 2 and Auto actions on page 1.

(CFR 41.5,41.10 / 45.6 / 45.1)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

14. The plant is operating at 100% power with all systems in NSA.
 - A Service Water/Normal Intake Structure Loss has occurred.

Step 2 of AOP-2.30.1, Service Water/Normal Intake Structure Loss instructs the operating crew to secure any liquid waste discharges **IF** service water header pressure cannot be restored above 34 psig.

Under these conditions, **WHY** are liquid waste discharges secured?

Because:

- A. The required liquid waste discharge dilution water flow cannot be assured.
- B. The liquid waste discharge radiation monitor will be inoperable.
- C. The Liquid Waste Effluent High Radiation Isolation Valve [2SGC-HCV100] will fail shut.
- D. The Steam Generator Blowdown Test Tanks Pumps [2SGC-P26A, 26B] will trip.

Answer A

Explanation/Justification:

- A. Correct. IAW OM Fig. 31-1 and 25-4 Dilution water for liquid waste discharges is provided by the service water system.
- B. Incorrect. The liquid waste discharge radiation monitor is not cooled by river water and will remain operable during loss of service water.
- C. Incorrect. 2SGC-HCV100 does fail shut on loss of air. However, domestic water is manually aligned to cool the station air compressors, therefore NO loss of air will occur.
- D. Incorrect. Steam Generator Blowdown Test Tanks Pumps do provide the driving force for the liquid waste discharges. However, these pumps are not cooled by service water and will remain operable.

K/A Sys #	K/A System	K/A Category	K/A Statement
000062	Loss of Nuclear Service Water	Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water:	Guidance actions contained in EOP for Loss of nuclear service water
K/A #	K/A Importance	4.0	Exam Level
AK3.03			RO
Question Source:	New	Question Cognitive Level:	Lower Fundamental
References provided to Candidate	None	Technical References:	OM Fig. 31-1 and 25-4
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR 41.4, 41.8 / 45.7)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

15. The plant is in Mode 3 with all systems in normal alignment for this mode.
- The reactor trip breakers are **OPEN**.
 - A Loss of station instrument air occurs.
 - Station instrument air header pressure is 0 psig.

What impact will this loss of station instrument air have on charging and letdown?

Charging will _____ (1) _____ and letdown will _____ (2) _____.

- A. (1) isolate (2) isolate
- B. (1) isolate (2) remain in service
- C. (1) remain in service (2) isolate
- D. (1) remain in service (2) remain in service

Answer C

Explanation/Justification:

- A. Incorrect. Charging remains in service.
- B. Incorrect. Charging remains in service and letdown will isolate.
- C. Correct. IAW AOP-2.34.1 attachment 2.34.1-1 Ch 7 fail positions.
- D. Incorrect. Letdown will isolate.

K/A Sys #	K/A System	K/A Category			K/A Statement
000065	Loss of Instrument Air	Ability to determine and interpret the following as they apply to the Loss of Instrument Air:			Failure modes of air-operated equipment
K/A #	AA2.08	K/A Importance	2.9	Exam Level	RO
Question Source:	New	Question Cognitive Level:			Higher Comprehension
References provided to Candidate	None	Technical References:			AOP-2.34.1 attachment 2.34.1-1 Ch 7 fail positions.
Objective #:	Task ID#:	10 CFR Part 55 Content:			(CFR: 43.5 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

16. Following a reactor trip and safety injection, the crew is performing actions of E-0, Reactor Trip Or Safety Injection.

The following conditions exist:

- All SG pressures are 1000 psig and stable.
- All SG NR levels are approximately 35% and stable.
- AFW flow is 380 gpm and stable.
- RCS pressure is ~1000 psig, lowering slowly.
- RCS temperature is 545°F, stable.
- Auxiliary Building - 710 Area Radiation Monitor [2RMP-RQ203] is in **HIGH** alarm.
- Auxiliary Building - 735 Area Radiation Monitor [2RMP-RQ204] is in **HIGH** alarm.
- Auxiliary Building - 735 Area Radiation Monitor [2RMP-RQ205] is in **HIGH** alarm.
- Containment pressure is 13.45 psia and stable.
- PRT conditions are NORMAL.
- CNMT sump level and radiation are NORMAL.

Which ONE (1) of the following procedures **MUST** be entered to mitigate this event?

- A. ES-1.1, SI Termination.
- B. ECA-1.2, LOCA Outside Containment.
- C. E-1, Loss Of Reactor Or Secondary Coolant.
- D. ES-1.2, Post-LOCA Cooldown And Depressurization.

Answer B

Explanation/Justification:

- A. Incorrect. RCS pressure is dropping.
- B. Correct. Per E-0 step 20.
- C. Incorrect. All CNMT parameters are normal.
- D. Incorrect. Entry would be from E-1, which would not be used.

K/A Sys #	K/A System	K/A Category			K/A Statement
W/E04	LOCA Outside Containment	Ability to determine and interpret the following as they apply to the (LOCA Outside Containment)			Facility conditions and selection of appropriate procedures during abnormal and emergency operations.
K/A #	EA2.1	K/A Importance	3.4	Exam Level	RO
Question Source:		New		Question Cognitive Level:	
References provided to Candidate		None		Technical References:	
Objective #:		Task ID#:		10 CFR Part 55 Content:	
				Level Of Difficulty: (1-5)	
				Higher Comprehension	
				EOP E-0 diagnostic steps	
				(CFR: 43.5 / 45.13)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

17. The plant is operating at 100% power with all systems in NSA.
- A large break LOCA occurs.
 - Reactor trip and safety injection actuation occur.
 - The crew is performing actions of E-1, Loss Of Reactor Or Secondary Coolant.
 - Cold leg recirculation capability cannot be verified and the crew transitions to ECA-1.1, Loss Of Emergency Coolant Recirculation.
 - At step 18 of ECA-1.1, the crew is instructed to stop/start charging pumps to establish **MINIMUM** SI flow to remove decay heat.

What is the reason for establishing **MINIMUM** SI flow in this procedure step?

- A. Prevent a potential ORANGE path for RCS integrity.
- B. Prevent PRZR overfill and subsequent RCS overpressurization.
- C. Delay SI accumulator injection and subsequent isolation.
- D. Delay Refueling Water Storage Tank (RWST) depletion.

Answer D

Explanation/Justification:

- A. Incorrect. Potential Orange or Red paths on RCS integrity are prevented by limiting the RCS cooldown to 100 °F/hr in this procedure.
- B. Incorrect. PRZR overfill and subsequent RCS overpressurization are the reasons for securing SI flow in ES-1.2 which would be appropriate for a SMALL break LOCA but NOT a concern for LARGE break LOCAs. For large break LOCAs the PRZR will not overfill and RVLIS is used for water inventory indications.
- C. Incorrect. A major objective of ECA-1.1 is to C/D and depressurize to get the accumulators to inject their inventory.
- D. Correct IAW ECA-1.1 step 18 bases.

K/A Sys #	K/A System	K/A Category	K/A Statement
E11	Loss of Emergency Coolant Recirc.	Knowledge of the reasons for the following responses as they apply to the (Loss of Emergency Coolant Recirculation)	Manipulation of controls required to obtain desired operating results during abnormal and emergency situations.
K/A #	EK3.3	K/A Importance 3.8	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	ECA-1.1 step 18 bases
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.5 / 41.10, 45.6, 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

18. The plant is operating at 100% power with all systems in NSA.
- A small break LOCA occurs inside containment.
 - The reactor trips and safety injection actuates.
 - 4KV Emergency Bus 2DF is de-energized.
 - Quench Spray Pump 2QSS*P21A **TRIPPED** cannot be started.
 - Containment pressure is 20 psig and slowly rising.
 - AFW flow is 100 gpm to each SG.
 - SG NR levels are 25%.
 - "A" & "B" SG NR levels are slowly dropping.
 - "C" SG NR level **BEGINS** rising in an uncontrolled manner.
 - The crew is performing E-1, Loss Of Reactor Or Secondary Coolant step 15 Verify Cold leg Recirculation Capability.
 - Cold leg recirculation capability **CANNOT** be verified.

Based on these plant conditions, what procedural transition is **Required**?

Transition into:

- A. ECA-1.1, Loss Of Emergency Coolant Recirculation
- B. FR-H.1, Response To Loss Of Secondary Heat Sink
- C. E-3, Steam Generator Tube Rupture
- D. FR-Z.1, Response To High Containment Pressure

Answer **B**

Explanation/Justification:

- A. Incorrect. Although the conditions have been met for ECA-1.1 entry, FR-H.1, FR-Z.1 and E-3 entry conditions are also present and have a higher priority.
- B. Correct. FR-H.1 red path entry conditions are present since AFW flow is only 300 gpm and NR levels in all SGs is less than the required 31% adverse CNMT level.
- C. Incorrect. Although the conditions have been met for E-3 entry based on LHP criteria, FR-H.1, and FR-Z.1 entry conditions are also present and have a higher priority.
- D. Incorrect. Although the conditions have been met for FR-Z.1 entry, FR-H.1 entry conditions are also present and have a higher priority.

K/A Sys #	K/A System	K/A Category			K/A Statement
W/E05	Loss of Secondary Heat Sink	Ability to determine and interpret the following as they apply to the (Loss of Secondary Heat Sink)			Facility conditions and selection of appropriate procedures during abnormal and emergency operations.
K/A #	EA2.1	K/A Importance	3.4	Exam Level	RO
Question Source:		New	Question Cognitive Level:		
References provided to Candidate		None	Technical References:		
Objective #:		Task ID#:	10 CFR Part 55 Content:		
			Higher Comprehension		
			F-0.3 status tree and EOP users guide page 9 paragraph B.1		
			(CFR: 43.5 / 45.13)		

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

19. The Plant is operating at 50% power **BOL** with all systems in NSA.
- Control Bank D is at 175 steps.
 - Control Bank D Demand step counters are at 175 steps.
 - Control Rod Group Selector Switch is in the "MAN" position.
 - Turbine control is in "First Stage Out".

The following **VALID** control room alarms are received:

- A4-4F NIS Power Range Comparator Deviation
- A4-4G NIS Power Range Neutron Flux Rate High
- A4-9F Rod At Bottom
- A4-3C Tavg Deviation from Tref
- A4-1D Pressurizer Control Pressure High/low
- A4-1E Pressurizer Control Press Deviation High/low

No operator actions have been taken.

Based on these conditions, what will be the status of the following parameters 5 minutes after the event began?

- RCS T_{avg} will be _____ (1) _____ than 558°F.
- PRZR Pressure will be _____ (2) _____ than 2235 psig.
- PRZR Backup Heaters will be _____ (3) _____.
- Reactor power will be _____ (4) _____ 50%.

- | | | | | |
|----|-----------|-----------|-----------------|---------------|
| A. | 1. lower | 2. lower | 3. energized | 4. lower than |
| | 1. lower | 2. lower | 3. energized | 4. equal to |
| C. | 1. higher | 2. higher | 3. de-energized | 4. lower than |
| D. | 1. higher | 2. higher | 3. de-energized | 4. equal to |

Answer A

Explanation/Justification:

- A.** Correct. All of the alarms listed will alarm for either high or low conditions **EXCEPT** A4-9F Rod At Bottom. Since A4-9F has energized and is valid, the candidate will need to identify there is a dropped rod event in progress. This also will eliminate higher Tavg and PRZR pressure from consideration. With the turbine in "first stage out" reactor power will be lower since the governor valves will not reposition to adjust for the lower steam pressures. Reactor power would be the same if the turbine was in "First stage In". BOL was selected to provide the most definite changes to the listed parameters.
- B.** Incorrect. With the turbine in "first stage out" reactor power will be lower since the governor valves will not reposition to adjust for the lower steam pressures. Reactor power would be the same if the turbine was in "First stage In".
- C.** Incorrect. Tavg and PRZR pressure will be lower. The PRZR B/U heaters will be energized.
- D.** Incorrect. Tavg and PRZR pressure will be lower. The PRZR B/U heaters will be energized. Reactor power will be lower.

K/A Sys #	K/A System	K/A Category	K/A Statement		
000005	Inoperable/Stuck Control Rod	N/A	Ability to verify that the alarms are consistent with the plant conditions.		
K/A #	2.4.46	K/A Importance	4.2	Exam Level	RO
Question Source:	New		Question Cognitive Level:	Higher	Analysis
References provided to Candidate	None		Technical References:	AOP- 2.1.8 symptoms (ran on Unit 2 simulator to confirm all parameters)	
Objective #:		Task ID#:	10 CFR Part 55 Content:	(CFR: 41.10 / 43.5 / 45.3 / 45.12)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

20. The plant is in Mode 2 with a reactor startup is in progress. All systems are in normal alignment for this condition.
- The reactor trip breakers are closed with the shutdown banks withdrawn.
 - Control rod withdrawal is in progress.
 - Two control bank A rods fail to move when required, and become misaligned by 15 steps
 - **BOTH** Source Range detectors **SIMULTANEOUSLY** become inoperable.
 - Reactor power is 1×10^4 CPS and stable.

What are **ALL** of the **IMMEDIATELY Required** Technical Specification actions?

1. Suspend operations involving positive reactivity additions.
 2. Open the reactor trip breakers.
 3. Initiate action to restore one source range neutron flux monitor to OPERABLE status.
 4. Verify SDM is within the limits specified in the COLR.
- A. 1 and 4
- B. 1 and 2
- C. 2 and 3
- D. 3 and 4

Answer B

Explanation/Justification:

- A. Incorrect. #1 is correct. #4 is the 1 hour requirement for the misaligned rods; it is NOT an immediate requirement.
- B. Correct. IAW TS 3.3.1 conditions H and I.
- C. Incorrect. #2 is correct. #3 is the immediate requirement for both source ranges inoperable in Mode 6.
- D. Incorrect. #3 is the immediate requirement for both source ranges inoperable in Mode 6 and #4 is the 1 hour requirement for the misaligned rods; it is NOT an immediate requirement.

K/A Sys #	K/A System	K/A Category	K/A Statement
000032	Loss of Source Range NI	N/A	Knowledge of less than or equal to one hour Technical Specification action statements for systems.

K/A #	2.2.39	K/A Importance	3.9	Exam Level	RO	Level Of Difficulty: (1-5)
Question Source:	New					Question Cognitive Level: Higher Analysis
References provided to Candidate	None					Technical References: TS 3.3.1 Table 3.3.1-1 and conditions H and I.
Objective #:	Task ID#:					10 CFR Part 55 Content: (CFR: 41.7 / 41.10 / 43.2 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

21. The plant is operating at 100% power with all systems in NSA.
- A 50 gpm Steam Generator Tube leak develops.
 - The crew enters AOP 2.6.4, Steam Generator Tube Leakage.
 - A controlled shutdown to Mode 3 has been completed.
 - It has been determined that the leaking Steam Generator shall be cooled and depressurized using the "Backfill" method.

Which of the below listed attributes are advantages to using the "Backfill" method over other methods?

1. Facilitates processing of contaminated primary coolant.
2. Minimizes Radiological releases.
3. Fastest means to cool the leaking Steam Generator.
4. Minimizes boron dilution of the primary coolant.

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

Answer A

Explanation/Justification:

- A. Correct. IAW E-3 step 43 background (AOP does not have a background document). The AOP used the EOP background to develop attachments to address cooling of the leaking SG).
- B. Incorrect. Boron dilution will NOT be limited by this method.
Incorrect. The fastest means to cooldown the SG is the steam dump method.
- D. Incorrect. These are advantages of the blowdown method.

K/A Sys #	K/A System	K/A Category	K/A Statement
000037	Steam Generator Tube Leak	Knowledge of the reasons for the following responses as they apply to the Steam Generator Tube Leak:	Use of "feed" and "bleed" process.
K/A #	AK3.04	K/A Importance 2.5	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	E-3 step 43 background
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR 41.5, 41.10 / 45.6 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

22. Which ONE (1) of the following constitutes a loss of an OPERABLE containment?

While in...

- A. **MODE 5**, it is discovered that the Phase 'B' isolation valve for CCP to the RCPs will **NOT CLOSE**.
- B. **MODE 4**, a review of Integrated Leak Rate test results show that leakage is **NOT WITHIN LIMITS**.
- C. **MODE 3**, it is discovered that Containment Atmosphere Purge Makeup valve will **NOT OPEN**.
- D. **MODE 6**, it is discovered that one of the Emergency Airlock (EAL) doors will **NOT CLOSE**.

Answer **B**

Explanation/Justification:

- A. Incorrect. An OPERABLE Containment is not required in Mode 5.
- B. Correct. IAW Technical Specification 3.6.1 and its' bases. (Operable containment equates to CNMT integrity with the new ITS)
- C. Incorrect. Purge Makeup Valve should not normally be open in Mode 3 and would not be a loss of OPERABLE containment if it does not **C**OPEN.
- D. Incorrect. In Mode 6, 1 airlock door may remain open.

K/A Sys #	K/A System	K/A Category			K/A Statement
000069 (W/E14)	Loss of CTMT Integrity	Ability to determine and interpret the following as they apply to the Loss of Containment Integrity:			Loss of containment integrity
K/A #	AA2.01	K/A Importance	3.7	Exam Level	RO
Question Source:		New	Question Cognitive Level:		
References provided to Candidate		None	Technical References:		
Objective #:		Task ID#:	10 CFR Part 55 Content:		
			Higher Analysis		
			TS 3.6.1 and bases.		
			(CFR: 43.5 / 45.13)		

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

23. The plant is operating at 100% power with all systems in NSA.
- A small break LOCA occurs inside containment.
 - The crew performs the actions of E-0, Reactor Trip Or Safety Injection and transitions into E-1, Loss Of Reactor Or Secondary Coolant.

Consider the below listed criteria:

What are **ALL** of the criteria that **MUST** be met before a transition to ES-1.1, SI Termination can be made?

1. One emergency diesel must be operating
2. One train of CIA must exist
3. Cold leg recirculation capability must exist
4. The RCS must be subcooled
5. A secondary heat sink must exist
6. RCS pressure must be stable or rising
7. PRZR level must be indicating on span
8. A RCP must be operating

A. 1, 3, 4, 5, & 8 **ONLY**

B. 1, 2, 4, 6, & 8 **ONLY**

C. 2, 3, 5, & 7 **ONLY**

D. 4, 5, 6, & 7 **ONLY**

Answer D

Explanation/Justification:

- A. Incorrect. IAW the background document for ES-1.1 the only 4 criteria that must be met are items 4, 5, 6, and 7. The other 4 items are nice to have during recovery efforts, but they are not required for SI termination. Additionally, cold leg recirculation capability isn't even checked before a transition into ES-1.1 is allowed. The 4 correct criteria (RCS Subcooling, heat sink, RCS pressure rising, and indicated PRZR level) combine to indicate that the RCS is in a safe state with adequate core cooling.
- B. Incorrect. IAW the background document for ES-1.1 the only 4 criteria that must be met are items 4, 5, 6, and 7. The other 4 items are nice to have during recovery efforts, but they are not required for SI termination. Additionally, cold leg recirculation capability isn't even checked before a transition into ES-1.1 is allowed. The 4 correct criteria (RCS Subcooling, heat sink, RCS pressure rising, and indicated PRZR level) combine to indicate that the RCS is in a safe state with adequate core cooling.
- C. Incorrect. IAW the background document for ES-1.1 the only 4 criteria that must be met are items 4, 5, 6, and 7. The other 4 items are nice to have during recovery efforts, but they are not required for SI termination. Additionally, cold leg recirculation capability isn't even checked before a transition into ES-1.1 is allowed. The 4 correct criteria (RCS Subcooling, heat sink, RCS pressure rising, and indicated PRZR level) combine to indicate that the RCS is in a safe state with adequate core cooling.
- D. Correct. IAW the background document for ES-1.1 the only 4 criteria that must be met are items 4, 5, 6, and 7. These 4 criteria (RCS Subcooling, heat sink, RCS pressure rising, and indicated PRZR level) combine to indicate that the RCS is in a safe state with adequate core cooling.

K/A Sys #	K/A System	K/A Category				K/A Statement
W/E02	SI Termination	Knowledge of the interrelations between the (SI Termination) and the following:				Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.
K/A #	EK2.2	K/A Importance	3.5	Exam Level	RO	Level Of Difficulty: (1-5)
Question Source:		New		Question Cognitive Level: Higher Comprehension		
References provided to Candidate		None		Technical References: ES-1.1 background page 1		
Objective #:		Task ID#:		10 CFR Part 55 Content: (CFR: 41.7 / 45.7)		

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

24. The plant has been operating at 100% power with all systems in NSA for the past 100 days.
- An inadvertent Turbine trip occurs coincident with a loss of offsite power.

IAW the Plant Technical Specifications, which of the following components **MUST** operate to prevent Steam Generator Overpressure (> 110% of design pressure)?

1. Atm Stm Dump Control Valves
2. Steam Generator Safety Valves
3. Residual Heat Release Valve
4. Diesel Driven Air Compressor

- A. 1 & 2 **ONLY**
- B. 2 **ONLY**
- C. 3 & 4 **ONLY**
- D. 4 **ONLY**

Answer B

Explanation/Justification:

- A. Incorrect. Atm Stm Dump Control Valves are for decay heat removal, NOT overpressure protection. They will limit SG pressure by virtue of removing decay heat, but they are NOT required by UFSAR. Since the Atm Stm Dump Control Valves remove decay heat and thus limit pressure there is a common misconception that they are required to prevent SG overpressure.
- B. Correct. IAW Tech Spec bases 3.7.1 page 1 1st paragraph and page 2 1st paragraph.
- C. Incorrect. The residual heat release valve is designed for decay heat only and no credit is taken for limiting SG overpressure. The Diesel Driven Air Compressor is not required, but nice to have for plant control. Many main steam system valves are kept open by air, but none are required to prevent SG overpressure.
- D. Incorrect. The Diesel Driven Air Compressor is not required, but nice to have for plant control. Many main steam system valves are kept open by air, but none are required to prevent SG overpressure.

K/A Sys #	K/A System	K/A Category	K/A Statement		
W/E13	Steam Generator Overpressure	Knowledge of the interrelations between the (Steam Generator Overpressure) and the following:	Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.		
K/A #	EK2.1	K/A Importance	3.0	Exam Level	RO
Question Source:	New			Question Cognitive Level:	Lower Fundamental
References provided to Candidate	None			Technical References:	Tech Spec bases 3.7.1 page 1 1 st paragraph and page 2 1 st paragraph.
Objective #:		Task ID#:		10 CFR Part 55 Content:	(CFR: 41.7 / 45.7)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

25. The plant is operating at 100% power with all systems in NSA.
- A large break LOCA occurs inside containment.
 - The crew is implementing the actions of E-1, Loss Of Reactor Or Secondary Coolant.

The STA then reports the following CSF status:

- YELLOW-Core Cooling-FR-C.3, Response To Saturated Core Cooling (Based on core exit temperatures less than 729°F and RVLIS greater than 40% full range).
- ORANGE-Containment- FR-Z.2, Response to Containment Flooding (Based on a containment sump level of 189 inches).
- YELLOW- Containment-FR-Z.3, Response To High Containment Radiation Level (Based on a containment radiation level of 76 R/hr).

