

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

1

ID: LO153202

Points: 1.00

Given:

- The unit was operating at 100% power.
- A turbine trip / reactor trip occurred on low condenser vacuum.
- The crew transitioned to EMG ES-02, REACTOR TRIP RESPONSE.

Based on these conditions, which of the following conditions would require the crew to MANUALLY Actuate Safety Injection?

- A. PZR Level 5% and lowering.
- B. Four control rods NOT fully inserted.
- C. PZR Pressure 1900 psig and lowering.
- D. RCS cold leg temperature 529°F and lowering.

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (PZR Level 5%) EMG ES-02 Foldout page criteria directs Manual Actuation of SI when RCS Subcooling <30F or PZR Level cannot be maintained >6%.

B. Distractor 1 (4 rods NOT inserted) is INCORRECT, but plausible. EMG ES-02, step 12 directs performance of OFN BG-009, EMERGENCY BORATION for this condition.

C. Distractor 2 (RCS Pressure 1900 psig and lowering) is INCORRECT, but plausible. This value is <reactor trip setpoint but is above the 1830 psig SI Actuation setpoint. If steam tables are referenced, saturation temperature for 1915 psia is ~629F, so ~100F subcooling exists for given temperature.

D. Distractor 3 (RCS CL Temp 529F and lowering) is INCORRECT, but plausible. EMG ES-02, Step 2 directs performance of OFN BG-009, EMERGENCY BORATION for this condition.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 1 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153202
User-Defined ID:	LO153202
Reference:	ECCS
Topic:	#1 006 / A1.18 (Bank - Low)
RO Importance Rating:	4.0
SRO Importance Rating:	N/A
K/A Number:	006 A1.18
Comments:	<p>2019 Wolf Creek NRC. K/A Statement: Emergency Core Cooling System (ECCS) Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including: PZR Level and Pressure. (CFR: 41.5 / 45.5)</p> <p>Tier 2 Group 1</p> <p>Low Cog - Recognition of setpoint and applying foldout page action to actuate ECCS System.</p> <p>Copy of LO107759 (100% History)</p> <p>LO1300600, ECCS, Objective 13, Evaluate ECCS response to a Safety Injection Signal (SIS) actuation and the conditions/setpoints which will actuate an SIS.</p> <p>Meets K/A in that applicant must analyze conditions post-trip to determine if Manual ECCS Actuation is required. The specific K/A is used in two answer choices, including the correct answer.</p> <p><u>Revision History:</u> 1. Specified Trip was from 100% power and added "Cold Leg" to Answer choice C. Swapped distractors C and D to maintain Short to Long format.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

2

ID: LO153212

Points: 1.00

Given:

- The unit was operating at 100% power
- A secondary transient caused PZR Pressure to lower to 2209 psig.

Based on these conditions, what is the expected automatic Pressurizer Pressure Control System response?

- A. Variable heaters are operating at FULL current and PZR Backup heaters are energized.
- B. Variable heaters are operating at FULL current and PZR Backup heaters remain OFF in auto.
- C. Variable heaters are operating at LESS THAN FULL current and PZR Backup heaters are energized.
- D. Variable heaters are operating at LESS THAN FULL current and PZR Backup heaters remain OFF in auto.

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (full current, PZR Backup heaters energize) Variable heaters operate at full current once pressure lowers to 2220 psig and backup heaters energize when pressure lowers to 2210 psig. Since the given pressure is 2209 psig, the Back Up Heaters will be energized as an automatic response to the drop in pressure.

B. Distractor 1 (full current, PZR Backup heaters remain OFF) is INCORRECT, but plausible. The variable heaters will be operating at full current when RCS pressure lowers to 2220 psig, but the PZR backup heaters energize when pressure lowers to 2210 psig.

C. Distractor 2 (less than full current, PZR Backup heaters energize) is INCORRECT, but plausible. The variable heaters will be operating at less than full current at any time RCS pressure is between 2220 psig and 2250 psig. PZR Backup heaters will be energized in auto with RCS pressure <2210 psig.