The crew transitions to FR-Z.2, Response to Containment Flooding and completes all of the actions of this procedure. The STA then reports **THE SAME** CSF status that was reported earlier.

What procedural transition, if any, is now **Required**?

- A. Return to Step 1 of FR-Z.2, Response to Containment Flooding.
- B. Return to step in effect of E-1, Loss Of Reactor Or Secondary Coolant.
- C. Go to FR-C.3, Response To Saturated Core Cooling.
- D. Go to FR-Z.3, Response To High Containment Radiation Level.

Answer B

Explanation/Justification:

- A. Incorrect. Plausible since normally the EOP usage rules do not allow a transition out of a red or orange path procedure until the symptoms have been corrected. However, FR-Z.2 is an exception and the crew is directed to return to step and procedure in effect.
- B. Correct. IAW F0.5 bases for step 4 page 7 knowledge paragraph.
- C. Incorrect. Plausible. Core cooling is a higher priority status tree terminus than either containment radiation or flooding. However, the terminus is only yellow, and transition to this procedure is optional not required. The question specifically asks for required transition.
- D. Incorrect. Plausible. Containment radiation is a higher priority status tree terminus than returning to E-1. However, the terminus is only yellow, and transition to this procedure is optional not required. The question specifically asks for required transition.

K/A Sys #	K/A System	K/A Category			K/A Statement
W/E15	Containment Flooding	Knowledge of the operational implications of the following concepts as they apply to the (Containment Flooding).			Normal, abnormal and emergency operating procedures associated with (Containment Flooding).
K/A #	EK1.2	K/A Importance	2.7	Exam Level	RO
Question Source:		New		Level Of Difficulty: (1-5)	
References provided to Candidate		None		Question Cognitive Level: Higher Analysis	
Objective #:		Task ID#:		Technical References: F0.5 bases for step 4 page 7 knowledge paragraph.	
				10 CFR Part 55 Content: (CFR: 41.8 / 41.10, 45.3)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

26. The plant is operating at 100% power with all systems in NSA.
- A small break LOCA occurs inside containment.
 - All systems function as designed.
 - The crew is implementing the actions of ES-1.2, Post LOCA Cooldown and Depressurization.
 - All RCPs have been secured.
 - Both trains of RVLIS are OOS.
 - SI, CIA, and CIB have all been reset.
 - While depressurizing the RCS to minimize subcooling in step 24 of ES-1.2, the following plant conditions are observed:
 - PRZR level is 45% and rapidly rising.
 - RWST level is 395 inches and slowly dropping.
 - CNMT pressure is 15 psig and slowly dropping

What procedural transition, if any, is now **Required**?

- A. Continue with step 24 of ES-1.2, Post LOCA Cooldown and Depressurization.
- B. Go to ES-0.4, Natural Circulation Cooldown With Steam Void In Vessel (Without RVLIS).
- C. Go to ES-1.3, Transfer To Cold Leg Recirculation.
- D. Go to FR-Z.1, Response To High Containment Pressure.

Answer C

Explanation/Justification:

- A. Incorrect. Plausible if the candidate does not recognize the need to transition to ES-1.3 based on RWST level below 400 inches. Incorrect. Plausible since RCPs are off and a natural circulation cooldown is in progress AND PRZR level rapidly rising is indicative of bubble formation in the upper head region. However, the transition to ES-0.4 can only be made from ES-0.2 where there is no other accident in progress.
- C. Correct. IAW ES-1.2 LHP item 4. ES-1.2 bases page 1 4th paragraph.
- D. Incorrect. Plausible since CNMT pressure is above 11 psig. However, this is incorrect because both QS pumps are operating and this is on a yellow path procedure.

K/A Sys #	K/A System	K/A Category			K/A Statement
W/E03	LOCA Cooldown - Depress.	Ability to determine and interpret the following as they apply to the (LOCA Cooldown and Depressurization)			Facility conditions and selection of appropriate procedures during abnormal and emergency operations.
K/A #	EA2.1	K/A Importance	3.4	Exam Level	RO
Question Source:		New		Question Cognitive Level:	
References provided to Candidate		None		Technical References:	
Objective #:		Task ID#:		10 CFR Part 55 Content:	

Level Of Difficulty: (1-5)

Higher Analysis

ES-1.2 LHP item 4. ES-1.2 bases page 1 4th paragraph.

(CFR: 43.5 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

27. The plant has been operating at 100% power with all systems in NSA for the past 100 days.
- An inadvertent reactor trip occurs coincident with a loss of offsite power.
 - All systems function as designed.
 - The crew is implementing the actions of ES-0.2, Natural Circulation Cooldown.
 - RCS temperature is 350°F and stable.
 - RCS Subcooling is 200°F and stable.
 - RCS Pressure 1200 psig and stable.
 - RCS cooldown rate is 20°F/hr and stable.

Alarm A11-5G CRDM Shroud Fan Auto-Start/Auto-Stop is received. **ALL** CRDM shroud fans have tripped and cannot be restarted.

What impact will the loss of these CRDM Shroud Fans have on the continued performance of ES-0.2, Natural Circulation Cooldown?

- A. Further RCS cooldown (below 350°F) cannot continue **UNTIL** a suitable RX vessel head soak has been performed.
- B. Further RCS depressurization (below 1200 psig) cannot continue **UNTIL** a suitable RX vessel head soak has been performed.
- C. Immediately **INCREASE** RCS pressure 100 psig to **RAISE** RCS subcooling.
- D. Immediately **DECREASE** RCS pressure 100 psig to **LOWER** RCS subcooling.

Answer **B**

Explanation/Justification:

Incorrect. The restriction to perform a head soak only applies when the RCS is below 350°F. However, cooldowns below 350°F are still allowed when CRDM fans are unavailable.

- B.** Correct. IAW ES-0.2 step 13 and background.
- C.** Incorrect. Raising pressure 100 psig is a technique employed by ES-0.4 natural circulation procedure when the head void growth becomes too large.
- D.** Incorrect. Minimizing Subcooling is a technique employed when RX vessel stresses are the concern but NOT when RX vessel head voids are the concern. Decreasing pressure may actually cause a void to form.

K/A Sys #	K/A System	K/A Category	K/A Statement
W/E09	Natural Circ.	Knowledge of the operational implications of the following concepts as they apply to the (Natural Circulation Operations)	Annunciators and conditions indicating signals, and remedial actions associated with the (Natural Circulation Operations).
K/A #	EK1.3	K/A Importance 3.3	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	ES-0.2 step 13 and background.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.8 / 41.10, 45.3)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

28. The plant is operating at 40% power with all systems in normal alignment for this power level.
- "B" RCP breaker **OPENS** due to a mechanical failure.

What impact will this **OPEN** breaker have on the reactor protection system (RPS)?

A reactor trip signal will...

- A. **NOT** be generated. At this power level it takes 2/3 RCP breakers open to generate a reactor trip signal.
- B. **NOT** be generated. At this power level it takes 2/3 RCS Loops Low Flow generate a reactor trip signal.
- C. Be generated by the single open RCP breaker.
- D. Be generated by the single RCS loop flow low.

Answer D

Explanation/Justification:

- A. Incorrect. It is true that it takes 2/3 breakers open to generate a trip signal at this power level. However, the single loop flow low will generate a trip signal.
- B. Incorrect. It only takes a single loop flow low to generate a trip signal.
- C. Incorrect. It is true that a trip signal will be generated. However, it is not generated from the RCP breaker opening.
- D. Correct. IAW UFSAR logic Figure 7.3-10

K/A Sys #	K/A System	K/A Category			K/A Statement
003	Reactor Coolant Pump	Knowledge of the effect that a loss or malfunction of the RCPS will have on the following:			RPS
K/A #	K3.04	K/A Importance	3.9	Exam Level	RO
Question Source:		New		Question Cognitive Level:	Lower Fundamental
References provided to Candidate		None		Technical References:	UFSAR logic Figure 7.3-10
Objective #:		Task ID#:		10 CFR Part 55 Content:	(CFR: 41.7 / 45.6)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

29. In the CVCS...

1. Which ONE (1) of the below listed components is designed to prevent flashing at the downstream side of the letdown orifices?
2. How is this accomplished?

- A. 1. Letdown Orifice Isol Vlv [2CHS*AOV200A(B)(C)]
2. Close on high temperature downstream of the orifices
- B. 1. Non-Regen HX Disch Press Control Vlv [2CHS*PCV145]
2. Maintains pressure downstream of the orifices above saturation pressure
- C. 1. Non-Regen HX Disch Diverting Vlv [2CHS*TCV143]
2. Diverts letdown flow to the degasifiers on high temperature
- D. 1. Non-Regen HX Temp Control Vlv [2CCP*TCV144]
2. Maintains letdown temperature downstream of the orifices below saturation temperature.

Answer B

Explanation/Justification:

- A. Incorrect. These valves do not have a high temperature isolation signal, although this would prevent flashing. They will isolate on CIA.
- B. Correct. IAW 2OM-7.1.C page 8 1st paragraph
- C. Incorrect. This valve is downstream of the Non-regen HX and diverts water away from the demineralizers to protect them from high temperature. It does NOT divert water to the degasifiers.
- D. Incorrect. This valve does cool the letdown water, BUT it is too far downstream to prevent flashing at the letdown orifices.

A Sys #	K/A System	K/A Category	K/A Statement		
J4	Chemical and Volume Control	Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the following:	Temperature/pressure control in letdown line: prevent boiling, lifting reliefs, hydraulic shock, piping damage, and burst		
K/A #	K4.11	K/A Importance	3.1	Exam Level	RO
Question Source: New			Question Cognitive Level: Lower Fundamental		
References provided to Candidate			Technical References: 2OM-7.1.C page 8 1 st paragraph		
Objective #:			10 CFR Part 55 Content: (CFR: 41.7)		
Task ID#:					

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

30. The plant is in Mode 4 with RCS temperature at 210°F.
- RHR Pump 2RHS*P21A is on clearance.
 - Train "B" of RHS is in service and being used for an RCS cooldown at 25°F/hr.
 - All Train "B" RHS components are arranged in their normal alignment for plant cooldown.
 - RHR HX Flow Control Valve [2RHS*HCV758B] is 30% OPEN.
 - RHR HX Bypass Valve [2RHS*FCV605B] is 50% OPEN.

As a result of poor Foreign Material Exclusion (FME) practices, a rubber Anti-C boot becomes lodged in the tube side of the "B" RHS Heat Exchanger. The boot **BLOCKS** 25% of the tubes in the heat exchanger.

IF the RCS cooldown is to **CONTINUE** at 25°F/hr, the reactor operator will be **required** to

- A. Manually **CLOSE** RHR HX Bypass Valve [2RHS*FCV605B] and allow RHR HX Flow Control Valve [2RHS*HCV758B] to automatically throttle **OPEN** to maintain total RHS system flow.
- B. Manually **OPEN** RHR HX Bypass Valve [2RHS*FCV605B] and allow RHR HX Flow Control Valve [2RHS*HCV758B] to automatically throttle **CLOSED** to maintain total RHS system flow.
- C. Manually **CLOSE** RHR HX Flow Control Valve [2RHS*HCV758B] and allow RHR HX Bypass Valve [2RHS*FCV605B] to automatically throttle **OPEN** to maintain total RHS system flow.
- D. Manually **OPEN** RHR HX Flow Control Valve [2RHS*HCV758B] and allow RHR HX Bypass Valve [2RHS*FCV605B] to automatically throttle **CLOSED** to maintain total RHS system flow.

Answer D

Explanation/Justification:

- A. Incorrect. Manually closing 2RHS*FCV605B will force more water through the HX. However, 2RHS*HCV758B does not have automatic flow control and will NOT automatically throttle open to maintain RHS system flow.
- B. Incorrect. Manually opening 2RHS*FCV605B will divert water away from the HX which would cause a heatup. Also, 2RHS*HCV758B does not have automatic flow control and will NOT automatically throttle open to maintain RHS system flow.
- C. Incorrect. These actions will slow the RCS cooldown.
- D. Correct. IAW OM figure 10-1, 2RHS*FCV605B has the automatic flow control, and 2RHS*HCV758B is a manually adjusted valve to control flow through the RHS HX.

K/A Sys #	K/A System	K/A Category	K/A Statement
005	Residual Heat Removal	Knowledge of the effect of a loss or malfunction on the following will have on the RHRS:	RHR heat exchanger
K/A #	K6.03	K/A Importance 2.5	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Analysis
References provided to Candidate	None	Technical References:	OM figure 10-1
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.7 / 45.7)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

31. The plant is operating at 100% power with all systems in NSA.
- Low Head SI Pump 2SIS*P21A becomes inoperable due to a bearing failure on the pump

In the event of a Large break LOCA, how will this failure impact Train "A" ECCS performance?

BEFORE transfer to cold leg recirculation there will be _____ (1) _____.

AND

AFTER transfer to cold leg recirculation there will be _____ (2) _____.

(Assume all other systems function as designed during the Large break LOCA)

- A. 1. NO Low Head SI flow.
2. Low Head SI flow available via Recirc spray pump 2RSS*P21C **AND** High Head SI flow will be available.
- B. 1. Low Head SI flow available via Recirc spray pump 2RSS*P21C.
2. NO Low Head SI flow **BUT** High Head SI flow will be available.
- C. 1. NO Low Head SI flow.
2. NO Low Head SI flow **AND** NO High Head SI flow.
- D. 1. Low Head SI flow available via Recirc spray pump 2RSS*P21C.
2. Low Head SI flow will be available via Recirc spray pump 2RSS*P21C **AND** High Head SI flow will be available.

Answer **A**

Explanation/Justification:

- A. Correct. IAW EOP Attachment A-0.7 and ES-1.3 and VOND 11-1 & 13-1
- B. Incorrect. Before transfer to cold leg Recirc there will be NO LHSI flow; after transfer to cold Recirc there will be flow via 2RSSP21C.
- C. Incorrect. After transfer to cold leg Recirc there will be LHSI flow via 2RSSP21C and it will provide suction to the HHSI pump.
- D. Incorrect. Before transfer to cold leg Recirc there will be NO LHSI flow.

K/A Sys #	K/A System	K/A Category	K/A Statement
006	Emergency Core Cooling	Knowledge of the effect of a loss or malfunction on the following will have on the ECCS:	Safety Injection Pumps
K/A #	K6.03	K/A Importance 3.6	Exam Level RO
Question Source:	New	Question Cognitive Level:	Lower Fundamental
References provided to Candidate	None	Technical References:	EOP Attachment A-0.7 and ES-1.3 and VOND 11-1 & 13-1
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.7 / 45.7)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

32. The plant is operating at 100% power with all systems in NSA.
- Charging/High Head Safety Inj Pump 2CHS*P21A is running.
 - Charging/High Head Safety Inj Pump 2CHS*P21B is in standby.
 - Charging/High Head Safety Inj Pump 2CHS*P21C is **NOT** racked onto any bus.

How will Charging/High Head Safety Inj Pump 2CHS*P21A **SUCTION** and **DISCHARGE** be impacted by the receipt of a SI signal?

Suction will realign to the _____ (1) _____
AND

Discharge will realign for _____ (2) _____.

- A. 1. VCT
2. Cold leg injection
- B. 1. RWST
2. Cold leg injection
- C. 1. VCT
2. Hot leg injection
- D. 1. RWST
2. Hot leg injection

Answer B

Explanation/Justification:

- A. Incorrect. Suction will re-align to the RWST
- B. Correct. IAW 2OM-7.1.D page 33, 35; 2OM-11.1.D page 4
- C. Incorrect. Suction will re-align to the RWST and discharge will re-align to the cold leg injection flowpath
- D. Incorrect. Discharge will re-align to the cold leg injection flowpath.

K/A Sys #	K/A System	K/A Category			K/A Statement
006	Emergency Core Cooling	Ability to manually operate and/or monitor in the control room:			Transfer of ECCS flowpaths prior to recirculation
K/A #	A4.05	K/A Importance	3.9	Exam Level	RO
Question Source:		New	Question Cognitive Level:		
References provided to Candidate		None	Technical References:		
Objective #:		Task ID#:	10 CFR Part 55 Content:		
			Level Of Difficulty: (1-5)		
			Lower Fundamental		
			2OM-7.1.D page 33, 35; 2OM-11.1.D page 4		
			(CFR: 41.7 / 45.5 to 45.8)		

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

33. The plant is operating at 100% power with all systems in NSA.
- The Pressurizer Relief Tank (PRT) level transmitter malfunctions and the operators inadvertently overfill the PRT to 95% level.

How will containment parameters be affected by this overfill condition **IF** a PRZR PORV opens and continuously discharges to the PRT?

Containment temperatures will _____ (1) _____ and containment radiation will _____ (2) _____.

- A. 1. Remain constant
2. Remain constant
- B. 1. Remain constant
2. Rise
- C. 1. Rise
2. Remain constant
- D. 1. Rise
2. Rise

Answer D

Explanation/Justification:

- A. Incorrect. The higher water level is not enough to keep a continuous discharge from blowing the PRT rupture disc and discharging RCS to containment. This will result in higher containment temperatures. Although the higher water level is capable of scrubbing some iodine from the RCS, it will not prevent containment radiation level; from increasing.
- B. Incorrect. The higher water level is not enough to keep a continuous discharge from blowing the PRT rupture disc and discharging RCS to containment. This will result in higher containment temperatures. Containment radiation will rise.
- C. Incorrect. The higher water level is not enough to keep a continuous discharge from blowing the PRT rupture disc and discharging RCS to containment. This will result in higher containment temperatures. Although the higher water level is capable of scrubbing some iodine from the RCS, it will not prevent containment radiation level; from increasing.
- D. Correct. IAW 20M-6.1.C page 34 3rd paragraph. The PRT is not designed for continuous discharge. Candidate must understand that even with the higher water level, the continuous discharge of a PORV will be a LOCA as far as the containment parameters are concerned.

K/A Sys #	K/A System	K/A Category	K/A Statement
007	Pressurizer Relief/Quench Tank	Knowledge of the effect that a loss or malfunction of the PRTS will have on the following:	Containment
K/A #	K3.01	K/A Importance 3.3	Exam Level RO
Question Source: New		Level Of Difficulty: (1-5)	
References provided to Candidate		Question Cognitive Level: Lower Fundamental	
Objective #:		Technical References: 20M-6.1.C page 34 3 rd paragraph	
		10 CFR Part 55 Content: (CFR: 41.7 / 45.6)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

34. The plant is operating at 75% power BOL with all systems in normal alignment for this power level.
- Rod control is in Automatic
 - All RCS T_{avg} indications are Matched with T_{ref} .
 - VCT level is 45% and stable.

With **NO INITIAL** change in turbine load, control rods begin to slowly step **INWARD**.

Which ONE (1) of the below listed failures will cause this inward rod motion?

- A. The Loop "A" T_C transmitter slowly failing **HIGH**.
- B. A Loop "A" T_H transmitter slowly failing **HIGH**.
- C. Boric Acid to Boric Acid Blender, [2CHS*FCV113A] failing **OPEN**.
- D. Non-Regen HX Disch Temp Control Vlv [2CCP*TCV144] failing **OPEN**.

Answer D

Explanation/Justification:

- A. Incorrect. If the T_C transmitter fails high, then T_{avg} for that loop will rise. However, this will NOT cause rods to move since the T_{avg} signal to rod control is median selected.
- B. Incorrect. If a T_H transmitter fails high, then T_{avg} for that loop will rise. However, this will NOT cause rods to move since the T_{avg} signal to rod control is median selected.
- C. Incorrect. This would appear to be a potential boration path. However, with blender setup in NSA, FCV113B and FCV114B are both CLOSED isolating any potential flowpath. Additionally, at Unit 2 the boric acid transfer pump is NOT running until a Makeup signal is generated. With VCT level at 45% there would be NO makeup signal available.
- D. Correct. IAW VOND 15-5 grid F-4 and LP GPF.C4 page 30. Colder water will allow the demineralizers to absorb more boron.

K/A Sys #	K/A System	K/A Category	K/A Statement
2.08	Component Cooling Water	N/A	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.
K/A #	2.4.47	K/A Importance	4.2
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Higher Comprehension
Objective #:	Task ID#:	Technical References:	VOND 15-5 grid F-4 and LP GPF.C4 page 30.
		10 CFR Part 55 Content:	(CFR: 41.10 / 43.5 / 45.12)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

35. The plant is in Mode 2 preparing for a turbine startup all systems in normal alignment for this mode.
- Reactor power is 3% and stable.
 - The PRZR Master Pressure Controller output is at 42% demand signal.
 - PRZR pressure is 2235 psig and stable.
 - Both PRZR spray valve controllers are in **AUTOMATIC**.
 - PRZR Spray Valve 2RCS*PCV455A is 20% **OPEN**.
 - PRZR Spray Valve 2RCS*PCV455B is **CLOSED**.
 - The PRZR control heater is in **AUTO** (Red Target).
 - The Steam Dump Control Mode Selector switch is in the "**Stm Press**" position.
 - The Main Stm Manifold Press Controller [2MSS-PK464] is in **AUTOMATIC** with a setpoint of 1000 psig.
 - RCS temperature is 547°F and stable.

Main Stm Manifold Stm Press [2MSS-PT464] transmitter **THEN** fails **LOW**.

How will the PRZR Pressure control system **INITIALLY** respond to this failure?
(Assume NO operator actions)

PRZR Master Pressure Controller output will _____(1)_____ and cause PRZR Spray Valve 2RCS*PCV455A to _____(2)_____.

- A. (1) **RISE** above 42%
(2) **OPEN** more than 20%
- B. (1) **RISE** above 42%
(2) fully **CLOSE**
- C. (1) **DROP** below 42%
(2) **OPEN** more than 20%
- D. (1) **DROP** below 42%
(2) fully **CLOSE**

Answer **A**

Explanation/Justification:

- A. Correct IAW 2OM-6.4.IFattachment 2 and 2OM-21.5.A.12. A low failure of 2MSS-PT464 will cause the steam dumps to close as the controller is trying to maintain 1000 psig and the input is now zero. Closing the steam dumps will cause an RCS heatup which will raise RCS pressure. With rising RCS pressure the PRZR master controller output will rise and spray valve 455A will OPEN farther to drop pressure.
- B. Incorrect. Spray valve 455A will OPEN.
- C. Incorrect. Master controller output will rise.
- D. Incorrect. Master controller output will rise and Spray valve 455A will OPEN.

K/A Sys #	K/A System	K/A Category	K/A Statement
010	Pressurizer Pressure Control	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR PCS controls including:	RCS heatup and cooldown effect on pressure
K/A #	A1.06	K/A Importance 3.1	Level Of Difficulty: (1-5)
Question Source:	New	Exam Level RO	Question Cognitive Level: Higher Comprehension
References provided to Candidate	None	Technical References:	2OM-6.4.IFattachment 2 and 2OM-21.5.A.12.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.5 / 45.5)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

36. The plant is operating at 100% power with all systems in NSA.
- PRZR Channel 1 Press 2RCS-PT455 has failed **HIGH**.
 - The control room crew has tripped all associated bistables IAW 2OM-6.4.IF, Instrument Failure.

PRZR Control Pressure [2RCS-PT445] **THEN** fails **HIGH**.

What will be the **INITIAL** plant response to this additional failure?

- A. PRZR Spray Valve 2RCS*PCV455A & 2RCS*PCV455B will **OPEN**.
- B. PRZR PORV 2RCS-PCV455C will **OPEN**.
- C. PRZR PORVs 2RCS-PCV455D & 2RCS-PCV456 will **OPEN**.
- D. High PRZR Pressure Reactor Trip will **ACTUATE**.

Answer C

Explanation/Justification:

- A. Incorrect. This would be the INITIAL response if 2RCS-PT444 failed High.
- B. Incorrect. This would be the next response if 2RCS-PT444 failed High.
- C. Correct. IAW 2OM-6.4.IF attachment 2.
- D. Incorrect. Failures are one control channel and one protection channel, therefore NO reactor trip.

K/A Sys #	K/A System	K/A Category	K/A Statement
010	Pressurizer Pressure Control	Ability to monitor automatic operation of the PZR PCS, including:	PZR pressure
K/A #	A3.02	K/A Importance 3.6	Exam Level RO
Question Source: New		Level Of Difficulty: (1-5)	
References provided to Candidate		Question Cognitive Level: Higher Comprehension	
Objective #:		Technical References: 2OM-6.4.IF attachment 2.	
Task ID#:		10 CFR Part 55 Content: (CFR: 41.7 / 45.5)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

37. Which ONE (1) of the following power changes will change the "RCS Loop Low Flow" Automatic Reactor Trip Logic from a 2/3 coincidence to a 1/3 coincidence?
- A. Raising power on 2/4 Power range channels from 8% to 12%.
 - B. Raising power on 2/4 Power range channels from 28% to 32%.
 - C. Lowering power on 2/4 Power range channels from 12% to 8%.
 - D. Lowering power on 2/4 Power range channels from 32% to 28%.

Answer B

Explanation/Justification:

- A. Incorrect. This power change would Arm the trip. Below P-10 the low flow trip is NOT active.
- B. Correct. IAW UFSAR Figs 7.3-9 and 7.3-10.
- C. Incorrect. This would remove all RCS low flow trips.
- D. Incorrect. This changes the logic from 1/3 to 2/3.

K/A Sys #	K/A System	K/A Category			K/A Statement
012	Reactor Protection	Knowledge of RPS design feature(s) and/or interlock(s) which provide for the following:			Automatic or manual enable/disable of RPS trips
K/A #	K4.06	K/A Importance	3.2	Exam Level	RO
Question Source:		New		Question Cognitive Level:	Lower Fundamental
References provided to Candidate		None		Technical References:	UFSAR Figs 7.3-9 and 7.3-10.
Objective #:		Task ID#:		10 CFR Part 55 Content:	(CFR: 41.7)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

38. The plant is operating in Mode 1 with all systems in NSA.
A secondary calorimetric has just been completed. The calorimetric indicates that reactor power is 99.6%. All power range channels are OPERABLE.

Power Range indications are as follows:

- N41 – 99.8%
- N42 – 99.5%
- N43 – 99.0%
- N44 – 100.0%

What Power Range gain adjustments are **Required**?

- A. Lower **ONLY** N44 indicated power to $\leq 99.6\%$
- B. Lower N41 **AND** N44 indicated power to $\leq 99.6\%$
- C. Raise N42 **AND** N43 indicated power to $\geq 99.6\%$
- D. Raise N41, N42 **AND** N43 indicated power to 100%

Answer C

Explanation/Justification:

- A. Incorrect. Adjustments not required for Nis with indicated power above actual power.
- B. Incorrect. Adjustments not required for Nis with indicated power above actual power.
- C. Correct. IAW 2OM-54.4.C1 page 14 2nd bullet.
- D. Incorrect. Although this would be conservative, it is NOT required to raise N41.

K/A Sys #	K/A System	K/A Category	K/A Statement
2	Reactor Protection	Ability to predict and/or monitor Changes in parameters (to prevent exceeding design limits) associated with operating the RPS controls including:	Trip setpoint adjustment
K/A #	A1.01	K/A Importance 2.9	Exam Level RO
Question Source:	New	Question Cognitive Level:	Lower Fundamental
References provided to Candidate	None	Technical References:	2OM-54.4.C1 page 14 2 nd bullet.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.5 / 45.5)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

39. Which ONE (1) of the following is the power supply to the Train "B" Solid State Protection System (SSPS) slave relays?

- A. Vital Bus 1
- B. Vital Bus 2
- C. 125VDC Bus 1
- D. 125VDC Bus 2

Answer B

Explanation/Justification:

- A. Incorrect. This is the power supply to the Train "A" slave relays.
- B. Correct IAW AOP-2.38.1B page 21 item 7.
- C. Incorrect. Slave relay power is provided by AC Vital bus 1
- D. Incorrect. Slave relay power is provided by AC Vital bus 1

K/A Sys #	K/A System	K/A Category			K/A Statement
013	Engineered Safety Features Actuation	Knowledge of bus power supplies to the following:			ESFAS/safeguards equipment control
K/A #	K2.01	K/A Importance	3.6	Exam Level	RO
Question Source:		New		Level Of Difficulty: (1-5)	
References provided to Candidate		None		Question Cognitive Level: Lower Memory	
Objective #:		Task ID#:		Technical References: AOP-2.38.1B page 21 item 7.	
				10 CFR Part 55 Content: (CFR: 41.7)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

40. The plant is operating at 100% power with all systems in NSA.

In **ADDITION** to bus undervoltage and motor electrical protection, which of the below listed signals will directly **TRIP** Containment Air Recirculation Fan 2HVR-FN201A?

1. 2HVR-FN201A hi-hi vibration signal.
2. CIA signal.
3. CIB signal.
4. Safety Injection signal.
5. Containment Sump water level high signal.

A. 1,3, & 4 **ONLY**

B. 1, 4, & 5 **ONLY**

C. 2, & 5 **ONLY**,

D. 2 & 3 **ONLY**

Answer B

Explanation/Justification:

- A. Incorrect. Will Not trip on CIB and it will trip on sump level high.
- B. Correct. IAW 2OM-44C.1.D page 3 2nd paragraph.
- C. Incorrect. Does not trip on CIA.
- D. Incorrect. Does not trip on CIA or CIB.

A Sys #	K/A System	K/A Category	K/A Statement
022	Containment Cooling	Ability to manually operate and/or monitor in the control room;	CCS fans
K/A #	A4.01	K/A Importance 3.6	Exam Level RO
Question Source:	New		Level Of Difficulty: (1-5)
References provided to Candidate	None		Question Cognitive Level: Lower Fundamental
Objective #:	Task ID#:		Technical References: 2OM-44C.1.D page 3 2 nd paragraph.
			10 CFR Part 55 Content: (CFR: 41.7 / 45.5 to 45.8)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

41. The plant is operating at 100% power with all systems in NSA.
- A large break LOCA occurs inside CNMT.
 - When the main generator tripped, the 2A Normal 4KV bus **FAILED** to transfer to the off-site power source (SSST).
 - CNMT pressure reaches 20 psig and is stable.
 - RWST level reaches 360 inches and is slowly dropping.
 - All ESF equipment operates as designed.

Based on these conditions, how many HHSI/Charging and Recirculation Spray pumps will be **DISCHARGING DIRECTLY** into the reactor vessel?

	<u>HHSI/Charging</u>	<u>Recirculation Spray</u>
A.	1	0
B.	1	1
C.	2	2
D.	2	4

Answer C

Explanation/Justification:

- A. Incorrect. EDG functioned therefore both trains of emergency power are available. If candidates believes only one train available and do NOT recognize that RWST level is below the transfer to Recirc setpoint, then they will choose this answer.
- B. Incorrect. EDG functioned therefore both trains of emergency power are available. If a candidate believes only one train available, then they will choose this answer.
- C. Correct. IAW 2OM-13.1.B page 3 3rd paragraph.
Incorrect. HHSI pumps are correct. However, two of the 4 Recirc spray pumps are re-aligned to inject into the core. All 4 pumps will be running, but only 2 are injecting into the core. The other 2 continue to inject into the CNMT spray header.

K/A Sys #	K/A System	K/A Category	K/A Statement
026	Containment Spray	Knowledge of the physical connections and/or cause-effect relationships between the CSS and the following systems:	ECCS
K/A #	K1.01	K/A Importance 4.2	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	2OM-13.1.B page 3 3 rd paragraph.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.2 to 41.9 / 45.7 to 45.8)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

42. The plant is operating at 100% power with all systems in NSA.
- Recirculation Spray Cooler 2RSS*E21A becomes **INOPERABLE**.

What Technical Specification actions are **REQUIRED**?

Entry into Technical Specification LCO:

- A. 3.6.7 Condition C **ONLY**
- B. 3.6.7 Condition C **AND** 3.6.8 Condition A **ONLY**
- C. 3.6.6 Condition A **AND** 3.6.7 Condition C **ONLY**
- D. 3.6.6, 3.6.8 Condition A, **AND** 3.6.7 Condition C.

Answer A

Explanation/Justification:

- A. Correct. IAW Tech Spec 3.6.7 condition C
- B. Incorrect. Candidates who believe chemical addition is through the Recirc spray system will select this answer since the chem. Add subsystem would also be inoperable. However, the chem. Add system injects into the QS system NOT the Recirc spray system.
- C. Incorrect. Candidate may believe that loss of this heat exchanger also impact one train of QS. However, the QS dispersion ring is a separate header and is NOT impacted by a loss of the RS heat exchanger.
- D. Incorrect. Candidates who believe chemical addition is through the Recirc spray system will select this answer since the chem. Add subsystem would also be inoperable. However, the chem. Add system injects into the QS system NOT the Recirc spray system. Candidate may ALSO believe that loss of this heat exchanger will impact one train of QS. However, the QS dispersion ring is a separate header and is NOT impacted by a loss of the RS heat exchanger.

K/A Sys #	K/A System	K/A Category	K/A Statement		
226	Containment Spray	N/A	Ability to apply Technical Specifications for a system.		
K/A #	2.2.40	K/A Importance	3.4	Exam Level	RO
Question Source:	New	Question Cognitive Level:		Higher	Application
References provided to Candidate	Tech Spec Section 3.6		Technical References:	Tech Spec 3.6.7 condition C.	
Objective #:	Task ID#:		10 CFR Part 55 Content:	(CFR: 41.10 / 43.2 / 43.5 / 45.3)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

43. The plant is operating at 40% power with all systems in normal alignment for this mode.
- Rod Control is in **MANUAL**.
 - A **FULL** load rejection occurs.
 - The reactor trip breakers remain **CLOSED**.
 - Tavg – Tref deviation indicates 6°F.
 - All systems function as designed.

Which ONE (1) of the following describes how the Steam Dump system will be operating for these conditions?

Steam Dump...

- A. Bank 1 will be **PARTIALLY OPEN**. All other Steam Dump Banks will be **CLOSED**.
- B. Bank 1 will be **FULL OPEN**. Bank 2 will be **PARTIALLY OPEN**. Banks 3 & 4 will be **CLOSED**.
- C. Banks 1 & 2 will be **FULL OPEN**. Bank 3 will be **PARTIALLY OPEN**. Bank 4 will be **CLOSED**.
- D. Banks 1, 2, & 3 will be **FULL OPEN**. Bank 4 will be **PARTIALLY OPEN**.

Answer A

Explanation/Justification:

- A. Correct. IAW 2OM-21.5.A.12 and 13
- B. Incorrect. Banks 3 & 4 response is correct but Bank 1 will only be partially open and bank 2 will be closed. The temperature error is not large enough to fully open bank 1 and partially open bank 2.
- C. Incorrect. Bank 4 response is correct but Bank 1 will only be partially open and bank 2 will be closed. The temperature error is not large enough to fully open bank 1 and partially open banks 2 and 3.
- D. Incorrect. Bank 1 will only be partially open and banks 2 & 3 will be closed. The temperature error is not large enough to fully open bank 1 and partially open banks 2, 3, & 4.

K/A Sys #	K/A System	K/A Category	K/A Statement
039	Main and Reheat Steam	Ability to manually operate and/or monitor in the control room;	Steam dump valves
K/A #	A4.07	K/A Importance 2.8	Exam Level RO
Question Source:	New	Level Of Difficulty: (1-5)	Question Cognitive Level: Higher Analysis
References provided to Candidate	None	Technical References:	2OM-21.5.A.12 and 13.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.7 / 45.5 to 45.8)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

44. The plant is operating at 100% power with all systems in NSA.

Which ONE (1) of the below listed failures will cause the associated Main Feed Regulating valve to **INITIALLY** throttle **CLOSED**.

(Assume NO operator Action)

- A. An associated level transmitter fails **HIGH**.
- B. The selected steam flow transmitter fails **HIGH**.
- C. The selected feed flow transmitter fails **LOW**.
- D. The associated steam pressure transmitter fails **LOW**.

Answer **D**

Explanation/Justification:

- A. Incorrect. Level is median selected. Therefore, a single failure either way will not impact MFRV operation. IF level were NOT median select, this failure would cause the MFRV to throttle closed.
- B. Incorrect. This will cause the valve to throttle OPEN.
- C. Incorrect. This will cause the valve to throttle OPEN.
- D. Correct. IAW 2OM-24.4.IF attachment 4 page 31 2nd NOTE. Steam pressure is used to compensate steam flow indication for density, and has the same effect as steam flow. Therefore, a pressure transmitter failing low will cause the SGWLC system to see low steam flow with respect to feed flow. This anticipatory signal will drive the MFRV closed in an attempt to match feed flow to the steam flow. This will be the initial response. Since the SGWLC system is level dominant, when level drops as a result of this initial response, the MFRV will be driven open again in an attempt to restore level back to program value.

K/A Sys #	K/A System	K/A Category	K/A Statement
259	Main Feedwater	Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following:	Feedwater regulatory valve operation (on basis of steam flow, feed flow mismatch)
K/A #	K4.08	K/A Importance 2.5	Level Of Difficulty: (1-5)
Question Source:	New	Exam Level RO	Question Cognitive Level: Higher Comprehension
References provided to Candidate	None	Technical References:	2OM-24.4.IF attachment 4 page 31 2 nd NOTE
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.7)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

45. The plant is operating at 70% power with all systems in normal alignment for this power level.
- Both Main feed pumps are in operation.

The "B" Main Feed pump **THEN** trips and cannot be re-started.

- (1) What impact will this failure have on SG Feed Pump 21B Recirculation Valve 2FWR-FCV150B operation?
- (2) IAW AOP-2.24.1, Loss of Main Feedwater, what actions will be required in response to this failure?

- A. (1) 2FWR-FCV150B will **OPEN**.
(2) Trip the Reactor and Go to E-0, Reactor Trip or Safety Injection.
- B. (1) 2FWR-FCV150B will **REMAIN CLOSED**.
(2) Start the SG Startup feed pump [2FWS-P24].
- C. (1) 2FWR-FCV150B will **REMAIN CLOSED**.
(2) Trip the Reactor and Go to E-0, Reactor Trip or Safety Injection.
- D. (1) 2FWR-FCV150B will **OPEN**.
(2) Start the SG Startup feed pump [2FWS-P24].

Answer B

Explanation/Justification:

- A. Incorrect. 2FWR-FCV150B will remain CLOSED. The number of pumps running does impact the control system for the feed pump recirculation valves. However, the feed at 70% power is large enough (~16,000 gpm) to keep the valve closed. The reactor is not required to be tripped. One main feed pump and the startup feed pump are adequate to supply the necessary feed flow. Therefore, AOP-2.24.1 requires the crew to start 2FWS-P24.
Correct. IAW AOP-2.24.1 step 2b RNO and 2OM-24.1.D pages 11 and 12.
- B. Incorrect. The reactor is not required to be tripped. One main feed pump and the startup feed pump are adequate to supply the necessary feed flow. Therefore, AOP-2.24.1 requires the crew to start 2FWS-P24.
- D. Incorrect. 2FWR-FCV150B will remain CLOSED. The number of pumps running does impact the control system for the feed pump recirculation valves. However, the feed at 70% power is large enough (~16,000 gpm) to keep the valve closed.

K/A Sys #	K/A System	K/A Category	K/A Statement
059	Main Feedwater	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:	Failure of feedwater control system
K/A #	A2.11	K/A Importance	3.0
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Level Of Difficulty: (1-5)	Higher Comprehension
Objective #:	Task ID#:	Question Cognitive Level:	Higher Comprehension
		Technical References:	AOP-2.24.1 step 2b RNO and 2OM-24.1.D pages 11 and 12.
		10 CFR Part 55 Content:	(CFR: 41.5 / 43.5 / 45.3 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

46. The plant is operating at 100% power with all systems in NSA.
- EDG #1 is on clearance for a lube oil change-out **AND** maintenance has just removed all lube oil from the crankcase.
 - An inadvertent reactor trip occurs **COINCIDENT** with a loss of offsite power.
 - All SG levels "Shrink" to 10% NR as a result of the trip.
 - All systems function as designed.

Based on these conditions:

Which motor driven auxiliary feed pump will be running **AND** which electrical bus will be providing the power to the pump?

- A. "A" AFW pump powered from 480V Bus 8N.
- B. "A" AFW pump powered from 4KV Bus 2AE.
- C. "B" AFW pump powered from 480V Bus 9P.
- D. "B" AFW pump powered from 4KV Bus 2DF.

Answer D

Explanation/Justification:

- A. Incorrect. Entire A Train will be de-energized and AFW pump motors are 4KV not 480V.
- B. Incorrect. Entire A Train will be de-energized.
- C. Incorrect. AFW pump motors are 4KV not 480V.
- D. Correct. IAW 2OM-24.1.C page 5 1st paragraph.

K/A Sys #	K/A System	K/A Category	K/A Statement
1	Auxiliary/Emergency Feedwater	Knowledge of bus power supplies to the following:	AFW electric drive pumps
K/A #	K2.02	K/A Importance 3.7	Exam Level RO
Question Source:	New		Level Of Difficulty: (1-5)
References provided to Candidate	None		Question Cognitive Level: Lower Fundamental
Objective #:	Task ID#:		Technical References: 2OM-24.1.C page 5 1 st paragraph.
			10 CFR Part 55 Content: (CFR: 41.7)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

47. The plant is operating at 100% power with all systems in NSA.
- A Steam Generator Tube Rupture (SGTR) occurs on the "B" Steam Generator.
 - All systems function as designed **EXCEPT** the turbine driven AFW pump did **NOT** start and could **NOT** be locally started.
 - The crew has entered E-3, Steam Generator Tube Rupture.
 - "B" Steam Generator NR level is 35% and rising.
 - At step 5 of E-3, the crew is attempting to isolate AFW flow to the "B" Steam Generator
 - 21B SG AFW Throttle Valve 2FWE*HCV100C will **NOT** close and **CANNOT** be closed from the control room.

IAW E-3, Steam Generator Tube Rupture step 5 how will AFW be isolated to the "B" Steam Generator?

- A. Reset SI **THEN** secure "A" AFW pump.
- B. Reset SI **THEN** secure "B" AFW pump.
- C. Secure "A" AFW pump **THEN** reset SI.
- D. Secure "B" AFW pump **THEN** reset SI.

Answer **A**

Explanation/Justification:

- A. Correct. IAW E-3 step 5. (predict which controls will need to be operated to prevent overfilling the SG)
- B. Incorrect. Wrong pump. 2FWE*HCV100C is an "A" train mechanical valve, therefore the "A" motor driven AFW pump must be secured to stop flow to the "B" SG.
- C. Incorrect. Resetting SI is done **AFTER** shutting down the turbine driven AFE pump, but is done **BEFORE** shutting down the motor driven pumps.
- D. Incorrect. Wrong pump. 2FWE*HCV100C is an "A" train mechanical valve, therefore the "A" motor driven AFW pump must be secured to stop flow to the "B" SG. Resetting SI is done **AFTER** shutting down the turbine driven AFE pump, but is done **BEFORE** shutting down the motor driven pumps.

K/A Sys #	K/A System	K/A Category	K/A Statement
061	Auxiliary/Emergency Feedwater	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AFW controls including:	SG Level
K/A #	A1.01	K/A Importance	3.9
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Technical References:	E-3 step 5
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.5 / 45.5)
		Level Of Difficulty: (1-5)	Lower Fundamental

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

48. The plant is operating in Mode 3.
- All systems are in normal alignment for this mode **EXCEPT** Primary Component Cooling Water Pump 2CCP*P21C is racked onto the 2AE bus and is running with its control switch in **AFTER START** (Red Target).
 - Primary Component Cooling Water Pump 2CCP*P21A is racked onto the 2AE bus with its control switch in **AFTER STOP** (Green Target).
 - Primary Component Cooling Water Pump 2CCP*P21B is racked onto the 2DF bus with its control switch in **AFTER STOP** (Green Target).

A loss of offsite power occurs and all systems function as designed.

AFTER the EDG have completed sequentially loading all equipment, WHICH Primary Component Cooling Water Pump(s) will be running?

- A. **ONLY 2CCP*P21B.**
- B. **ONLY 2CCP*P21A AND 2CCP*P21B.**
- C. **ONLY 2CCP*P21C AND 2CCP*P21B.**
- D. **ALL Primary Component Cooling Water Pumps.**

Answer B

Explanation/Justification:

- A. Incorrect. 2CCP*21A will also start.
- B. Correct. IAW 2OM-15.1.D page 3 1st paragraph and 2OM-15.1.D page 6 last paragraph.
NOTE:
2nd part of the K/A has not been addressed. Use procedures to mitigate, correct or control is not applicable to the situation. The alignment of the standby CCP pump is correct and the plant response is correct. Therefore, additional operator actions would NOT be required. Additionally if the situation posed in the question is modified such that the plant response is incorrect, the only procedural guidance that exists to correct would be to simply start the pump that should have started OR stop the pump that started inappropriately. Based on this information, the more important part of the K/A has been addressed. It is important for the operators to understand the CCP start logic when the standby pump is racked onto an emergency bus.
- C. Incorrect. 2CCP*21C will NOT start because 2CCP-21A is NOT in disconnect position on the 2AE bus. 2CCP*21A will start.
- D. Incorrect. 2CCP*21C will NOT start because 2CCP-21A is NOT in disconnect position on the 2AE bus.

K/A Sys #	K/A System	K/A Category	K/A Statement
062	AC Electrical Distribution	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:	Aligning standby equipment with correct emergency power source (D/G)
K/A #	A2.11	K/A Importance	3.7
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Higher Comprehension.
Objective #:	Task ID#:	Technical References:	2OM-15.1.D page 6 last paragraph
		10 CFR Part 55 Content:	(CFR: 41.5 / 43.5 / 45.3 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

49. The plant is operating at 100% power with all systems in NSA.
- Battery Charger *2-1 **FAILS** and its associated output breaker **OPENS**.
 - All systems function as designed.

Based on these conditions, what will be the status of 125VDC Switchboard 2-1?

- A. **ENERGIZED** by 120VAC Vital Bus 1
- B. **ENERGIZED** by station Battery *2-1
- C. **DE-ENERGIZED** until the spare charger is installed as a replacement.
- D. **DE-ENERGIZED** until Vital Bus 1 Manual Bypass Switch is placed to "Bypass".

Answer **B**

Explanation/Justification:

- A. Incorrect. #1 inverter automatically receives DC power on loss of input power; it does NOT output power to the DC SWBD.
- B. Correct. IAW 20M-39.1.B page 3 3rd paragraph
- C. Incorrect. Installing the spare charger will restore the AC power to the SWBD. However, the battery will provide 125VDC power in the interim.
- D. Incorrect. The battery will provide 125VDC power. Placing the Vital bus manual bypass switch to Bypass will restore AC power to a Vital bus that failed to transfer thru its static switch.

NOTE

At Unit 2 there is NO position labeled Bypass. This is a Unit 1 term. Bypass position was used in this question to avoid giving any hints to the candidate on how to answer question #12.

K/A Sys #	K/A System	K/A Category	K/A Statement
063	DC Electrical Distribution	Knowledge of the physical connections and/or cause-effect relationships between the DC electrical system and the following systems:	AC electrical system
K/A #	K1.02	K/A Importance	2.7
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Lower Fundamental
Objective #:	Task ID#:	Technical References:	20M-39.1.B page 3 3 rd paragraph
		10 CFR Part 55 Content:	(CFR: 41.2 to 41.9 / 45.7 to 45.8)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

50. The plant is operating at 100% power with all systems in NSA.
- An inadvertent reactor trip occurs **COINCIDENT** with a loss of offsite power.
 - **BOTH** EDGs **FAIL** to start and cannot be started.
 - The operating crew enters the appropriate Emergency Operating Procedure to address these conditions.
 - ~ 30 minutes after the reactor trip, CNMT pressure rises to 5.0 psig.
 - SI and CIA actuate.

What will be the status of the following CIA components **AFTER** this CIA actuation?

1. Letdown orifice isolation valves.
2. RCP seal water return CNMT isolation valves.
3. CNMT Instrument Air Compressor suction isolation valves.
4. Non-Regen Heat exchanger Letdown inlet valve.

A. 1. Closed.
2. Closed.
3. Closed.
4. Closed.

B. 1. Closed.
2. Open.
3. Closed.
4. Open.

C. 1. Closed.
2. Open.
3. Open.
4. Closed.

D. 1. Open.
2. Open.
3. Open.
4. Open.

Answer C.

Explanation/Justification:

- A. Incorrect. This is the position they should all be in if power is available. However, items 2 and 3 are 480V motor operated valves that would have already been OPENING when power was lost. Without power to close the valves, they would remain open.
- B. Incorrect. Item 2 is a 480V motor operated valve that would have already been OPEN when power was lost. Without power to close the valve it would remain open. Item 4 is DC powered, and DC power is still available (batteries are designed for 2 hours) to close the valve.
- C. Correct. IAW EOP attachment A-0.2 pages 6-9.
- D. Incorrect. Items 1 & 4 are DC powered, and DC power is still available (batteries are designed for 2 hours) to close these valves.

K/A Sys #	K/A System	K/A Category	K/A Statement
064	Emergency Diesel Generator	Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following:	ESFAS controlled or actuated systems
K/A #	K3.02	K/A Importance 4.2	Exam Level RO
Question Source:	New	Question Cognitive Level:	Lower Fundamental
References provided to Candidate	None	Technical References:	EOP attachment A-0.2 pages 6-9.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.7 / 45.6)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

51. The plant is in Refueling Mode with all systems aligned for core off-load.
- While lowering a spent fuel assembly into the Spent fuel pool, the assembly ruptures and releases **ALL** of the gases from **ALL** of the rods in that assembly **ONLY**.
 - **NO** other fuel assemblies have been damaged.
 - Fuel Pit Bridge Radiation Monitor 2RMF-RQ202 goes into **HIGH** alarm.

Based on these conditions, will Fuel Building Vent Radiation Monitor 2RMF- RQ301A/B **ALSO** go into a **HIGH** alarm condition? **Why or Why Not?**

- A. **NO**, Fuel Pit Bridge Radiation Monitor 2RMF-RQ202 is designed to detect gamma radiation (GM tube) **AND** Fuel Building Vent Radiation Monitor 2RMF-RQ301A/B is designed to detect beta radiation (scintillation).
- B. **NO**, The iodine and xenon released from the fuel assembly **WILL BE** sufficiently scrubbed out by the water above the assembly.
- C. **YES**, Fuel Pit Bridge Radiation Monitor 2RMF-RQ202 is designed to detect beta radiation (scintillation) **AND** Fuel Building Vent Radiation Monitor 2RMF- RQ301A/B is designed to detect gamma radiation (GM tube).
- D. **YES**, The iodine and xenon released from the fuel assembly **WILL NOT BE** sufficiently scrubbed out by the water above the assembly.

Answer D

Explanation/Justification:

- A. Incorrect. The type of detectors is correct. However, if the gases released are emitting enough gamma radiation to actuate the high alarm on 2RMF-RQ-202, then there will be more than enough Xe and iodine to actuate the high alarm on 2RMF-RQI301.
- B. Incorrect. Some iodine will be scrubbed by the 23 feet of water, but enough iodine and other gases will be present to actuate the high alarm on 2RMF-RQI301.
- C. Incorrect. Yes the alarm will actuate, but not because of detector types which are not correct.
- D. Correct. IAW 2OM-43.1.C page 28 AND UFSAR section 15.7.4.3. The analyzed fuel handling accident in the fuel pool will result in an offsite dose. The 2RMF-RQI301 radiation monitor will detect this release and actuate the alarms. AOP- 2.49.1 for the fuel handling accident also lists both monitors as symptoms of the event.

K/A Sys #	K/A System	K/A Category			K/A Statement
073	Process Radiation Monitoring	Knowledge of the operational implications as they apply to concepts as they apply to the PRM system:			Radiation theory, including sources, types, units, and effects
K/A #	K5.01	K/A Importance	2.5	Exam Level	RO Level Of Difficulty: (1-5)
Question Source:		New	Question Cognitive Level:		Lower Fundamental.
References provided to Candidate		None	Technical References:		2OM-43.1.C page 28 AND UFSAR section 15.7.4.3
Objective #:		Task ID#:	10 CFR Part 55 Content:		(CFR: 41.5 / 45.7)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

52. The plant is operating at 100% power with all systems in NSA.
- Service Water Pumps 2SWS*P21A **AND** B are **BOTH** in service.
 - Service Water Pump 2SWS*P21C is on clearance and unavailable.
 - "A" and "B" Primary Plant Component Cooling Water Heat Exchangers are **BOTH** in service.
 - "A" and "B" Secondary Plant Component Cooling Water Heat Exchangers are **BOTH** in service.

A large Service water leak develops at the inlet to the "A" Primary Plant Component Cooling Water Heat Exchanger. The leak causes the following Service water header pressure indications:

- Service Water Header Press 2SWS-PI113A is 30 psig and stable.
- Service Water Header Press 2SWS-PI113B is 40 psig and stable.

- (1) **IF** these Service Water Header Pressures are sustained for greater than 1 minute, what will be the impact on Secondary Plant Component Cooling Water Heat Exchanger operations?
- (2) IAW AOP-2.30.1, Service Water/Normal Intake Structure Loss, what actions will be **REQUIRED IF BOTH** Service Water Header Pressures drop below 34 psig and cannot be restored above 34 psig?
- A. (1) **ONLY** the "A" Secondary Plant Component Cooling Water Heat Exchanger will be **ISOLATED**.
(2) Manually trip the reactor and Go to E-0, Reactor Trip or Safety Injection.
- B. (1) **ONLY** the "A" Secondary Plant Component Cooling Water Heat Exchanger will be **ISOLATED**.
(2) Perform an emergency shutdown IAW AOP-2.51.1, Emergency Shutdown.
- C. (1) **NEITHER** Secondary Plant Component Cooling Water Heat Exchanger will be **ISOLATED**.
(2) Manually trip the reactor and Go to E-0, Reactor Trip or Safety Injection.
- D. (1) **NEITHER** Secondary Plant Component Cooling Water Heat Exchanger will be **ISOLATED**.
(2) Perform an emergency shutdown IAW AOP-2.51.1, Emergency Shutdown.

Answer C

Explanation/Justification:

- A. Incorrect. 2SWS*MOV107A will auto close when pressure is less than 34 psig for greater than 45 seconds. However, this only isolates the "A" header. The "B" header will continue to supply BOTH secondary plant component cooling water heat exchangers. Manually trip the reactor is correct.
- B. Incorrect. 2SWS*MOV107A will auto close when pressure is less than 34 psig for greater than 45 seconds. However, this only isolates the "A" header. The "B" header will continue to supply BOTH secondary plant component cooling water heat exchangers. Manually trip the reactor is required action, NOT perform an emergency shutdown. Performing an emergency shutdown is appropriate if service water cannot be restored to the secondary side AND it has been restored to the primary side.
- C. Correct. IAW AOP-2.30.1 automatic actions on page 1 & VOND 30-1 grid G-6 and 7; Part 2 IAW AOP-2.30.1 step 2 RNO e.
- D. Incorrect. 2SWS*MOV107A will auto close when pressure is less than 34 psig for greater than 45 seconds. However, this only isolates the "A" header. The "B" header will continue to supply BOTH secondary plant component cooling water heat exchangers. Manually trip the reactor is required action, NOT perform an emergency shutdown. Performing an emergency shutdown is appropriate if service water cannot be restored to the secondary side AND it has been restored to the primary side.

K/A Sys #	K/A System	K/A Category	K/A Statement
076	Service Water	Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Loss of SWS
K/A #	A2.01	K/A Importance	3.5
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Higher Comprehension
Objective #:	Task ID#:	Technical References:	AOP-2.30.1 automatic actions on page 1 & VOND 30-1 grid G-6 and 7; Part 2 IAW AOP-2.30.1 step 2 RNO e.
		10 CFR Part 55 Content:	(CFR: 41.5 / 43.5 / 45/3 / 45/13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

53. The plant is operating at 100% power with all systems in NSA.
- A Large Break LOCA occurs inside CNMT.
 - CNMT pressure rises to 35 psig.
 - All equipment functions as designed.

Which of the below listed components will **NOW** be cooled by Service Water?

1. CNMT Air Recirc Coolers
 2. Charging pump lube oil coolers
 3. Primary Plant Component Cooling Water Heat Exchangers
 4. Recirculation Spray Heat Exchangers
 5. Secondary Plant Component Cooling Water Heat Exchanger
 6. Rod Control Area A/C Units
- A. 3, 5, and 6 **ONLY**
- B. 1, 3, and 5 **ONLY**
- C. 1, 2, 4, and 6 **ONLY**
- D. 2, and 4 **ONLY**

Answer D

Explanation/Justification:

- A. Incorrect. Primary and Secondary plant component cooling water heat exchangers are isolated. Rod Control area is NOT isolated at the header, but the inlet MOVs will only open when temp exceeds 107°F. Even if they did open, the outlet valve is manually closed so there will be no flow.
- B. Incorrect. CNMT air Recirc coolers are NOT isolated at the header. However, service water is a backup to normal cooling and MUST be manually aligned. Primary and Secondary plant component cooling water heat exchangers are isolated.
- C. Incorrect. CNMT air Recirc coolers are NOT isolated at the header. However, service water is a backup to normal cooling and MUST be manually aligned. Rod Control area is NOT isolated at the header, but the inlet MOVs will only open when temp exceeds 107°F. Even if they did open, the outlet valve is manually closed so there will be no flow. Charging pump lube oil coolers and Recirc spray heat exchangers are correct.
- D. Correct. IAW VOND 30-1 grid D-6; 30-2 grid D-1; EOP Attachment A-0.5

K/A Sys #	K/A System	K/A Category			K/A Statement
076	Service Water	Ability to manually operate and/or monitor in the control room:			Emergency heat loads
K/A #	A4.04	K/A Importance	3.5	Exam Level	RO
Question Source:		New		Level Of Difficulty: (1-5)	
References provided to Candidate		None		Question Cognitive Level:	
Objective #:		Task ID#:		Technical References:	
				10 CFR Part 55 Content:	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

54. The plant is operating at 100% power with all systems in NSA **EXCEPT** Station Air Compressor [2SAS-C21B] is on clearance and unavailable.
- A large leak develops in the station service air header.
 - Station air header pressure begins to drop.

As station air header pressure continues to drop, at what setpoint will each of the below listed automatic actions occur:

1. Diesel-Driven Air Compressor 2IAS-C21 – **AUTOMATIC START**
2. Condensate Polishing Air Compressor 2SAS-C22 - **AUTOMATIC START**
3. SAS Main Header to Service Air Header AOV 2SAS-AOV105 - **AUTOMATIC CLOSE**

- A. 1. 82 psig
2. 90 psig
3. 86 psig
- B. 1. 86 psig
2. 90 psig
3. 82 psig
- C. 1. 82 psig
2. 86 psig
3. 90 psig
- D. 1. 90 psig
2. 86 psig
3. 82 psig

Answer A

Explanation/Justification:

- A. Correct IAW 20M-34.2.B page 2 pressure setpoints. The candidate will need to know the sequence of starting (which one first, 2nd and 3rd, but will NOT need to have these three setpoint memorized. All of these automatic actions are geared towards maintaining Instrument Air available.
- B. Incorrect. Wrong setpoints for 2IAS-C21 and 2SAS-AOV105.
- C. Incorrect. Wrong setpoints for 2SAS-C22 and 2SAS-AOV105.
- D. Incorrect. All setpoints are wrong.

K/A Sys #	K/A System	K/A Category		K/A Statement	
078	Instrument Air	Ability to monitor automatic operation of the IAS, including:		Air pressure	
K/A #	A3.01	K/A Importance	3.1	Exam Level	RO
Question Source: New		Level Of Difficulty: (1-5)		Question Cognitive Level: Lower Fundamental	
References provided to Candidate		None		Technical References: 20M-34.2.B page 2 pressure setpoints	
Objective #:		Task ID#:		10 CFR Part 55 Content: (CFR: 41.7 / 45.5)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

55. Which ONE (1) of the below listed components **DIRECTLY** receives a CIA signal to **CLOSE**?

- A. HEPA Filter House No. 1 Outlet Damper 2HVS*MOD211A
- B. Pri Comp Clg Wtr Supply Hdr B Isol 2CCP*MOV175-1
- C. Control Room ACU Outside Air Intake DMPR 2HVC*MOD201A
- D. Regen HX Normal Charging Disch Vlv 2CHS*MOV310

Answer B

Explanation/Justification:

- A. Incorrect. This damper receives a CIA OPEN signal.
- B. Correct. IAW EOP Attachment A-0.2 page 7
- C. Incorrect. This damper receives a CIB signal.
- D. Incorrect. This valve receives a SI signal.

K/A Sys #	K/A System	K/A Category	K/A Statement
103	Containment	Ability to monitor automatic operation of the containment system, including:	Containment isolation
K/A #	A3.01	K/A Importance 3.9	Exam Level RO
Question Source:	New	Question Cognitive Level:	Lower Memory
References provided to Candidate	None	Technical References:	EOP Attachment A-0.2 page 7
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.7 / 45.5)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

56. The plant is operating at 100% power with all systems in NSA.
- All Rods are indicating 228 steps on DRPI.

The following alarms and indications are **THEN** received in the control room:

- Annunciator A4-8B, Rod Control System Non-Urgent Alarm - has **ALARMED**
- ALL 48 DRPI General Warning (GW) LED lights - "**Flashing**".
- DRPI Rod Deviation 1, R, & 2 LED lights – **LIT**.
- DRPI Data **A** Failure 1, 2, & 3 LED lights - "**Flashing**".
- DRPI Central Control Failure 1, 2, & 3 LED lights – **NOT LIT**.
- DRPI Urgent Failure 1, 2, & 3 LED lights – **NOT LIT**.
- DRPI Data **B** Failure 1, 2, & 3 LED lights – **NOT LIT**.
- All DRPI Rod Bottom (RB) lights – **NOT LIT**.
- All Rods are **STILL** indicating 228 steps on DRPI.
- Reactor power **REMAINS** at 100% and stable.

Based on these conditions:

1. Rod positions will be indicated every _____ steps.
2. IAW ARP A4-8B, Rod Control System Non-Urgent Alarm, the **REQUIRED** action is to Place the Accuracy Mode selector switch to the _____ position.

- A. 1. 6
2. "A + B"
- B. 1. 6
2. "B Only"
- C. 1. 12
2. "A + B"
- D. 1. 12
2. "B Only"

Answer D

Explanation/Justification:

- A. Incorrect. Indications given in the stem of the question indicate that Data A has failed. If the 6VAC power to the "A" coils is lost, these indications would be present. The presence of the Non-urgent alarm results in "half-accuracy" mode. This means DRPI will indicate every 12 steps instead of every 6. Placing the switch to A+B is incorrect. The NSA position is A+B. Candidate may confuse this A+B switch with the SSPS A+B position where the NSA position is for 1 train to be in A+B and the other train is in A or B only.
- B. Incorrect. Indications given in the stem of the question indicate that Data A has failed. If the 6VAC power to the "A" coils is lost, these indications would be present. The presence of the Non-urgent alarm results in "half-accuracy" mode. This means DRPI will indicate every 12 steps instead of every 6. Placing the switch to "B ONLY" is correct. The NSA position is A+B. Candidate may confuse this A+B switch with the SSPS A+B position where the NSA position is for 1 train to be in A+B and the other train is in A or B only.
- C. Incorrect. Indications given in the stem of the question indicate that Data A has failed. If the 6VAC power to the "A" coils is lost, these indications would be present. The presence of the Non-urgent alarm results in "half-accuracy" mode. This means DRPI will indicate every 12 steps instead of every 6. Placing the switch to A+B is incorrect. The NSA position is A+B. Candidate may confuse this A+B switch with the SSPS A+B position where the NSA position is for 1 train to be in A+B and the other train is in A or B only.
- D. Correct. IAW ARP A4-8B (20M-1.4.AAK page 3) **Ran on simulator to verify all indications for Data A failure.**

K/A Sys #	K/A System	K/A Category	K/A Statement
014	Rod Position Indication	Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Loss of power to the RPIS
K/A #	A2.02	K/A Importance	3.1
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Higher Comprehension
Objective #:	Task ID#:	Technical References:	ARP A4-8B (20M-1.4.AAK page 3)
		10 CFR Part 55 Content:	(CFR: 41.5 / 43.5 / 45.3 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

57. The plant is in Mode 3 with the RX trip breakers **CLOSED** and the shutdown banks withdrawn. All systems are aligned normally for this plant condition.
- **BOTH** Source range channels are indicating 500 CPS and stable.

2OST-2.3, Nuclear Source Range Channel Test **MUST** be performed, for N32 **ONLY** before the startup can proceed.

During the performance of this surveillance, what control room actions will be **REQUIRED** to prevent the reactor from tripping on Source Range High Flux?

Place the N32 SR drawer:

- A. "High Flux at Shutdown" switch to the **BLOCK** position.
- B. "Level Trip" switch to the **BYPASS** position.
- C. "HV Manual On/Off" switch to the **HV ON** position.
- D. "Operation Selector" switch to the **10⁴ CPS** position.

Answer B

Explanation/Justification:

- A. Incorrect. This does NOT block the High Flux trip; rather it enables the High Flux at S/D alarm.
- B. Correct. IAW 2OST-2.3 page 37 step 7.
- C. Incorrect. This ensures the HV power to the detector. It does NOT block the trip by holding the power to SSPS relays.
- D. Incorrect. This injects a test signal equal to 10⁴ CPS. It does NOT keep the signal from exceeding 10⁴ CPS.

K/A Sys #	K/A System	K/A Category	K/A Statement
5	Nuclear Instrumentation	Ability to manually operate and/or monitor in the control room:	Trip bypasses
K/A #	A4.03	K/A Importance	3.8
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Higher Comprehension
Objective #:	Task ID#:	Technical References:	2OST-2.3 page 37 step 7.
		10 CFR Part 55 Content:	(CFR: 41.7 / 45.5 to 45.8)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

58. The plant is operating at 100% power with all systems in NSA.
- The "Main Turb First Stage Press Sensor Select" switch is in the **PM 446** position.

IF the "Main Turb First Stage Press Sensor Select" switch is placed in the **PM 447** position, what impact will this have on plant operations?

The _____ will **NOW** be coming from 1B First Stage STM Press 2MSS-PT447 transmitter **INSTEAD** of 1A First Stage STM Press 2MSS-PT446 transmitter.

- A. T_{ref} signal to Steam Dumps
- B. Steam Dump Load Rejection "Arming " signal
- C. AMSAC "Bypass" permissive
- D. T_{ref} signal to Rod control.

Answer **D**

Explanation/Justification:

- A. Incorrect. This signal is not selectable.
- B. Incorrect. This signal is always provided by the 447 transmitter.
- C. Incorrect. AMSAC bypass requires both 446 and 447 input. Not selectable.
- D. Correct. IAW 2OM-24.4.IF attachment 5

K/A Sys #	K/A System	K/A Category	K/A Statement
016	Non-nuclear Instrumentation	Ability to manually operate and/or monitor in the control room:	NNI channel select controls
A #	A4.01	K/A Importance 2.9	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	2OM-24.4.IF attachment 5
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.7 / 45.5 to 45.8)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

59. Which ONE (1) of the following is **NOT** a source of hydrogen inside containment following a Design Bases Large break LOCA of an RCS cold leg?
- A. Pressurizer Relief Tank gas space.
 - B. Zirc - water reaction between the fuel clad and the reactor coolant.
 - C. Corrosion of aluminum and zinc by the ECCS water.
 - D. Radiolysis of water in the core and CNMT sump.

Answer A

Explanation/Justification:

- A. Correct. PRT gas space gas is nitrogen NOT hydrogen. Also, any gas in the PRT gas space will remain in the PRT during a Large Cold leg LOCA.
- B. Incorrect. This is a source of hydrogen in containment.
- C. Incorrect. This is a source of hydrogen in containment.
- D. Incorrect. This is a source of hydrogen in containment.

K/A Sys #	K/A System	K/A Category			K/A Statement
028	Hydrogen Recombiner and Purge Control	Knowledge of the operational implications of the following concepts as they apply to the HRPS:			Sources of hydrogen within containment
K/A #	K5.03	K/A Importance	2.9	Exam Level	RO
Question Source:		New		Level Of Difficulty: (1-5)	
References provided to Candidate		None		Question Cognitive Level: Lower Fundamental	
Objective #:		Task ID#:		Technical References: Lesson Plan 2SQS-46.1 slide 7	
				10 CFR Part 55 Content: (CFR: 41.5 / 45.7)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

60. A large break LOCA has occurred and the following plant conditions exist:
- RVLIS is available.
 - All RCPs are **STOPPED**.
 - The RCS is 50°F **SUPERHEATED**.

Which ONE (1) of the following plant conditions will **REQUIRE** a RED PATH entry into FR-C.1, Response To Inadequate Core Cooling?

- A. The two hottest core exit TC is 1250°F, **ALL** the other core exit TCs are 700°F **AND** RVLIS Full range level is 33%.
- B. The two hottest core exit TC is 1250°F, **ALL** the other core exit TCs are 700°F **AND** RVLIS Dynamic range level is 33%.
- C. The three hottest core exit TCs are 750°F, **ALL** the other core exit TCs are 700°F **AND** RVLIS Full range level is 33%.
- D. The three hottest core exit TCs are 750°F, **ALL** the other core exit TCs are 700°F **AND** RVLIS Dynamic range level is 33%.

Answer C

Explanation/Justification:

- A. Incorrect. The three MAX TCs are NOT greater than 1200°F **NOR** are they greater than 729°F. RVLIS level is low enough to require entry if TCs are hot enough.
- B. Incorrect. The three MAX TCs are NOT greater than 1200°F **NOR** are they greater than 729°F. Wrong RVLIS range.
- C. Correct. IAW EOP status tree F-0.2.
- D. Incorrect. The three MAX TCs are NOT greater than 1200°F. Wrong RVLIS range.

K/A Sys #	K/A System	K/A Category	K/A Statement
017	In-Core Temperature Monitor System (ITM)	Ability to manually operate and/or monitor in the control room:	Temperature values used to determine RCS/RCP operation during inadequate core cooling (i.e., if applicable, average of five highest values)
K/A #	A4.02	K/A Importance	3.8
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Lower Fundamental
Objective #:	Task ID#:	Technical References:	EOP status tree F-0.2.
		10 CFR Part 55 Content:	(CFR: 41.7 / 45.5 to 45.8)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

61. The Unit is in Mode 6. A fuel assembly is being lowered into the core.

IF the fuel assembly "**BINDS**" against another fuel assembly, downward motion of the hoist will be automatically stopped to prevent fuel assembly damage.

What manipulator crane interlock provides this protection?

- A. Tube Down
- B. Underload
- C. Overload
- D. Bridge-Trolley-Hoist

Answer B

Explanation/Justification:

- A. Incorrect. Tube down interlock will stop hoist downward motion when the hoist is all the way down.
- B. Correct. IAW LP 3SQS-6.13 slide 49. (2RP-3.3)
- C. Incorrect. Overload will stop UPWARD motion if an assembly is binding while moving upward.
- D. Incorrect. Bridge-Trolley-Hoist interlock will only allow motion/movement in one direction at a time.

K/A Sys #	K/A System	K/A Category			K/A Statement
034	Fuel Handling Equipment	Knowledge of design feature(s) and/or interlock(s) which provide for the following:			Fuel protection from binding and dropping
K/A #	K4.01	K/A Importance	2.6	Exam Level	RO
Question Source:		New		Question Cognitive Level:	
References provided to Candidate		None		Lower Fundamental	
Objective #:		Task ID#:		Technical References:	
				LP 3SQS-6.13 slide 49. (2RP-3.3)	
				10 CFR Part 55 Content:	
				(CFR: 41.7)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

62. The plant is operating at 100% power with all systems in NSA.
- An inadvertent turbine trip occurs.
 - The "B" reactor trip breaker **FAILS** to OPEN.
 - All other systems function as designed.

Without any operator action, where will RCS temperature automatically stabilize?

- A. 541°F
- B. 547°F
- C. 550°F
- D. 554°F

Answer C

Explanation/Justification:

- A.** Incorrect. This is where RCS would stabilize if it were relying on the steam dump lo-lo Tavg interlock to stop a cooldown.
- B.** Incorrect. This is where RCS would stabilize if it were being controlled by the Rx trip controller. However, with "B" trip breaker still closed, the steam dumps will function on the load rejection controller which has a 3°F deadband before it will open the steam dumps.
- C.** Correct. IAW 2OM-21.5.A.12.
- D.** Incorrect. This is where RCS would stabilize if it were relying on the SG safeties to control temperature. This would be necessary if the steam dumps were NOT armed. However, the "A" reactor trip breaker opening will arm the dumps.

K/A Sys #	K/A System	K/A Category	K/A Statement
041	Steam Dump/Turbine Bypass Control	Knowledge of the Physical connections and/or cause-effect relationships between the SDS and the following systems:	RCS
'A #	K1.05	K/A Importance 3.5	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	2OM-21.5.A.12.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.2 to 41.9 / 45.7 to 45.8)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

63. The plant is operating at 100% power with all systems in NSA.
- Condensate Bypass Vlv 2CNM-AOV100 inadvertently **OPENS**.

What effect will this have on plant operations?

- A. Feedwater inlet Temperature to the Steam Generators will **DROP**.
- B. Condenser hotwell level will **RISE**.
- C. Main feed Pump Suction pressure will **DROP**.
- D. Turbine Plant Demineralized Water Storage Tank will **RISE**.

Answer A

Explanation/Justification:

- A.** Correct. IAW VOND 22A-2 grid B-5
- B.** Incorrect. This would be true if the bypass around the normal LCV was failed open. (LCV103).
- C.** Incorrect. This would be true if the condensate pump Recirc valve was failed open. (FCV101).
- D.** Incorrect. This would be true if the bypass around the normal condensate pump reject MOV was failed open. (LCV101)

K/A Sys #	K/A System	K/A Category	K/A Statement
056	Condensate	Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems:	MFV
K/A #	K1.03	K/A Importance	2.6
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Lower Fundamental
Objective #:	Task ID#:	Technical References:	VOND 22A-2 grid B-5
		10 CFR Part 55 Content:	(CFR: 41.2 to 41.9 / 45.7 to 45.8)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

64. Which ONE (1) of the below listed set of conditions are the **MINIMUM REQUIRED** conditions to actuate annunciator A12-4C, Condenser Unavailable?
- 2 out of 2 Condenser Pressure transmitters below 19.5" of Hg vacuum
OR
 4 out of 4 Circulating Water Pumps **NOT** running
- B. 2 out of 2 Condenser Pressure transmitters above 19.5" of Hg vacuum
OR
 3 out of 4 Circulating Water Pumps **NOT** running
- C. 1 out of 2 Condenser Pressure transmitters below 19.5" of Hg vacuum
OR
 4 out of 4 Circulating Water Pumps **NOT** running
- D. 1 out of 2 Condenser Pressure transmitters above 19.5" of Hg vacuum
OR
 3 out of 4 Circulating Water Pumps **NOT** running

Answer C

Explanation/Justification:

- A. Incorrect. This will actuate the alarm, but it is NOT the MINIMUM required conditions. It only takes ½ transmitters.
- B. Incorrect. It only takes ½ transmitters, vacuum is below NOT above. Also MUST have 4/4 circ pumps OFF.
- C. Correct. 2OM-26.4.ABM page 3 setpoints.
- D. Incorrect. Vacuum is below NOT above, Also MUST have 4/4 circ pumps OFF.

K/A Sys #	K/A System	K/A Category			K/A Statement
75	Circulating Water	Knowledge of circulating water system design feature(s) and interlock(s) which provide for the following:			Heat sink
K/A #	K4.01	K/A Importance	2.5	Exam Level	RO
Question Source:		New	Question Cognitive Level:		
References provided to Candidate		None	Technical References:		
Objective #:		Task ID#:	10 CFR Part 55 Content:		
			Level Of Difficulty: (1-5)		
			Lower Memory		
			2OM-26.4.ABM page 3 setpoints.		
			(CFR: 41.7)		

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

65. The plant is operating at 100% power with all systems in NSA.
- 10 Ton CO₂ Storage Tank 2FPD-TK22 **MUST** be removed from service for maintenance.
 - 10 Ton CO₂ Storage Tank 2FPD-TK23 is able to supply CO₂ to the System 2 Zones.
 - 24 Ton CO₂ Storage Tank 2FPD-TK24 is able to supply CO₂ to the System 2 Zones.

IAW 2OM-33.4.G, CO₂ Fire Protection System Startup And Storage Tank Fill, how will the CO₂ system be re-aligned to maintain operability of the system?

Align the ____ (1) ____ for service, then place the Smoke Detection Panel 2FPS-PNL-XL3 MAIN/RESERVE switch to ____ (2) ____, **AND** isolate ____ (3) ____.

- A. (1) 24 Ton CO₂ Storage Tank 2FPD-TK24
(2) MAIN
(3) **ONLY** 10 Ton CO₂ Storage Tank 2FPD-TK22
- B. (1) 24 Ton CO₂ Storage Tank 2FPD-TK24
(2) RESERVE
(3) **BOTH** 10 Ton CO₂ Storage Tanks 2FPD-TK22 & 23
- C. (1) 10 Ton CO₂ Storage Tank 2FPD-TK23
(2) MAIN
(3) **ONLY** 10 Ton CO₂ Storage Tank 2FPD-TK22
- D. (1) 10 Ton CO₂ Storage Tank 2FPD-TK23
(2) RESERVE
(3) **BOTH** CO₂ Storage Tanks 2FPD-TK22 & 24

Answer B

Explanation/Justification:

- A. Incorrect. Switch must be placed to reserve for 24 ton tank master valve to function. All other items are correct.
- B. Correct. IAW 2OM-33.4.G page 25 step 5. This is NOT minutia, rather it tests the candidates ability to predict what line-up changes are needed to prevent operating the CO₂ outside of the required alignment.
- C. incorrect. 24 ton unit must be aligned for service, Smoke Detection Panel 2FPS-PNL-XL3 MAIN/RESERVE switch must be placed to reserve, and BOTH 10 ton units must be isolated.
- D. Incorrect. 24 ton unit must be aligned for service, items 2 and 3 are correct.

K/A Sys #	K/A System	K/A Category	K/A Statement
086	Fire Protection	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Fire Protection System operating the controls including:	FPS lineups
K/A #	A1.05	K/A Importance 2.9	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	2OM-33.4.G page 25 step 5 Rev. 10.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.5 / 45.5)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

66. The plant is in Mode 5 preparing to enter Mode 4.
- Valve alignments are being performed on a Safety-Related system.
 - The **REQUIRED** NSA position of a manually operated globe valve is **2 Turns OPEN**.
 - The valve must be in this position **PRIOR** to Mode 4 entry.
 - The valve has **MINIMAL** safety significance.
 - The valve list **REQUIRES** Concurrent verification for this valve.
 - The second verifier will receive 5 mR performing the Concurrent verification.
 - The valve has **NO** remote valve indication.
 - The valve **CANNOT** be verified in the correct position by the performance of a functional test.

IAW the guidance provided in 1/2OM-48.3.D, Administrative Control Of Valves And Equipment, how will the Concurrent verification for this valve be addressed?

- A. The Shift Manager shall waive the Concurrent verification for this valve based on **MINIMAL** safety significance and **HIGH** radiation exposure to the second verifier.
- B. The First verifier places the valve in the required position; **WITHIN** 4 hours the second verifier verifies the valve in the required position.
- C. The First verifier places the valve in the required position; the second verifier remains **OUTSIDE** the line of sight of the first verifier **THEN** verifies the valve in the required position.
- D. The First verifier places the valve in the required position **WHILE** the second verifier observes the first verifier placing the valve in the required position.

Answer D

Explanation/Justification:

- Incorrect. The shift manager may waive the independent verification of a safety related valve if it has minimal safety significance and will result in 10mR exposure to the second verifier. This valve only has 5 mR exposure. Also since this valve requires a number of turns, the only individual that can waive the concurrent verification is the operations manager.
- B. Incorrect. These are the requirements for independent verification of Tech Spec related actions that support current plant conditions. Since this valve is required for Mode 4 entry, it is NOT required for the current plant Mode.
- C. Incorrect. These are the requirements for independent verification NOT concurrent verification. Additionally, this valve must be concurrently verified since independent verification would negate the original condition.
- D. Correct. IAW 1/2OM-48.3.D III.C and VI.A.9.a. The valve requires concurrent verification and it cannot be waived by the shift manager. Concurrent verification is specifically defined for valves that require a number of turns. This definition specifically states that the second verifier will observe the original manipulation.

K/A Sys #	K/A System	K/A Category			K/A Statement
N/A	Generic	Conduct Of Operations			Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc
K/A #	2.1.29	K/A Importance	4.1	Exam Level	RO Level Of Difficulty: (1-5)
Question Source:		New	Question Cognitive Level:		Higher Comprehension
References provided to Candidate		None	Technical References:		IAW 1/2OM-48.3.D III.C and VI.A.9.a.
Objective #:		Task ID#:	10 CFR Part 55 Content:		(CFR: 41.10 / 45.1 / 45.12)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

67. The plant is operating in Mode 6 with all systems in normal alignment for this Mode.
- Core Re-loading activities are in progress.
 - There are 100 fuel assemblies in the core.
 - Source Range Channel N32 fails low.
 - Source Range Channel N31 remains OPERABLE.

Which ONE (1) of the below listed evolutions can **STILL** be performed **WITHOUT** violating the Technical Specification required actions for Source Range Instrumentation?

- A. Removing a SPENT fuel assembly from its fully lowered core position and placing it into the fuel transfer cart.
- B. Moving an underwater camera from one core location to another to verify proper seating of fuel assemblies.
- C. Removing a temporary secondary source device that was installed in the center core location to assist in plotting 1/M data.
- D. Moving a fuel assembly from a temporary core location into the final core location that is adjacent to source range channel N31.

Answer B

Explanation/Justification:

- A. Incorrect. Even though this would lessen the overall reactivity of the core, it would violate the TS action for one inoperable source range channel. This is a Core Alteration since it is fuel movement within the vessel with fuel in the vessel.
- B. Correct. Loss of HV power supply will render N32 inoperable. TS action is to IMMEDIATELY suspend core alterations. Core alterations are defined as movement of fuel, sources, or reactivity control components within the vessel WITH fuel in the vessel. Underwater cameras are none of these therefore, this evolution would be permitted.
- C. Incorrect. Even though this is removing a source device, it would violate the TS action for one inoperable source range channel. This is a Core Alteration since it is movement as a source within the vessel with fuel in the vessel.
- D. Incorrect. Even though the assembly is already in the core in its temporary location, it would violate the TS action for one inoperable source range channel. This is a Core Alteration since it is fuel movement within the vessel with fuel in the vessel.

K/A Sys #	K/A System	K/A Category			K/A Statement
N/A	Generic	Conduct Of Operations			Knowledge of procedures and limitations involved in core alterations.
K/A #	2.1.36	K/A Importance	3.0	Exam Level	RO Level Of Difficulty: (1-5)
Question Source:		New	Question Cognitive Level:		Higher Comprehension
References provided to Candidate		None	Technical References:		Tech Spec 3.9.2; Tech Spec Definition of Core Alteration.
Objective #:		Task ID#:	10 CFR Part 55 Content:		(CFR: 41.10 / 43.6 / 45.7)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

68. The plant is operating at 90% power with all systems in NSA.
- Control Bank D is at 229 steps.
 - Core Burnup is 3000 MWD/MTU.
 - RCS Boron Concentration is 1250 ppm.
 - Equilibrium Xenon concentration conditions exist.
 - Tav_g is equal to T_{ref}.

How many gallons of dilution water will be needed to raise power to 95% and keep Tav_g equal to T_{ref}?

Assume the Boron Correction factor is 1.0 and disregard any changes in Xenon concentration.

- A. 20 gals.
- B. 420 gals.
- C. 520 gals.
- D. 720 gals.

Answer C

Explanation/Justification:

- A. Incorrect. If the candidate makes a math error and stops after determining the change in boron concentration, they will choose this answer.
- B. Incorrect. If the candidate does all of the calculations correctly and but sloppily uses the correct nomograph for dilution, they will choose this answer. Sloppy use of the nomograph means to inaccurately apply the straight edge to the nomograph.
- C. Correct. CB-28 3000 md/mtu equals boron worth of -6.0 pcm/ppm. CB-21 1250 ppm power defect for 90-95% is 90 pcm. 90pcm/-6pcm/ppm equals -15 ppm. Must reduce RCS boron 15 ppm to compensate for power defect. Using CB-33 nomograph determine volume of water needed ~520 gals.
NOTE: Alternate method of using CB-33 formula $8069FT^3 / .02264FT^3 / lbm/8.33 \times \ln(C_i/C_f) = 516 \text{ gals}$. Candidate will NOT have the table that specifies the volume of the RCS and will therefore need to use the nomograph to determine the answer.
- D. Incorrect. If the candidate does all of the calculations correctly but DOES NOT realize the correct nomograph for dilution is NOT linear, they will choose this answer.

K/A Sys #	K/A System	K/A Category	K/A Statement
N/A	Generic	Conduct Of Operations	Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc.
K/A #	2.1.43	K/A Importance 4.1	Exam Level RO
Question Source:	New	Question Cognitive Level:	Higher Analysis
References provided to Candidate	Curve book curves CB-28, 21, & 33	Technical References:	Curve book curves CB-28, 21, & 33
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.10 / 43.6 / 45.6)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

69. What is the Technical Specification basis for the Reactor Core Safety Limit?

There must be a least a 95% probability at a 95% confidence level that the :

- A. Hot fuel rod in the core does not experience DNB or centerline fuel melting.
- B. Integrity of the Reactor Coolant System will be protected against overpressurization.
- C. Core will be protected against rapid increases in neutron flux.
- D. Maximum clad oxidation does not exceed 17% of clad thickness.

Answer A

Explanation/Justification:

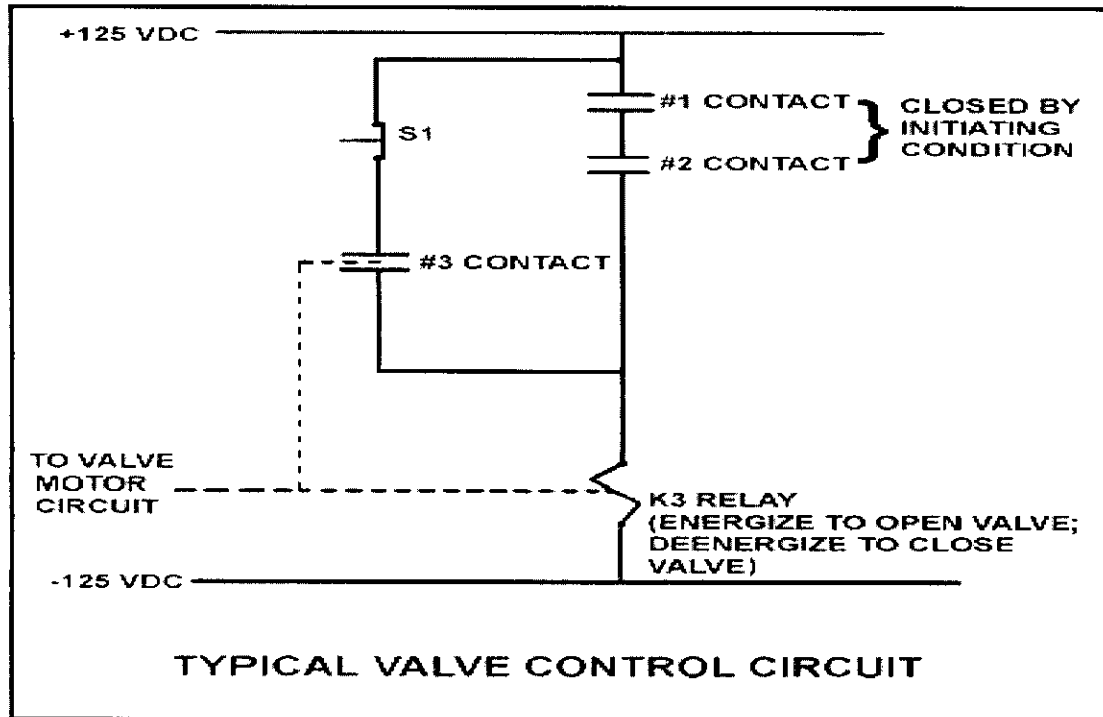
- A. Correct. IAW Tech Spec bases 2.1.1 page B 2.1.1-2
- B. Incorrect. This is the bases for the other Tech spec Safety limit.
- C. Incorrect. This is the Tech Spec bases for the high positive rate trip. Setpoint.
- D. Incorrect. This is an ECCS acceptance criteria NOT the Tech Spec bases for the core safety limit.

K/A Sys #	K/A System	K/A Category		K/A Statement	
N/A	Generic	Equipment Control		Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	
K/A #	2.2.25	K/A Importance	3.2	Exam Level	RO
Question Source:		New		Question Cognitive Level:	
References provided to Candidate		None		Technical References:	
Objective #:		Task ID#:		10 CFR Part 55 Content:	
				Level Of Difficulty: (1-5)	
				Lower Memory	
				Tech Spec bases 2.1.1 page B 2.1.1-2	
				(CFR: 41.5 / 41.7 / 43.2)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

70. Refer to the drawing of a typical valve control circuit for a 480 VAC motor-operated valve (see figure below).

With **NO** initiating condition present, the valve is currently OPEN. If the S1 pushbutton is depressed, the valve will _____ and when the S1 pushbutton is subsequently released the valve will _____.



- A. remain open; remain open
- B. close; remain closed
- C. remain open; close
- D. close; open

Answer B

Explanation/Justification:

- A. Incorrect. Wrong initial response; wrong subsequent response.
- B. Correct. Right initial response; right subsequent response.
- C. Incorrect. Wrong initial response; right subsequent response.
- D. Incorrect. Right initial response; wrong subsequent response.

K/A Sys #	K/A System	K/A Category	K/A Statement
N/A	Generic	Equipment Control	Ability to obtain and interpret station electrical and mechanical drawings.
K/A #	2.2.41	K/A Importance	Level Of Difficulty: (1-5)
Question Source:	BVPS Bank Question 13933	3.5	Exam Level RO
References provided to Candidate	None		Question Cognitive Level: Higher Analysis
Objective #:	Task ID#:		Technical References: Print reading skills
			10 CFR Part 55 Content: (CFR: 41.10 / 45.12 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

71. You have been assigned the task of venting a radioactive system that is located in a Locked High Radiation Area (LHRA).

When you open the vent valve you receive an **UNEXPECTED** dose rate alarm on your electronic alarming dosimeter (EAD).

IAW NOP-WM-7025, High Radiation Area Program, what are your **Required** actions for these conditions?

- A. Immediately notify Radiation Protection (RP) and stay in the area to await further instructions.
- B. Close the vent valve and report the alarm to the control room supervisor and Radiation Protection (RP).
- C. Immediately exit the area and perform whole body frisk.
- D. Close the vent valve and immediately exit the area.

Answer D

Explanation/Justification:

- A. Incorrect. These are the correct actions personnel contamination.
- B. Incorrect. These would be appropriate actions for an alarming air monitor.
- C. Incorrect. Frisking is required before exiting the RCA but not necessarily required as part of LHRA exit.
- D. Correct. IAW NOP-WM-7025 step 4.2.12 on page 6 and 7.

K/A Sys #	K/A System	K/A Category	K/A Statement
N/A	Generic	Radiation Control	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high radiation areas, aligning filters, etc.
K/A #	2.3.12	K/A Importance	3.2
Question Source:	New	Exam Level	RO
References provided to Candidate	None	Question Cognitive Level:	Lower Fundamental
Objective #:	Task ID#:	Technical References:	NOP-WM-7025 step 4.2.12 on page 6 and 7.
		10 CFR Part 55 Content:	(CFR: 41.12 / 45.9 / 45.10)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

72. What type of radiation detector is used in the In-Containment High Range Area Radiation Monitors 2RMR*RQ206 and 207?

- A. Proportional.
- B. Geiger-Mueller.
- C. Ion Chamber.
- D. Beta/Gamma Scintillator.

Answer C

Explanation/Justification:

- A. Incorrect. This is the type of detector used in the source range instrument.
- B. Incorrect. This is the type of detector used in most area monitors, however in order to meet the Reg. guide 1.97 criteria for post accident monitors, Ion chambers are needed to avoid saturating the detector from the extremely high radiation fields that the monitors are designed to detect
- C. Correct. IAW 20M-43.1.C page 51. In order to meet the Reg. guide 1.97 criteria for post accident monitors, Ion chambers are needed to avoid saturating the detector from the extremely high radiation fields that the monitors are designed to detect.
- D. Incorrect. These are the type detectors used in the process radiation monitoring system.

K/A Sys #	K/A System	K/A Category	K/A Statement		
N/A	Generic	Radiation Control	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.		
K/A #	2.3.15	K/A Importance	2.9	Exam Level	RO
Question Source:	New			Question Cognitive Level:	Lower Memory
References provided to Candidate	None			Technical References:	20M-43.1.C page 51
Objective #:		Task ID#:		10 CFR Part 55 Content:	{CFR: 41.12 / 43.4 / 45.9}

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

73. The plant is in Mode 4 with a plant shutdown in progress.
- RHS has just been placed in service.
 - RHR Pump 2RHS*P21A is in service.
 - RHR Pump 2RHS*P21B is out of service.
 - PRZR level is 15% and stable.
 - 21C RCP is in service.

Annunciator A1-5H Residual Heat Removal System Trouble (RHR TRN A FLW RHS*FT605A LOW computer address point F0600D) – Alarms

The following control room indications **NOW** exist:

- RHR Train A Flow [2RHS-FI605A] is oscillating between 0 and 1400 gpm.
- 21A RHR Pump Amps [2RHS-I121A] are erratically oscillating.
- 21A RHR HX Bypass Vlv [2RHS*FCV605A] is erratically oscillating.
- 21C RCP Amp [2RCS-I121C] indicates 688 amps and stable.
- PRZR level remains at 15% and stable.

In order to address these conditions, what procedure are you **Required** to enter?

- A. AOP-2.6.5, Shutdown LOCA
- B. AOP-2.6.8, Abnormal RCP Operation
- C. AOP-2.10.1, Residual Heat Removal System Loss
- D. AOP-2.10.2, Loss of RHS While At Reduced Inventory/Midloop Conditions

Answer C

Explanation/Justification:

- A. Incorrect. This procedure entry would be appropriate if the RHR system was displaying these symptoms due to a loss of inventory. There are no indications that a loss of inventory is progress, PRZR level is 15 and stable.
- B. Incorrect. Entry into the procedure would be appropriate if the RCP was displaying the erratic amps and flow. Since the RHP pump is displaying the erratic amps and flow and RCP amps are stable entry into this procedure is NOT appropriate or required.
- C. Correct. IAW symptoms listed in AOP-2.10.1.
- D. Incorrect. Although all of the symptoms listed in the stem are symptoms in this AOP also, you must also be at reduced inventory or midloop before entry is required. With PRZR level stable at 15%, the plant is NOT at reduced inventory OR midloop.

K/A Sys #	K/A System	K/A Category			K/A Statement
N/A	Generic	Emergency Procedures/Plan			Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.
K/A #	2.4.4	K/A Importance	4.5	Exam Level	RO
Question Source:		New	Question Cognitive Level:		Higher Comprehension
References provided to Candidate		None	Technical References:		Symptoms listed in AOP-2.10.1.
Objective #:		Task ID#:	10 CFR Part 55 Content:		(CFR: 41.10 / 43.2 / 45.6)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

74. Which of the below listed Abnormal Operating Procedures contain Immediate Operator Actions?

- (1) AOP-2.1.3, RCCA Control Bank Inappropriate Continuous Movement
- (2) AOP-2.1.7, Rod Position Indication Malfunction
- (3) AOP-2.1.8, Rod Inoperability
- (4) AOP-2.6.4, Steam Generator Tube Leakage
- (5) AOP-2.24.1, Loss of Main Feedwater
- (6) AOP-2.26.1, Turbine and Generator Trip
- (7) AOP-2.36.1, Loss of All AC Power When Shutdown
- (8) AOP-2.36.2, Loss of 4KV Emergency Bus

A. 1, 2, 6, 7, & 8 **ONLY**

B. 2, 3, 4, 5, & 7 **ONLY**

C. 1, 3, 6, & 8 **ONLY**

D. 3, 4, 5, & 7 **ONLY**

Answer C

Explanation/Justification:

- A. Incorrect. 2 and 7 do NOT have IMAs; 3 does
- B. Incorrect. 3 is the only one with IMAs.
- C. Correct. IAW AOPs 2.1.3, 2.1.8, 2.26.1, & 2.36.2.
- D. Incorrect. 4, 5, & 7 do NOT have IMAs; 1, 6, & 8 have IMAs.

K/A Sys #	K/A System	K/A Category			K/A Statement
N/A	Generic	Emergency Procedures/Plan			Knowledge of abnormal condition procedures.
A #	2.4.11	K/A Importance	4.0	Exam Level	RO
Question Source: New		Question Cognitive Level:		Lower	Memory
References provided to Candidate		Technical References:		AOPs 2.1.3, 2.1.8, 2.26.1, & 2.36.2.	
Objective #:		Task ID#:		10 CFR Part 55 Content: (CFR: 41.10 / 43.5 / 45.13)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

75. The plant is operating at 25% power with all systems in normal alignment for this power level.
- A Steam Generator Tube Rupture (750 gpm) occurs.
 - RCS pressure slowly drops to the Low PRZR pressure reactor trip setpoint.
 - Ruptured SG NR level is 20% and slowly rising.

The BOP operator wishes to pre-emptively isolate feed flow to the ruptured SG.

IAW the guidance provided in 1/2OM-53B.2, User's Guide, how will this pre-emptive action be accomplished?

The BOP operator is **REQUIRED** to:

- A. Complete the Immediate actions of E-0, Reactor or Safety Injection, **THEN** obtain concurrence from the SM/US, **THEN** isolate feed flow to the ruptured SG.
- B. Complete the Immediate actions of E-0, Reactor or Safety Injection, **THEN** isolate feed flow to the ruptured SG, **THEN** at the first crew brief inform the SM/US of the preemptive actions taken.
- C. Isolate feed flow to the ruptured SG, **THEN** complete the Immediate actions of E-0, Reactor or Safety Injection, **THEN** at the first crew brief inform the SM/US of the preemptive actions taken.
- D. Obtain concurrence from the SM/US, **THEN** isolate feed flow to the ruptured SG, **THEN** complete the Immediate actions of E-0, Reactor or Safety Injection.

Answer A

Explanation/Justification:

- A. Correct. IAW 1/2OM-53.B.2 item 10 on page 7. Preemptive actions can only be performed after completing the IMAs and after obtaining SM/US concurrence.
- B. Incorrect. Must obtain permission first. This is the requirements for any automatic action that failed to occur.
- C. Incorrect. This would be the appropriate response to completing an automatic action that failed to occur EXCEPT the actions were completed out of order
- D. Incorrect. Completing the IMAs MUST be accomplished first.

K/A Sys #	K/A System	K/A Category			K/A Statement
N/A	Generic	Emergency Procedures/Plan			Knowledge of crew roles and responsibilities during EOP usage.
K/A #	2.4.13	K/A Importance	4.0	Exam Level	RO
Question Source:		New		Question Cognitive Level:	
References provided to Candidate		None		Technical References:	
Objective #:		Task ID#:		10 CFR Part 55 Content:	
				Level Of Difficulty: (1-5)	
				Higher Comprehension	
				1/2OM-53.B.2 item 10 on page 7	
				(CFR: 41.10 / 45.12)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

76. The plant is operating at 100% power with all systems in NSA.
- A LOCA occurs coincident with a loss of offsite power.
 - All systems respond as designed.
 - The crew has entered procedure ECA-1.1, Loss Of Emergency Coolant Recirculation due to the inability to verify cold leg recirculation capability.
 - At step 13 the crew is attempting to perform an RCS cooldown to Mode 5 at 100°F/hr.

IF the RCS cooldown cannot be manually established from the control room:

- (1) What local actions will be **REQUIRED** to perform the cooldown?
AND
(2) What would be the consequences of **NOT** performing these actions?

Direct Local operators to:

- A. (1) Open SG Atm steam Dump Valves [2SVS*PCV101A(B)(C)] IAW EOP Attachment A-1.11, Manual Handpump Operations Of Hydraulically Actuated Valves.
(2) RCS depressurization will **NOT** be permitted and the time to RWST depletion will be shortened
- B. (1) Open SG Atm steam Dump Valves [2SVS*PCV101A(B)(C)] IAW EOP Attachment A-1.11, Manual Handpump Operations Of Hydraulically Actuated Valves.
(2) RCS bleed and feed will be immediately required to maintain core cooling.
- C. (1) Perform EOP Attachment A-1.18, ERFS Diesel Generator Startup **THEN** start the Station and CNMT air compressors.
(2) RCS depressurization will **NOT** be permitted and the time to RWST depletion will be shortened.
- D. (1) Perform EOP Attachment A-1.18, ERFS Diesel Generator Startup **THEN** start the Station and CNMT air compressors.
(2) RCS bleed and feed will be immediately required to maintain core cooling.

Answer **A**

Explanation/Justification:

- A. Correct. Action directed by ECA-1.1 step 13 and ECA-1.1 bases page 3 item 3, the cooldown is being done to allow RCS depressurization to limit breakflow and prolong the time to RWST depletion.
- B. Incorrect. Correct action but incorrect consequence for not completing the action. Feed and bleed is not required as long as AFW flow is functioning. AFW would be in service if systems responded as designed and stated in the stem.
- C. Incorrect. These would be correct actions if the SG Atm steam Dump Valves were air operated valves like Unit 1. Correct consequence.
- D. Incorrect. These would be correct actions if the SG Atm steam Dump Valves were air operated valves like Unit 1. Incorrect consequence for not completing the action. Feed and bleed is not required as long as AFW flow is functioning. AFW would be in service if systems responded as designed and stated in the stem.

K/A Sys #	K/A System	K/A Category	K/A Statement		
000011	Large Break LOCA	N/A	Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.		
K/A #	2.4.35	K/A Importance	4.0	Exam Level	SRO
Question Source:	New	Question Cognitive Level:	Higher	Analysis	
References provided to Candidate	None	Technical References:	ECA-1.1 bases, EOP Att. A-1.11		
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.10 / 43.5 / 45.13)		

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

77. The plant is operating at 26% power with all systems in normal alignment for this power level.

- Annunciator A2-4D Reactor Coolant Pump Seal Trouble is in alarm (computer address RCF 21B SEAL LK OFF HIGH).
- RCP21B No. 1 seal leakoff flow indicates >6 gpm (off-scale high).
- RCP21B No. 2 seal leakoff flow is less than 0.1 GPM.
- VCT pressure is 26 psig.
- RCP21B seal injection flow is 9.5 gpm.

IAW AOP 2.6.8, Abnormal RCP Operation, which ONE (1) of the following actions and sequence of actions are you **REQUIRED** to direct the crew to perform?

- A. Stop RCP 21B, **THEN** shut the Seal Water Leakoff Vlv [2CHS*MOV303B] within 3 - 5 minutes of securing the pump. **THEN** initiate an Emergency Shutdown to Hot Standby in accordance with AOP 2.51.1, Emergency Shutdown.
- B. Trip the reactor and go to E-0, Reactor Trip or Safety Injection. Complete the immediate actions of E-0 **THEN** Stop RCP 21B, **THEN** shut the Seal Water Leakoff Vlv [2CHS*MOV303B] within 3 - 5 minutes of securing the pump.
- C. Monitor seal return temperature, **THEN** maintain seal injection flow to RCP 21B greater than 9 gpm **THEN** initiate an Emergency Shutdown to Hot Standby in accordance with AOP 2.51.1, Emergency Shutdown.
- D. Trip the reactor. **THEN** Stop RCP 21B and go to E-0, Reactor Trip or Safety Injection. Complete the immediate actions of E-0, **THEN** shut the Seal Water Leakoff Vlv [2CHS*MOV303B] within 3 - 5 minutes of securing the pump.

Answer **B**

Explanation/Justification:

- A. Incorrect. Wrong Sequence and wrong procedural guidance.
- B. Correct. IAW AOP-2.6.8 step 2.g RNO
- C. Incorrect. Wrong actions and wrong procedural guidance.
- D. Incorrect. Wrong sequence of correct actions.

K/A Sys #	K/A System	K/A Category	K/A Statement
000015/17	RCP Malfunctions	Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow):	When to secure RCPs on loss of cooling or seal injection
K/A #	AA2.10	K/A Importance	3.7
Exam Level	SRO	Level Of Difficulty: (1-5)	
Question Source:	BVPS Unit 1 Bank (1LOT7 Audit Exam)	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	AOP-2.6.8 step 2.g RNO, 2OM-7.4.AA-H
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR 43.5 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

78. The plant is operating at 100% power with all systems in NSA **EXCEPT**:
- The control switch for PZR PORV 2RCS*PCV455C is in the CLOSE position and its associated block valve is closed and de-energized.

The Technical Specification surveillance for RCP seal injection flow has just been satisfactorily completed.

Immediately after completing the RCP seal injection flow surveillance,

- Pressurizer pressure transmitter 2RCS*PT444 fails HIGH.
- NO operator actions have been taken.

How will this failure impact RCP seal injection flow?

(Assume **NO** reactor trips have occurred).

RCP seal injection flow will ____ (1) ____.

IF an accident were to **NOW** occur, the amount of ECCS flow that **WOULD BE** diverted from the ECCS injection path will be ____ (2) ____ the range assumed in the safety analysis.

- A. (1) increase
(2) outside of
- B. (1) increase
(2) within
- C. (1) decrease
(2) outside of
- D. (1) decrease
(2) within

Answer B

Explanation/Justification:

- A. Incorrect. Correct impact on seal injection flow. Incorrect impact on assumed ECCS flow.
- B. Correct. RCS pressure will drop, which allows seal injection flow to increase. However the RCP seal injection surveillance sets the flow to within the limits assumed in the safety analysis. Even if pressure is dropping, the manual throttle valves have been adjusted to ensure ECCS injection flow is within the values assumed in the accident analysis.
- C. Incorrect. Incorrect impact on seal injection flow. Incorrect impact on assumed ECCS flow.
- D. Incorrect. Incorrect impact on seal injection flow. Correct impact on assumed ECCS flow.

K/A Sys #	K/A System	K/A Category			K/A Statement	
000027	Pressurizer Pressure Control System Malfunction	Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions:			RCP injection flow	
K/A #	AA2.14	K/A Importance	2.9	Exam Level	SRO	Level Of Difficulty: (1-5)
Question Source:		New	Question Cognitive Level:		Higher	Analysis
References provided to Candidate		None	Technical References:		Technical Specification 3.5.5 and basis; 2OM-6.4.1F Attachment 2	
Objective #:		Task ID#:	10 CFR Part 55 Content:		(CFR: 43.5 / 45.13)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

79. The plant is operating at 100% power with all systems in NSA.
- A Steam Generator Tube Rupture occurs on the "B" Steam Generator.
 - All systems function as designed.
 - The crew has just entered E-3, Steam Generator Tube Rupture.
 - "A" and "C" Steam Generators are intact.

The following plant conditions exist:

- Total AFW flow is 900 gpm and stable.
- CNMT pressure is 1 psig and stable.
- "A" and "C" NR SG level are 0%.
- "B" NR SG level is 5% and rising.

The reactor operator requests permission to perform "pre-emptive" actions and isolate all AFW flow to the "B" Steam Generator.

IAW the guidance contained in E-3, Steam Generator Tube Rupture, what direction are you **REQUIRED** to give the reactor operator **AND** what is the bases for this direction?

- A. Isolate feed flow to the "B" Steam Generator, the required heat sink will be maintained by "A" and "C" Steam Generators.
- B. Isolate feed flow to the "B" Steam Generator, "B" Steam Generator overfill must be avoided to limit the radiological consequences.
- C. Continue feeding the "B" Steam Generator until NR level is >12%, "B" Steam Generator is required for a heat sink.
- D. Continue feeding the "B" Steam Generator until NR level is >12%, "B" Steam Generator tubes must remain covered to avoid SG depressurization.

Answer D

Explanation/Justification:

- A. Incorrect. Feed flow is NOT to be isolated UNLESS NR of >12% has been reached (pre-emptive requirement of EOP users guide page 7 item 10 4th bullet) Heat sink requirement is correct.
- B. Incorrect. Feed flow is NOT to be isolated UNLESS NR of >12% has been reached (pre-emptive requirement of EOP users guide page 7 item 10 4th bullet), SG overfill is a concern but not at the expense of allowing a ruptured SG to depressurize.
- C. Incorrect. Correct direction, however "B" SG will not be needed as a heat sink with A and C intact.
- D. Correct. IAW E-3 step 5 bases page 65 2nd bullet.

K/A Sys #	K/A System	K/A Category	K/A Statement		
000038	Steam Generator Tube Rupture (SGTR)	N/A	Knowledge of the specific bases for EOPs.		
K/A #	2.4.18	K/A Importance	4.0	Exam Level	SRO
Question Source:	New			Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None			Technical References:	E-3 step 5 bases page 62 2 nd bullet.
Objective #:	Task ID#:			10 CFR Part 55 Content:	(CFR: 41.10 / 43.1 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

80. The plant is operating at 100% power with all systems in NSA.

- A Reactor trip occurs coincident with a loss of offsite power.
- The steam driven AFW pump failed to start and cannot be started.
- All other plant equipment responded as designed.
- 30 minutes **AFTER** the reactor trip the following plant conditions exist:
 - All SG pressures are 1005 psig and stable.
 - RCS Subcooling is 35°F and stable.
 - Loop ΔTs are indicating upscale and stable.
 - All SG NR levels are 45% and slowly dropping.
 - Total AFW flow is 100 gpm and stable.

(1) When natural circulation has been established, what will be the status of T_{cold} and T_{hot} ?

(2) IAW EOP Attachment A-1.7, Natural Circulation Verification, what directions are you **REQUIRED** to give the crew in order to enhance natural circulation?

- A. (1) T_{cold} will be at 547°F and T_{hot} will be stable or rising.
 (2) Raise SG NR levels by increasing AFW flow.
- B. (1) T_{cold} will be at 512°F and T_{hot} will be stable or dropping.
 (2) Raise the rate at which steam is being dumped.
- C. (1) T_{cold} will be at 512°F and T_{hot} will be stable or rising.
 (2) Raise SG NR levels by increasing AFW flow.
- D. (1) T_{cold} will be at 547°F and T_{hot} will be stable or dropping.
 (2) Raise the rate at which steam is being dumped.

Answer D

Explanation/Justification:

- A. Incorrect. Right T_c response; Wrong T_h response and wrong enhancement directions. T_c will be at saturation temperature for SG pressure. T_h will be rising as natural circulation is being developed BUT it will be stable or dropping once it has been developed. If T_h is still rising then natural circulation has not been developed. Raising SG levels may seem plausible however, NR SG levels are within the band of 35-50%. The direction for enhancing is to raise the steam dump rate.
- B. Incorrect. Wrong T_c response; Right T_h response and Right enhancement directions. T_c will be at saturation temperature for SG pressure which is 1005 psig (547°F). T_h will be rising as natural circulation is being developed BUT it will be stable or dropping once it has been developed. If T_h is still rising then natural circulation has not been developed. 512°F corresponds to 35°F below T_{sat} . A non-discriminating candidate may think this is where T_c will be for these conditions.
- C. Incorrect. Wrong T_c response; Wrong T_h response and wrong enhancement directions. T_c will be at saturation temperature for SG pressure. T_h will be rising as natural circulation is being developed BUT it will be stable or dropping once it has been developed. If T_h is still rising then natural circulation has not been developed. Raising SG levels may seem plausible however, NR SG levels are within the band of 35-50%. The direction for enhancing is to raise the steam dump rate. 512°F corresponds to 35°F below T_{sat} . A non-discriminating candidate may think this is where T_c will be for these conditions.
- D. Correct. T_c will be at saturation temperature for SG pressure which is 1005 psig (547°F). T_h will be rising as natural circulation is being developed BUT it will be stable or dropping once it has been developed. If T_h is still rising then natural circulation has not been developed. IAW EOP Attachment A-1.7 Natural Circulation Verification the direction for enhancing natural circulation is to raise the rate of dumping steam.

NOTE:

This question is NOT too similar to RO question #10. RO question #10 requires candidate to know only trends and the concept of T_c being equal to or less than saturation pressure in the SGs. This SRO question requires the SRO candidate to calculate T_c and addresses T_h which is NOT addressed in the RO question. This question also requires the SRO candidate to determine what actions will be directed to enhance natural circulation.

K/A Sys #	K/A System	K/A Category	K/A Statement
000056	Loss of Off-site Power	Ability to determine and interpret the following as they apply to the Loss of Offsite Power:	T_{cold} and T_{hot} indicators (wide range)
K/A #	AA2.19	K/A Importance	4.2
Question Source:	New	Exam Level	SRO
References provided to Candidate	Steam Tables	Question Cognitive Level:	Higher Comprehension
Objective #:	Task ID#:	Technical References:	EOP Attachment A-1.7 Natural Circulation Verification
		10 CFR Part 55 Content:	(CFR: 43.5 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

81. The plant is operating at 100% power with all systems in NSA.
- A Reactor trip and Safety injection occur.
 - All systems function as designed.

The crew has implemented E-0, Reactor Trip or Safety Injection and has begun the diagnostic steps of E-0 with the following plant conditions:

- All SG pressures are 800 psig and stable.
- All SG NR levels are 35% and slowly rising.
- All Secondary radiation monitors are consistent with pre-event values.
- CNMT Pressure is -1.0 psig and stable.
- CNMT sump level is consistent with pre-event values.
- CNMT radiation is consistent with pre-event values.
- RCS Subcooling is 40°F and slowly dropping.
- AFW flow is 700 gpm and stable.
- RCS Pressure is 1125 psig and slowly dropping.
- PRZR level is 12% and slowly dropping.
- Auxiliary Building Radiation levels are rising.
- Auxiliary Building sump levels are rising.

Based on these conditions:

What procedural entry is **REQUIRED**?

- A. ECA-1.2, LOCA Outside Containment.
- B. ES-1.1, SI Termination.
- C. E-2, Faulted Steam Generator Isolation.
- D. E-3, Steam Generator Tube Rupture.

Answer A

Explanation/Justification:

- A. Correct. IAW E-0 step 20 Auxiliary Building radiation levels rising and evidence of a LOCA outside CNMT requires entry into ECA-1.2.
- B. Incorrect. RCS pressure must be stable or rising and PRZR level must be > 17 % for this to be the right procedural entry.
- C. Incorrect. At least one SG pressure must be dropping in an uncontrolled manner for this to be the right procedural entry.
- D. Incorrect. At least one SG level must be rising in an uncontrolled manner or secondary radiation must be inconsistent with pre-event values for this to be the right procedural entry.

K/A Sys #	K/A System	K/A Category		K/A Statement	
W/E04	LOCA Outside Containment	Ability to determine and interpret the following as they apply to the (LOCA Outside Containment)		Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	
K/A #	EA2.1	K/A Importance	4.3	Exam Level	SRO
Question Source:		New		Question Cognitive Level: Higher Analysis	
References provided to Candidate		None		Technical References: E-0 steps 14-20; E-0 step 20 bases.	
Objective #:		Task ID#:		10 CFR Part 55 Content: (CFR: 43.5 / 45.13)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

82. The Plant is operating at 100% power with all systems in NSA.
- Control Bank D is at 229 steps.
 - Control Bank D Demand step counters are at 229 steps.
 - Control Rod Group Selector Switch is in the "MAN" position.

The following control room alarms are received:

- A4-9F Rod At Bottom
- A4-3C Tavg Deviation from Tref
- A4-4F NIS Power Range Comparator Deviation
- A4-4G NIS Power Range Neutron Flux Rate High

Plant Parameters are **NOW** as follows:

- Tavg is 575°F and slowly dropping.
- RCS Pressure is 2230 psig and slowly dropping.
- Reactor power has dropped to 96% and is slowly rising.
- PR N-41 Negative Rate Trip bistable is LIT
- All other PR Negative Rate Trip bistables are NOT LIT
- Control Bank D Demand step counters remain at 229 steps.

Based on these conditions:

What procedure contains the **REQUIRED** guidance to address these plant conditions?

- A. E-0, Reactor Trip or Safety Injection.
- B. AOP 2.1.3, RCCA Control Bank Inappropriate Continuous Movement.
- C. AOP 2.1.7, Rod Position Indication Malfunction.
- D. AOP 2.1.8, Rod Inoperability.

Answer D

Explanation/Justification:

- A. Incorrect. No entry conditions for E-0 have been met. The PR rate coincidence is 2/4 and only one rate bistable has been actuated.
- B. Incorrect. The entry conditions for this procedure would require rods stepping out in conjunction with A4-3C Tavg Deviation from Tref in alarm. The rods are not stepping in the conditions of the question.
- C. Incorrect. Entry into this procedure is required ONLY if there is no evidence of a plant response to the alarms. In this question, the plant has responded to a dropped rod with corresponding temp/pressure/power change. This procedure may be entered as part of the initial diagnostics, however entry into this procedure is not REQUIRED.
- D. Correct. IAW symptoms listed for AOP 2.1.8, the alarms and plant response are consistent with a dropped rod. AOP 2.1.5 Dropped rod has been deleted, and AOP 2.1.8 now addresses a dropped rod in Part A. SRO candidate must evaluate the given conditions and those that are NOT present to determine that a rod has dropped, and is in fact at zero steps.

NOTE: The stem is worded using the word contains due to the allowance for entry into AOP 2.1.7 which would then diagnose AOP 2.1.8 as the correct procedure to address these conditions. If the stem asked what procedure entry is required, then there would be 2 possible answers. Only AOP 2.1.8 "Contains" the appropriate guidance.

K/A Sys #	K/A System	K/A Category	K/A Statement
000003	Dropped Control Rod	Ability to determine and interpret the following as they apply to the Dropped Control Rod:	Rod position indication to actual rod position
K/A #	AA2.01	K/A Importance	Level Of Difficulty: (1-5)
Question Source:	New	Exam Level	Question Cognitive Level:
References provided to Candidate	None	Technical References:	Higher Analysis
jective #:	Task ID#:	10 CFR Part 55 Content:	AOPs 2.1.3, 2.1.7, & 2.1.8
			(CFR: 43.5 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

83. The Plant is operating at 100% power with all systems in NSA.

- RCS activity is high, right at the Technical Specification Limits, due to leaking fuel elements.
- At T = 0, RCP 21C Thermal barrier heat exchanger develops a leak **AND** 21C RCP Thermal Barrier Outlet Isol Vlv [2CCP*AOV107C] **FAILS** to isolate and **CANNOT** be closed.
- Thermal barrier outlet flow is 60 gpm and stable.

At T = 1 minute, The following alarms and indications are received:

- Annunciator A4-5C Radiation Monitoring Level High - Alarms
- Component Cooling Heat Exchanger Radiation Monitor 2SWS-RQI101 **AND** Component Cooling Service Water Radiation Monitor 2SWS-RQI102 are **BOTH** in – **HIGH Alarm**
- Radiation Monitor 2SWS-RQI101 is reading $9.0 \times 10^{-2} \mu\text{Ci/ml}$.
- Radiation Monitor 2SWS-RQI102 is reading $9.0 \times 10^{-4} \mu\text{Ci/ml}$

No Reactor Trip or SI signals have been actuated.

No Reactor Trip or SI signals are required.

If all of these conditions continue until T = 20 minutes, What is the highest Emergency Plan Classification **REQUIRED**, if any, at T = 20 minutes?

(Assume NO Dose projections will be available until T = 50 minutes).

- A. No Emergency Plan Classification is required.
- B. Unusual Event.
- C. Alert.
- D. Site Area Emergency.

Answer C

Explanation/Justification:

- A. Incorrect. Candidate could choose this based on RCS identified leakage being less than 25 gpm (Tab 2.6) based on thermal barrier outlet flow rising from a nominal 45 gpm to 60 gpm.
- B. Incorrect. Candidate could choose this based on [2SWS-RQI102] being greater than 2 times the ODCM setpoint (Tab 7.2), however this MUST be for a period of greater than 60 minutes to be a UE.
- C. Correct. IAW Tab 7.2 and the bases for Tab 7.2, [2SWS-RQI101] is 200 times the ODCM setpoint and this has been for greater than 15 minutes. The candidate must refer to the EAL Tab 7.2 and the corresponding table 7-1 and apply the given data to the EAL matrix. The keys to the question are to recognize that the given radiation monitors are indicators used to determine if an EAL criterion has been exceeded **AND** to recognize that the numbers in table 7-1 have been exceeded. After analyzing and applying this information, the candidate may still choose JE since this value has been exceeded, but NOT for > 60 minutes. Making the correct EAL determination demonstrates the SRO ability.
- D. Incorrect. Candidates could choose this if they incorrectly declare both the Fuel barrier and RCS barrier to be potential losses.

K/A Sys #	K/A System	K/A Category	K/A Statement
000059	Accidental Liquid RadWaste Rel.	N/A	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.
K/A #	2.4.47	K/A Importance	4.2
Exam Level	SRO		
Question Source:	New		
References provided to Candidate	EALs.		
Objective #:	Task ID#:		
		Question Cognitive Level:	Higher Application
		Technical References:	EAL Tab 7.2 and table 7-1
		10 CFR Part 55 Content:	(CFR: 41.10 / 43.5 / 45.12)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

84. The Plant is operating at 100% power with all systems in NSA.
- A major fire has started in the control room.
 - The fire is **NOW** out of control and the fire brigade has not been able to extinguish the fire.
 - As the Shift manager, you direct the implementation of 2OM-56C, Alternate Safe Shutdown From Outside The Control Room.

Which ONE (1) of the following methods/locations will be used to bring the unit to cold shutdown?

Direct the crew to conduct a :

- A. Natural circulation cooldown from the Alternate Shutdown Panel (ASP).
- B. Natural circulation cooldown from the Emergency Shutdown Panel (ESP).
- C. Forced circulation cooldown from the Alternate Shutdown Panel (ASP).
- D. Forced circulation cooldown from the Emergency Shutdown Panel (ESP).

Answer A

Explanation/Justification:

- A. Correct. IAW 2OM-56C.1.B page 2 3rd paragraph and 2OM-56C.4.A page 2 1st paragraph and 2OM-56C.4.B page 3 2nd item.
- B. Incorrect. Implementation of 2OM-56C, Alternate Safe Shutdown From Outside The Control Room requires the ASP to be activated. The ESP is activated for small fires, toxic fumes, etc.
- C. Incorrect. RCPs are tripped before leaving the control room.
- D. Incorrect. RCPs are tripped before leaving the control room.

K/A Sys #	K/A System	K/A Category	K/A Statement
0067	Plant Fire On-site	N/A	Knowledge of "fire in the plant" procedures
K/A #	2.4.27	K/A Importance 3.9	Exam Level SRO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	2OM-56C.1.B page 2 3 rd paragraph and 2OM-56C.4.A page 2 1 st paragraph and 2OM-56C.4.B page 3 2 nd item.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.10 / 43.5 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

85. The Plant is operating at 100% power with all systems in NSA.
- The control room crew is performing 2OST-43.6, Containment High Range Area Monitor Channel Test.
 - During the surveillance, the HIGH alarm setpoint for In-Containment High Range Area monitor [2RMR*RQ206] is found to be set at 2.6×10^4 R/hr.
 - Background radiation is 100 mr/hr.

Based on these conditions, what is the **MINIMUM** Technical Specification/LRM action, if any, that is **REQUIRED**?

- A. No Technical Specification/LRM action is required.
- B. Restore the required alarm channel to OPERABLE status within 30 days.
- C. Adjust the alarm setpoint to within the limit within 4 hours.
- D. Declare the radiation monitor alarm inoperable within 72 hours.

Answer C

Explanation/Justification:

- A. Incorrect. The alarm setpoint is out of range, and must be adjusted.
- B. Incorrect. This would be the required action if the MONITOR was inoperable.
- C. Correct. In this case, the LRM provides specific actions for the alarm setpoint being out of range. Therefore, the minimum required action is to adjust the setpoint as specified in LRM 3.3.15 Condition A.1.
- D. Incorrect. This action is an option BUT it must be completed within 4 hours NOT 72 hours.

K/A Sys #	K/A System	K/A Category	K/A Statement
0061	ARM System Alarms	Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms:	Required actions if alarm channel is out of service
K/A #	AA2.06	K/A Importance	4.1
Question Source:	New	Exam Level	SRO
References provided to Candidate	2OST-43.6, LRM 3.3.15, TS 3.3.3	Question Cognitive Level:	Higher Application
Objective #:	Task ID#:	Technical References:	LRM 3.3.15 Condition A.1
		10 CFR Part 55 Content:	(CFR: 43.5 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

86. A plant heatup/startup is in progress with RCS average temperature at 325°F.

Other plant conditions are as follows:

- Recirculation Pump 2RSS*P21D is **INOPERABLE**.
- Charging/HHSI Pump 2CHS*P21C is on clearance for maintenance.
- A risk assessment for this condition has **NOT YET** been performed.

Charging/HHSI Pump 2CHS*P21B becomes **INOPERABLE**.

Which ONE (1) of the following describes the Technical Specification **REQUIRED** Actions?

- A. Restore the 2RSS*P21D recirculation pump and 2CHS*P21B Charging/HHSI Pump to OPERABLE status **BEFORE** exceeding 350°F.
- B. Restore **ONLY** the Charging/HHSI Pump 2CHS*P21B to OPERABLE status **BEFORE** exceeding 350°F.
- C. Restore the 2RSS*P21D recirculation pump and 2CHS*P21B Charging/HHSI Pump to OPERABLE status **BEFORE** exceeding 375°F.
- D. Restore **ONLY** the Charging/HHSI Pump 2CHS*P21B to OPERABLE status **BEFORE** exceeding 375°F.

Answer **A**

Explanation/Justification:

- A. Correct. IAW LCO 3.5.2 both pumps must be operable before transitioning above 350°F. At Unit 2 RSS* P21C and D provide the LHSI function during recirculation phase.
- B. Incorrect. Both pumps are required before exceeding 350°F.
- C. Incorrect. The 25 degree allowance in Note 2 of TS 3.5.2 is only applicable to the charging pump. The Recirc spray pump is required before exceeding 350°F.
- D. Incorrect. Both pumps are required before exceeding 350°F.

K/A Sys #	K/A System	K/A Category	K/A Statement		
006	Emergency Core Cooling	N/A	Knowledge of conditions and limitations in the facility license.		
K/A #	2.2.38	K/A Importance	4.5	Exam Level	SRO
Question Source:		BVPS Bank 56320		Question Cognitive Level: Higher Application	
References provided to Candidate		LCO 3.5.2 and LCO 3.5.3		Technical References: LCO 3.5.2 and Bases; LCO 3.5.3 and Bases; and LCO 3.0.4	
Objective #:		Task ID#:		10 CFR Part 55 Content: (CFR: 41.7 / 41.10 / 43.1 / 45.13)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

87. The Plant is operating at 100% power with all systems in NSA.

- The control switches for all PORV Motor Operated Isol Vlvs [2RCS*MOV535, 536, 537] are in AUTO.
- An inadvertent reactor trip occurs.
- 2 Minutes later Pressurizer Spray Valve 2RCS*PCV455A fails OPEN and is stuck OPEN.

The PORV Motor Operated Isol Vlvs [2RCS*MOV535, 536, 537] will AUTOMATICALLY close when _____(1)_____.

E-0, Reactor Trip or Safety Injection **REQUIRES** you to direct the crew to stop Reactor Coolant Pumps _____(2)_____.

- A. (1) 2/3 PZR Protection channels decrease to less than 2000 psig
(2) 21A and 21C
- B. (1) 2/3 PZR Protection channels decrease to less than 2185 psig
(2) 21A and 21C
- C. (1) 2/3 PZR Protection channels decrease to less than 2000 psig
(2) 21B and 21C
- D. (1) 2/3 PZR Protection channels decrease to less than 2185 psig
(2) 21B and 21C

Answer: B

Explanation/Justification:

- A. Incorrect. Wrong setpoint for auto closure. 2000 psig is the P-11 permissive. At Unit 1 the P-11 interlock performs this function. At Unit 2 the function is performed at 2185 psig.
- B. Correct. IAW 20M-6.4.IF auto close feature is 2/3 protection channels below 2185 psig. IAW E-0 step 12b RNO secure the 21A and C RCF's.
- C. Incorrect. Wrong setpoint for auto closure. Wrong pumps for the PCV455A failure.
- D. Incorrect. Correct setpoint for auto closure. Wrong pumps for the PCV455A failure.

K/A Sys #	K/A System	K/A Category	K/A Statement
010	Pressurizer Pressure Control	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
K/A #	A2.02	K/A Importance 3.9	Exam Level SRO
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	E-0 step 12b RNO; 20M-6.4.IF
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.5 / 43.5 / 45.3 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

88. The Plant is operating at 100% power with all systems in NSA.
- An **Instrument** Power fuse for Power Range NIS Channel 2 (N42) Blows.
- (1) What will be the status of the SSPS Rx trip relay for N42 Overpower Trip High Range?
- (2) What are **ALL** of the applicable Reactor Trip System (RTS) Instrumentation Functions that will **REQUIRE** Technical Specification action? (Choose from the list below)
- a. Power range neutron flux –High
 - b. Power range neutron flux –Low
 - c. Power range neutron flux High positive rate
 - d. Overtemperature ΔT
 - e. P8 Power range neutron flux interlock
 - f. P9 Power range neutron flux interlock
 - g. P10 Power range neutron flux interlock
- A. (1) Tripped
(2) a, c, d, e, f, and g
- B. (1) Tripped
(2) a, b, c, d, e, f, and g
- C. (1) NOT Tripped
(2) a, c, d, e, f, and g
- D. (1) NOT Tripped
(2) a, b, c, d, e, f, and g

Answer A

Explanation/Justification:

- A. Correct. Loss of control power OR instrument power will cause the bistable to trip. It is a common misconception that only a loss of control power will cause the bistable to trip since control power is what powers the drawer. However, the bistable relay driver will input a trip for loss of either power supply. The six TS actions are applicable.
- B. Incorrect. Action 2b is not applicable since reactor power is above the P-10 interlock.
- C. Incorrect. Loss of control power OR instrument power will cause the bistable to trip. It is a common misconception that only a loss of control power will cause the bistable to trip since control power is what powers the drawer. However, the bistable relay driver will input a trip for loss of either power supply. The six TS actions are applicable.
- D. Incorrect. Loss of control power OR instrument power will cause the bistable to trip. It is a common misconception that only a loss of control power will cause the bistable to trip since control power is what powers the drawer. However, the bistable relay driver will input a trip for loss of either power supply. Action 2b is not applicable since reactor power is above the P-10 interlock.

K/A Sys #	K/A System	K/A Category	K/A Statement
012	Reactor Protection System	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
K/A #	A2.02	K/A Importance 3.9	Exam Level SRO
Question Source:	BVPS Bank #61405 Modified to make closed book	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	TS Section 3.3.1 and AOP 2.2.1C Symptom #5, LP 3SQS-2.1 slide 59
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.5 / 43.5 / 45.3 / 45.5)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

89. The Plant is operating at 100% power with all systems in NSA.
- Battery *2-2 is being charged, per maintenance request.
 - Emergency Switchgear Exhaust Fan 2HVZ*FN262A is running.
 - Emergency Switchgear Exhaust Fan 2HVZ*FN262B is in Auto.
 - The running Battery Room Exhaust Fan 2HVZ*FN216A **TRIPS**.
 - Annunciator A10-7H Battery Room Exhaust Fan Auto-Start/Auto-Stop is received.
 - No automatic actions occur.

Based on these conditions:

- (1) What impact will this have on the battery rooms?
 (2) IAW ARP A10-7H, Battery Room Exhaust Fan Auto-Start/Auto-Stop, what actions are you **REQUIRED** to direct the crew to perform in order to address this alarm condition?

- A. (1) Oxygen concentrations will buildup.
 (2) Start Emergency Switchgear Exhaust Fan 2HVZ*FN262B.
- B. (1) Hydrogen concentrations will buildup.
 (2) Start Emergency Switchgear Exhaust Fan 2HVZ*FN262B.
- C. (1) Oxygen concentrations will buildup.
 (2) Start Battery Room Exhaust Fan 2HVZ*FN216B.
- D. (1) Hydrogen concentrations will buildup.
 (2) Start Battery Room Exhaust Fan 2HVZ*FN216B.

Answer D

Explanation/Justification:

- A. Incorrect. Battery charging generates hydrogen gas NOT Oxygen gas. The excess hydrogen gas could buildup to explosive levels if the exhaust system is not functioning. Starting the Emergency Switchgear Exhaust Fan 2HVZ*FN262B may seem like a viable solution since the battery rooms are located in emergency switchgear. However, the Emergency Switchgear supply and Exhaust Fans provide fresh cool air to the emergency switchgear area and the battery room exhaust fans will pull this air into the battery room and exhaust it to outside. The procedural guidance is to start the redundant battery room exhaust fan NOT start the redundant Emergency Switchgear Exhaust Fan.
- B. Incorrect. Right impact; wrong procedural actions. Starting the Emergency Switchgear Exhaust Fan 2HVZ*FN262B may seem like a viable solution since the battery rooms are located in emergency switchgear. However, the Emergency Switchgear supply and Exhaust Fans provide fresh cool air to the emergency switchgear area and the battery room exhaust fans will pull this air into the battery room and exhaust it to outside. The procedural guidance is to start the redundant battery room exhaust fan NOT start the redundant Emergency Switchgear Exhaust Fan.
- C. Incorrect. Wrong impact; correct actions.
- D. Correct. Correct impact; correct actions.

K/A Sys #	K/A System	K/A Category	K/A Statement
063	DC Electrical Distribution	Ability to (a) predict the impacts of the following malfunctions or operations on the DC electrical systems; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Loss of ventilation during battery charging
K/A #	A2.02	K/A Importance	3.1
Question Source:	New	Exam Level	SRO
References provided to Candidate	None	Question Cognitive Level:	Higher Comprehension
Objective #:	Task ID#:	Technical References:	2OM-44F.AAH; 2OM-44F.1.B page 3 of 4
		10 CFR Part 55 Content:	(CFR: 41.5 / 43.5 / 45.3 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

90. The Plant is operating at 15% power with all systems in normal alignment for this power level.
- SGWLC is being maintained Automatically by the SG Feedwater Bypass Control Vlvs [2FWS*FCV479(489)(499)].
 - Annunciator A6-3C Station Instrument Air Receiver Tank Trouble is received.
 - Station Instrument Air Header Pressure is 80 psig and slowly dropping.
 - A local operator reports that the station instrument air dryers have malfunctioned, and both dryers are venting.
- (1) IAW AOP 2.34.1, Loss Of Station Instrument Air, what directions are you **REQUIRED** to give the local operator to address the degrading Station Instrument Air Header Pressure?
- (2) IF Station Instrument Air Header Pressure continues to drop below 30 psig, how will the SG Feedwater Bypass Control Vlvs **FAIL**?
- A. (1) Place the Instrument Air Bypass filters in service **THEN** isolate the Instrument Air dryers.
(2) **OPEN**.
- B. (1) Place the Instrument Air Bypass filters in service **THEN** isolate the Instrument Air dryers.
(2) **CLOSED**.
- C. (1) Supply Station Instrument Air with Containment Instrument Air by **OPENING** CNMT instrument Air backup supply Valve [2IAC-MOV131] and CNMT instrument Air supply Isol Valve [2IAC-MOV130].
(2) **OPEN**.
- D. (1) Supply Station Instrument Air with Containment Instrument Air by **OPENING** CNMT instrument Air backup supply Valve [2IAC-MOV131] and CNMT instrument Air supply Isol Valve [2IAC-MOV130].
(2) **CLOSED**.

Answer B

Explanation/Justification:

- A. Incorrect. Correct actions; wrong failure mode for the SG Feedwater Bypass Control Vlvs
- B. Correct. IAW AOP-2.34.1 place bypass filters in service and SG Feedwater Bypass Control Vlvs fail closed.
- C. Incorrect. These are the actions for loss of containment instrument air. Containment instrument air can be supplied by station instrument air by opening these valves and these are the directions given in AOP 2.34.2; wrong failure mode for the SG Feedwater Bypass Control Vlvs
- D. Incorrect. These are the actions for loss of containment instrument air. Containment instrument air can be supplied by station instrument air by opening these valves and these are the directions given in AOP 2.34.2; correct failure mode for the SG Feedwater Bypass Control Vlvs

K/A Sys #	K/A System	K/A Category	K/A Statement
078	Instrument Air	Ability to (a) predict the impacts of the following malfunctions or operations on the IAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	Air dryer and filter malfunctions
K/A #	A2.01	K/A Importance	2.9
Exam Level	SRO	Level Of Difficulty: (1-5)	
Question Source:	New	Question Cognitive Level:	Higher Comprehension
References provided to Candidate	None	Technical References:	AOP 2.34.1 step 3 and NOTE prior to step 7
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.5 / 43.5 / 45.3 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

91. The Plant is operating at 100% power with all systems in NSA.
- A Reactor Trip coincident with a loss of offsite power occurs.
 - Both trains of RVLIS are **NOT** functioning.
 - All other systems functioned as designed.
 - RCS Hot leg temperatures are 450°F and stable.
 - The crew is performing a Natural Circulation Cooldown IAW ES-0.4, Natural Circulation Cooldown With Steam Void in Vessel (Without RVLIS).

Throughout this procedure, the plant is depressurized in several discrete phases. **AFTER** each depressurization phase there is a check of pressurizer level to ensure it is less than 90%.

During this check of pressurizer level, **IF** Pressurizer level is greater than 90% :

- (1) What directions are you **REQUIRED** to give the crew to address the pressurizer level situation?
- (2) What is the basis for this action?

- A.
 - (1) Maximize letdown flow.
 - (2) Prevent a water solid PRZR and the resultant loss of pressure control.
 - B.
 - (1) Raise RCS pressure 100 psig using PRZR Heaters.
 - (2) Prevent a water solid PRZR and the resultant loss of pressure control.
 - C.
 - (1) Maximize letdown flow.
 - (2) Partially or wholly collapse the Rx vessel void.
- (1) Raise RCS pressure 100 psig using PRZR Heaters.
 - (2) Partially or wholly collapse the Rx vessel void.

Answer D

Explanation/Justification:

- A. Incorrect. This is the required action and basis for high pressurizer level while in ES-0.3 where the technique employed for the RCS cooldown is dramatically different. In ES-0.3 charging and letdown are controlled throughout the cooldown to keep PRZR level below 90%. In ES-0.4 charging and letdown are set PRIOR to the cooldown and thereafter NOT adjusted. PRZR level rise is then used to monitor void growth.
- B. Incorrect. Right action; wrong basis.
- C. Incorrect. Wrong action; right basis.
- D. Correct. IAW ES-0.4 step 9 and basis.

K/A Sys #	K/A System	K/A Category	K/A Statement			
011	Pressurizer Level Control	N/A	Ability to perform specific system and integrated plant procedures during all modes of plant operation.			
K/A #	2.1.23	K/A Importance	4.4	Exam Level	SRO	Level Of Difficulty: (1-5)
Question Source:	New			Question Cognitive Level:	Higher	Analysis
References provided to Candidate	None			Technical References:	ES-0.4 step 9 and basis;	
Objective #:	Task ID#:			10 CFR Part 55 Content:	(CFR: 41.10 / 43.5 / 45.2 / 45.6)	

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

92. The Plant is operating at 100% power with all systems in NSA.
- Gaseous Waste Storage Tanks [2GWS-TK25A-G] pressures are 10 psig and stable.
 - Gaseous Waste Surge Tank [2GWS-TK21] pressure is 62 psig and stable.
 - The Waste Gas Storage Tanks Radiation Monitor [2GWS-RQ104] is out of service.
 - Oxygen Analyzer [2GWS-OA100A] is out of service.
 - RCS Coolant activity is 25 $\mu\text{Ci/ml}$.

It is desired to fill the Gaseous Waste Storage Tanks IAW 2OM-19.4.G, Filling Unit 2 Gaseous Waste Storage Tanks From Unit 2 Surge Tank.

While filling the Gaseous Waste Storage Tanks, under these conditions, what LRM/ODCM compensatory actions are **REQUIRED**?

At least once per:

- A. 24 hours; take grab samples and analyze for **BOTH** Oxygen concentration and radioactive content.
- B. 24 hours; take grab samples and analyze for Oxygen concentration **ONLY**.
- C. 4 hours; take grab samples and analyze for Oxygen concentration and 24 hours for radioactive content.
- D. 4 hours; take grab samples and analyze for Oxygen concentration **ONLY**.

Answer **A**

Explanation/Justification:

- A. Correct. IAW LRM 3.3.12 condition B.1 and ODCM attachment O surveillance 4.11.2.5.1.
Incorrect. At Unit 2 Both Oxygen and radioactive content must be sampled and analyzed. If the candidate does NOT correctly apply the ODCM surveillance, then this distractor would appear plausible. Unit 1 does NOT have to perform this surveillance if RCS activity is below 100 $\mu\text{Ci/ml}$.
- C. Incorrect. This oxygen sample time is the time limit if BOTH oxygen analyzers were OOS. Right actions for radioactive content.
- D. Incorrect. This oxygen sample time is the time limit if BOTH oxygen analyzers were OOS. If the candidate does NOT correctly apply the ODCM surveillance, then this distractor would appear plausible. Unit 1 does NOT have to perform this surveillance if RCS activity is below 100 $\mu\text{Ci/ml}$.

K/A Sys #	K/A System	K/A Category	K/A Statement
071	Waste Gas Disposal	N/A	Ability to interpret and execute procedure steps.

K/A #	2.1.20	K/A Importance	4.6	Exam Level	SRO	Level Of Difficulty: (1-5)
Question Source:	New					Question Cognitive Level: Higher Application
References provided to Candidate		1/2 ODCM section 2.02 ; LRM 3.3.12				Technical References: LRM 3.3.12 condition B.1 and 1/2-ODC-3.03 attachment O surveillance 4.11.2.5.1
Objective #:		Task ID#:			10 CFR Part 55 Content:	(CFR: 41.10 / 43.5 / 45.12)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

93. The Plant is in Mode 5.

- Train A is the declared protected Train.
- System Station Transformer 2A is supplying the 2A and 2AE 4KV Buses.
- The Deluge valve for System Station Transformer 2A inadvertently actuates and sprays the transformer.
- Operators locally isolate the Deluge valve.
- System Station Transformer 2A remains in service.

IAW ½-ADM-1900, Fire Protection Program, what actions, if any, are **REQUIRED** for the isolated Deluge valve?

- A. No actions required.
- B. Within 1 hour, establish an hourly fire watch patrol with backup fire suppression capability and establish controls to prohibit transient combustibles in the affected area.
- C. Within 1 hour, establish an hourly fire watch patrol in the affected area with backup fire suppression capability, and to check for proper cooling, no oil leakage, or any abnormal conditions.
- D. Within 4 hours, establish an hourly fire watch patrol in the affected area to check for proper cooling, no oil leakage, or any abnormal conditions.

Answer D

Explanation/Justification:

A. Incorrect. Candidate may think that since the 2A transformer is not safety related that no actions are required.

B. Incorrect. These are the required actions for safety related equipment that is protected by the CO₂ system.

C. Incorrect. This is a combination of CO₂/water and safety/non-safety related actions.

Correct. IAW Att. B of ½-ADM-1900 item 3b for non-safety related equipment that is required to be operable. Candidate must realize that the 2A transformer is non-safety related and is required to be operable in Mode 5 with Train A protected.

K/A Sys #	K/A System	K/A Category	K/A Statement		
086	Fire Protection	N/A	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.		
K/A #	2.1.7	K/A Importance	4.7	Exam Level	SRO
Question Source:	New	Question Cognitive Level: Higher Application			
References provided to Candidate	½-ADM-1900	Technical References: ½-ADM-1900 Attachment B item 3b			
Objective #:	Task ID#:	10 CFR Part 55 Content: (CFR: 41.5 / 43.5 / 45.12 / 45.13)			

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

- 94.
- You are a Licensed Senior Reactor Operator at Beaver Valley.
 - You have been Licensed for Five and one-half years.
 - Your License renewal medical examination (NRC Form 396, Certification Of Medical Examination By Facility Licensee) is due to the NRC Regional Administrator in 6 months.
 - Your License is "Active" and you are currently assigned as the Unit 2 Control Room Shift Manager.
 - Your License contains **NO** medical restrictions.
 - You have been experiencing some difficulties with your "distant" vision.

On your first relief day, your personal physician (a licensed optometrist) determines that your "distant" vision has permanently degraded and you will **NOW** be required to wear corrective lenses at all times.

IAW 10CFR 50.74, Notification of Change In Operator or Senior Operator Status, when are you are **REQUIRED** to notify the NRC Regional Administrator of this change in your medical status?

- A. Immediately.
- B. Prior to assuming your next shift.
- C. Within 30 days of the diagnosis.
- D. Within 60 days of the diagnosis.

Answer C

Explanation/Justification:

- A. Incorrect. You should immediately begin wearing the corrective lenses, but not required to report for 30 days.
- B. Incorrect. You should begin wearing the corrective lenses prior to your next shift, but not required to report for 30 days.
- C. Correct. IAW 10CFR 50.74, 55.25, 55.23, NRC form 396. (Beaver Valley specific OE CR 07-22311)
- D. Incorrect. Must be within 30 days.

K/A Sys #	K/A System	K/A Category	K/A Statement
N/A	Generic	Conduct Of Operations	Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no-solo" operation, maintenance of active license status, 10CFR55, etc.
K/A #	2.1.4	K/A Importance	3.8
Question Source:	New	Exam Level	SRO
References provided to Candidate	None	Question Cognitive Level:	Lower Fundamental
Objective #:	Task ID#:	Technical References:	10CFR 50.74, 55.25, 55.23, NRC form 396
		10 CFR Part 55 Content:	(CFR: 41.10 / 43.2)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

95. The Plant is operating at 100% steady state power with all systems in NSA. The shift chemist reports the following **STABLE** Primary and Secondary plant chemistry conditions:
- Secondary Specific Activity is 0.025 $\mu\text{Ci/gm}$ DOSE EQUIVALENT I-131
 - RCS Specific Activity is 25.0 $\mu\text{Ci/gm}$ DOSE EQUIVALENT I-131
 - RCS Dissolved Oxygen is 0.15 ppm
 - RCS Chlorides are 0.10 ppm
 - RCS Fluorides are 0.10 ppm

Based on these chemistry conditions, what Technical Specification/LRM actions are **REQUIRED**?

Within:

- A. 6 hours be in Mode 3 and within 36 hours be in Mode 5.
- B. 6 hours be in Mode 3 with T_{avg} less than 500°F.
- C. 24 hours restore DOSE EQUIVALENT I-131 to within its limit.
- D. 48 hours restore RCS Dissolved Oxygen to within the steady state limit.

Answer B

Explanation/Justification:

- A. Incorrect. These are the required actions if Oxygen, chloride, or fluoride, are outside their transient limits. Oxygen is outside the steady state limit but within the transient limit.
- B. Correct. IAW TS 3.4.16 condition C.1 since DOSE EQUIVALENT I-131 is in the unacceptable region of TS figure 3.4.16-1.
- C. Incorrect. Time limit is 48 hours NOT 24 hours.
- D. Incorrect. Time limit is 24 hours NOT 48 hours.

A Sys #	K/A System	K/A Category	K/A Statement
N/A	Generic	Conduct Of Operations	Knowledge of primary and secondary plant chemistry limits.
K/A #	2.1.34	K/A Importance 3.5	Exam Level SRO
Question Source:	New	Question Cognitive Level:	Higher Application
References provided to Candidate	TS 3.4.16, 3.7.13; LRM 3.4.2	Technical References:	TS 3.4.16 condition C.1 and TS figure 3.4.16-1.
Objective #:	Task ID#:	10 CFR Part 55 Content:	(CFR: 41.10 / 43.5 / 45.12)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

96. • The Plant is operating at 100% power with all systems in NSA.
- All PORVs and associated block valves are OPERABLE.
- Technical Specification LCO 3.4.11 requires each PORV and associated block valve to be OPERABLE.
- Every 92 days, Surveillance 2OST-6.6, PORV Isolation Valve Test and Position Check, is performed to meet this requirement.

While performing 2OST-6.6:

- 2RCS*MOV535 PORV Motor Operated Isol Vlv **CLOSES** but **WILL NOT OPEN**.
- Maintenance finds a bad power supply breaker to the MOV, and replaces the entire breaker assembly at the MCC.
- ALL of their required work package instructions have been completed.
- The tagout has been lifted, 2RCS*MOV535 is **ENERGIZED** and **CLOSED**.
- 2RCS*MOV535 is ready for operations' post-maintenance testing.

For these conditions:

What **MINIMUM** post-maintenance testing will be **REQUIRED** to verify compliance with Technical Specification LCO 3.4.11?

(For each of the below actions, assume all valve stroke times and indications are within acceptable limits)

- A. Open 2RCS*MOV535, no other actions required.
- B. Open 2RCS*MOV535; then Close; then re-open.
- C. Cycle the associated PORV through one complete cycle, then open 2RCS*MOV535.
- D. Cycle the associated PORV through one complete cycle, then open 2RCS*MOV535; then Close; then re-open.

Answer B

Explanation/Justification:

- A. Incorrect. The surveillance requirement is for a complete cycle. Opening the valve would ONLY meet half of a cycle. If the candidate believed that the other half was satisfactorily performed earlier, then the candidate would select this choice. Since maintenance was on the breaker the valve must be again cycled through a complete cycle (open and closed)
- B. Correct. The surveillance requirement is for a complete cycle. Since maintenance was on the breaker the valve must be again cycled through a complete cycle (open and closed)
- C. Incorrect. Since maintenance was on the breaker the valve must be again cycled through a complete cycle (open and closed). The LCO addresses both the PORV and the block valve, but maintenance was only performed on the block valve. NO requirement to perform any surveillance activities for the PORV.
- D. Incorrect. Right actions for the block valve. Wrong actions for the PORV. The LCO addresses both the PORV and the block valve, but maintenance was only performed on the block valve. NO requirement to perform any surveillance activities for the PORV.

K/A Sys #	K/A System	K/A Category			K/A Statement
N/A	Generic	Equipment Control			Knowledge of pre- and post-maintenance operability requirements.
K/A #	2.2.21	K/A Importance	4.1	Exam Level	SRO
Question Source:	New			Question Cognitive Level:	Higher Analysis
References provided to Candidate	None			Technical References:	Technical Specification 3.4.11 SR 3.4.11.1; 2OST-6.6 Acceptance Criteria page 5 and 6
Objective #:		Task ID#:		10 CFR Part 55 Content:	(CFR: 41.10 / 43.2)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) **SRO ONLY**

- 97.
- The Plant is operating at 100% power with all systems in NSA.
 - A turbine runback occurs.
 - All systems respond as designed.
 - The crew is stabilizing the plant in accordance with the appropriate procedure.
 - Control Bank "D" Group Counters are at 180 steps.
 - On DRPI, one Control Bank "D" rod indicates 196 steps; all other rods indicate 182 steps.
 - The affected rod has a blown movable gripper fuse and has been determined to be trippable.
 - Power stabilizes at 85%

Which ONE (1) of the following describes the Technical Specification implications of this event?

- A. The rod is INOPERABLE AND NOT within alignment limits; Realign the rod within 1 hour to ensure acceptable power distribution limits are maintained.
- B. The rod is INOPERABLE AND NOT within alignment limits; Realign the rod within 1 hour to ensure Shutdown Margin is maintained.
- C. The rod is OPERABLE, BUT NOT within alignment limits; Realign the rod within 1 hour to ensure acceptable power distribution limits are maintained.
- D. The rod is OPERABLE, BUT NOT within alignment limits; Realign the rod within 1 hour to ensure Shutdown Margin is maintained.

Answer C

Explanation/Justification:

- A. Incorrect. 1 hour is required by T.S. 3.1.4 Condition A, but rod is not inoperable if it is trippable. If the rod was untrippable, then SDM would be affected. Power distribution limits are the correct reason. Common misconception is that a rod is INOPERABLE if it is misaligned. This misconception stems for the OLD Technical Specifications where misaligned rods WERE INOPERABLE.
- B. Incorrect. Would be true if the rod was untrippable
- C. Correct. 1 hour is required by T.S. 3.1.4 Condition B. Misalignment limits are based on impact on power distribution limits.
- D. Incorrect. Correct call on operability, but the concern for the situation presented is not shutdown margin

K/A Sys #	K/A System	K/A Category	K/A Statement		
N/A	Generic	Equipment Control	Ability to determine operability and/or availability of safety related equipment.		
K/A #	2.2.37	K/A Importance	4.6	Exam Level	SRO
Question Source:		Bank 1LOT7 NRC Exam	Question Cognitive Level:		Higher Comprehension
References provided to Candidate		None	Technical References:		TS 3.1.4, Condition B, and basis
Objective #:		Task ID#:	10 CFR Part 55 Content:		(CFR: 41.7 / 43.5 / 45.12)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

98. The Plant is operating at 100% power with all systems in NSA.
- A Large break LOCA occurs inside containment coincident with a loss of offsite power.
 - Rx Trip, SI, CIA and CIB all actuate as designed.
 - 2-2 Emergency Generator **TRIPS** and ALL Train B AC Equipment de-energizes.

As Shift manager, you are assessing the EAL Fission Product Barrier Matrix.

Which of the below listed Radiation Monitors will be the **ONLY** available monitors for this assessment?

1. Control Room Area [2RMC*RQ201]
2. Control Room Area [2RMC*RQ202]
3. In-Containment High Range Area [2RMR*RQ206]
4. In-Containment High Range Area [2RMR*RQ207]
5. Recirc Spray Heat Exchanger [2SWS*RQI100A]
6. Recirc Spray Heat Exchanger [2SWS*RQI100B]
7. Recirc Spray Heat Exchanger [2SWS*RQI100C]
8. Recirc Spray Heat Exchanger [2SWS*RQI100D]
9. Containment Purge [2HVR*RQ104A]
10. Containment Purge [2HVR*RQ104B]

- A. 1, 3, 5, 6, & 9
- B. 2, 4, 6, 8, & 10
- C. 2, 4, 5, & 7
- D. 1, 3, 5, & 7

Answer D

Explanation/Justification:

- A. Incorrect. 2SWS*RQI100B has no power and 2HVR*RQ104A is not part of the fission product barrier matrix.
- B. Incorrect. 2RMC*RQ202, 2RMR*RQ207, 2SWS*RQI100B & 2SWS*RQI100D have no power and 2HVR*RQ104A is not part of the fission product barrier matrix.
- C. Incorrect. 2RMC*RQ202 and 2RMR*RQ207 have no power.
- D. Correct. All of these have power and are a part of the fission product barrier matrix.

K/A Sys #	K/A System	K/A Category	K/A Statement
N/A	Generic	Radiation Control	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.
K/A #	2.3.15	K/A Importance	3.1
Question Source:	New	Exam Level	SRO
References provided to Candidate	None	Question Cognitive Level:	Higher Comprehension
Objective #:	Task ID#:	Technical References:	EAL Fission product barrier matrix; 2014-43.3.C page 3
		10 CFR Part 55 Content:	(CFR: 41.12 / 43.4 / 45.9)

Beaver Valley Unit 2 NRC Written Exam (2LOT6) SRO ONLY

99. Throughout the EOP network there are numerous steps that address SI reset.

PRIOR to these steps is a "Caution" that reads as follows:

"If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment"

What is the basis of this "Caution"?

It is a reminder that normal sequencing of safeguards loads onto the emergency bus after diesel generator startup _____(1)_____ occur **AND** a blackout sequencer (bus undervoltage) actuation _____(2)_____ possible.

- A. (1) will NOT
(2) is
- B. (1) will NOT
(2) is NOT
- C. (1) will
(2) is
- D. (1) will
(2) is NOT

Answer A

Explanation/Justification:

- A. Correct. IAW ES-1.1 step 1 caution 1 basis. In order to correctly answer this question, the candidate must understand the workings of the D/G sequencer. Once SI has been reset, any of the equipment that was started due to the SI that is then secured, will not receive a sequencer restart signal UNLESS the equipment is also on the "blackout" sequencer.
- B. Incorrect. Right normal response; wrong blackout response.
- C. Incorrect. Wrong normal response right blackout response.
- D. Incorrect. Wrong normal response; wrong blackout response.

K/A Sys #	K/A System	K/A Category			K/A Statement
N/A	Generic	Emergency Procedures/Plan			Knowledge of the operational implications of EOP warnings, cautions, and notes.
K/A #	2.4.20	K/A Importance	4.3	Exam Level	SRO
Question Source:		New	Question Cognitive Level:		Lower Fundamental.
References provided to Candidate		None	Technical References:		ES-1.1 step 1 caution 1 basis.
Objective #:		Task ID#:	10 CFR Part 55 Content:		(CFR: 41.10 / 43.5 / 45.13)

Beaver Valley Unit 2 NRC Written Exam (2LOT6)

SRO ONLY

100. A large Steam break accident inside containment has occurred.
- Containment pressure peaked at 20 psig.
 - All Equipment functioned as designed **EXCEPT** all seal injection flow has been lost.
 - SI, CIA, and CIB have all been reset.
 - SWS has been restored to the CCP heat exchangers.
 - CCP flow has been restored.
 - While performing EOP Attachment A-1.2, Establishing RCP CCP Cooling and Seal Injection, the Reactor Operator is unable to "OPEN" 21A RCP Thermal Barrier Outlet Isol Vlv [2CCP*AOV107A], using the benchboard control switch.

In order to "OPEN" 21A RCP Thermal Barrier Outlet Isol Vlv [2CCP*AOV107A] it will be necessary to defeat the "CLOSE" signal to 21A RCP Thermal Barrier Outlet Isol Vlv [2CCP*AOV107A].

IAW EOP Attachment A-1.2, Establishing RCP CCP Cooling and Seal Injection:

What directions are you **REQUIRED** to give the local operator to defeat the "CLOSE" signal to 21A RCP Thermal Barrier Outlet Isol Vlv [2CCP*AOV107A]?

- A. Install jumpers across the opening contacts of the valve's control circuit.
- B. Remove the valve's associated secondary process rack power supply card.
- C. Remove the valve's associated control circuit power supply fuse.
- D. Install jumpers across the contacts of the high discharge flow transmitter.

Answer B

Explanation/Justification:

- A. Incorrect. Although this may open the valve, it is NOT IAW EOP attachment A-1.2.
- B. Correct. IAW EOP attachment A-1.2 step 4.a.3.
- C. Incorrect. This action will fail the valve closed.
- D. Incorrect. This action will only defeat the high flow signal BUT NOT the high pressure and it is NOT IAW EOP attachment A-1.2

K/A Sys #	K/A System	K/A Category			K/A Statement
N/A	Generic	Emergency Procedures/Plan			Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.
K/A #	2.4.35	K/A Importance	4.0	Exam Level	SRO
Question Source:	New	Question Cognitive Level:			Lower Fundamental
References provided to Candidate	None	Technical References:			EOP attachment A-1.2 step 4.b.3.
Objective #:	Task ID#:	10 CFR Part 55 Content:			(CFR: 41.10 / 43.5 / 45.13)