D. Distractor 3 (less than full current, PZR Backup heaters remain OFF) is INCORRECT, but plausible. Both answer choices are wrong; the opposite of the correct answer. Variable heaters operate at full current once pressure lowers to 2200 psig and backup heaters energize when pressure lowers to 2210 psig.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 2 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153212
User-Defined ID:	LO153212
Reference:	PZR PCS
Topic:	#2 010 / A3.02 (New - High)
RO Importance Rating:	3.6
SRO Importance Rating:	N/A
K/A Number:	010 A3.02
Comments:	<p>2019 NRC Exam, K/A Statement, Pressurizer Pressure Control System (PZR PCS), Ability to monitor AUTOMATIC operation of the PZR PCS, including: PZR Pressure. (CFR: 41.7 / 45.5)</p> <p>Tier 2 Group 1</p> <p>High Cog - Requires applicant to understand setpoints and how changes to RCS pressure drives automatic pressure control system response to maintain pressure within normal operating bands.</p> <p>LO1301000, Pressurizer Pressure and Level Control, Objective 8, Explain the operation of the pressurizer sprays and heaters during startup, normal, and transient operations.</p> <p>Meets K/A since the applicant is given a change in PZR Pressure and asked for the AUTOMATIC response of the PZR Pressure Control System.</p> <p><u>Revision History:</u> 1 - Modified answer choices to make 2x2. Removed the distractors for automatic response to a rising pressure. 2 - Corrected pressure value listed in Answer Choice 'A' Explanation (2220 psig).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

3

ID: LO153210

Points: 1.00

Given:

- The unit was operating at 100% power with the CCW Service Loop aligned to 'B' Train.
- MCB Annunciator 053B, CCW PMP B/D TROUBLE alarmed.
- Green and amber lights are lit on EG HIS-22 for 'B' CCW Pump.
- Red light is lit on EG HIS-24 for 'D' CCW Pump.

Which of the following conditions DIRECTLY satisfied the interlock for 'D' CCW Pump to Auto Start?

- A. CCW System header pressure dropped below 25.5 psig.
- B. The supply breaker for CCW Pump 'B' opened on electrical fault.
- C. CCW System flow dropped below 3850 gpm ( $1.925 \times 10^6$  lbm/hr).
- D. The supply breaker for CCW Pump 'B' opened on timed overcurrent.

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (pressure). Per ALR 00-053B entry condition, the standby pumps starts in 4 seconds after the CCW system header pressure drops below 25.5 psig. Drawing E-13EG01D for D CCW Pump note 3 specifies PSL contact closes on low discharge pressure.

B. Distractor 1 (electrical fault) is INCORRECT, but plausible. This condition could be one of the malfunctions that caused the 'B' pump to trip and is specifically directed by ALR 00-053B to be checked in addition to timed overcurrent. This answer choice is wrong because an electrical fault does NOT satisfy the interlock to start the standby pump.

C. Distractor 2 (flow) is INCORRECT, but plausible. Low flow causes Annunciator 53C to alarm at below the specified flow rate, but flow has NO associated control functions for the CCW Pump Standby feature.

D. Distractor 3 (timed overcurrent) is INCORRECT, but plausible. ALR 00-053B specifies a timed overcurrent condition of 115% will cause the supply breaker in addition to an electrical fault. This answer choice is wrong because this condition does not DIRECTLY satisfy the interlock to start the 'D' standby pump.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 3 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153210
User-Defined ID:	LO153210
Reference:	CCW
Topic:	#3 008 / K4.09 (New - High)
RO Importance Rating:	2.7
SRO Importance Rating:	N/A
K/A Number:	008 K4.09
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Component Cooling Water System (CCWS), Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: The "Standby" feature for the CCW pumps (CFR: 41.7)</p> <p>Tier 2 Group 1</p> <p>High Cog - Analysis of given conditions, application of design/system knowledge.</p> <p>LO1400800, Component Cooling Water (CCW) System, Objective 2, Explain the characteristics of the CCW System major components.</p> <p>Meets K/A since the question asks for what condition would cause the standby CCW pump to auto start.</p> <p><u>Revision History:</u> 1. Changed Distractor 'D' from "instantaneous overcurrent" to "electrical fault." Swapped order of distractors B, C and D to maintain short to long format.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

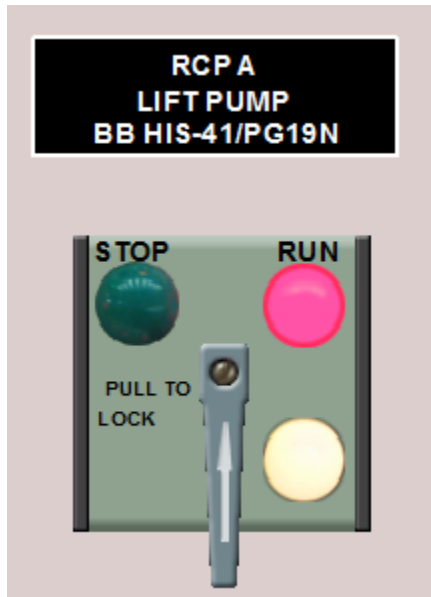
4

ID: LO153201

Points: 1.00

Given:

- You have been directed to start 'A' RCP in preparation for startup from Refueling Outage.
- After taking BB HIS-41, RCP A LIFT PUMP hand switch to NORMAL-AFTER-RUN, you observe the following indications. (Both Red and White Lights LIT)



In accordance with SYS BB-201, REACTOR COOLANT PUMP OPERATION, based on these indications:

- A. Both minimum lube oil pressure and pump operation time limits are satisfied, and 'A' RCP may be started now.
- B. The Lift Oil system is vapor locked. Stop and Restart the lift pump to clear the vapor lock until the white light remains off.
- C. RCP Lube Oil Pressure is >600 psig, 'A' RCP may be started after ensuring two minutes have elapsed since starting the Lift Oil pump.
- D. Two minutes have elapsed since starting the pump, 'A' RCP may be started only after verifying MCB Indication of Lube Oil Pressure is >600 psig.

Answer: C

**Answer Explanation**

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (Both oil pressure and time limits are satisfied) is INCORRECT, but plausible. The white light indicates the interlock associated with lube oil pressure is satisfied. The two minute wait is procedurally directed and not part of the white light interlock satisfied indication. Wrong since this light will illuminate prior to the pump running for two minutes.

B. Distractor 2 (oil system is vapor locked) Is INCORRECT, but plausible. A note in SYS BB-201, Prior to step 6.1.11 specifies the failure of the white to illuminate might be an indication of the system being vapor locked and directs stopping and restarting the pump up to 5 times per ATTACHMENT B to clear the vapor lock. Wrong since the white light is LIT, so the interlock is satisfied and NOT vapor locked.

C. CORRECT (RCP Lube Oil Pressure >600 psig, ensure 2 minutes has elapsed). Per SYS BB-201, note in before paragraph 6.1.11, A pressure interlock prevents starting the RCP unless a minimum oil pressure of 600 psig is available to the Motor Thrust Bearing Oil Lift System. This interlock is satisfied when the white light on the respective oil lift pump control switch is lit. Ensuring two minutes has elapsed is directed by step 6.1.12.

D. Distractor 3 (Two minutes has elapsed, verify lube oil pressure >600 psig) is INCORRECT, but plausible. This is opposite of the correct answer and there is no MCB indication of lube oil pressure. The white light illumination is the indication that the minimum pump pressure interlock is satisfied. Wrong since the white light will illuminate prior to the pump running for 2 minutes.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 4 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153201
User-Defined ID:	LO153201
Reference:	RCPS
Topic:	#4 003 / A4.03 (New - High)
RO Importance Rating:	2.8
SRO Importance Rating:	N/A
K/A Number:	003 A4.03
Comments:	<p>2019 Wolf Creek NRC, Reactor Coolant Pump System (RCPS), Ability to manually operate and/or monitor in the control room: RCP lube oil and lift pump motor controls. (CFR: 41.7 / 45.5 to 45.8)</p> <p>Tier 2 Group 1</p> <p>High Cog - Application of system knowledge to given indications to assess conditions and display normal operational procedure knowledge to answer the question.</p> <p>LO1300300, Rev 12, Objective 8, Describe the instrumentation for the RCPs and RCP components, including pump motors, <b>oil lift and lubricating systems</b>, seal system and thermal barriers.</p> <p>Meets K/A since question provides the indication that results from the specified MANUAL operation and asks system knowledge regarding those indications.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

5

ID: LO98958

Points: 1.00

Given:

- The unit is operating at 100% steady state power.
- An auto makeup to the VCT occurs but BG HIS-110A, BA to BA BLENDING TEE, fails to open.
- Annunciator 041D, BA FLOW DEV, actuates and the system continues to operate.

Based on these conditions, 1) which of the following describes the expected plant response and 2) what action should the crew take per ALR 00-041D?

- A.     1) Dilution  
          2) Stop the Auto Makeup.
- B.     1) Boration  
          2) Stop the Auto Makeup.
- C.     1) Dilution  
          2) Reduce the total makeup flow rate to a value  $\leq$  to the alarm setpoint.
- D.     1) Boration  
          2) Reduce the total makeup flow rate to a value  $\leq$  to the alarm setpoint.

Answer:        A

## Answer Explanation

Answer choices sorted.   Correct answer at A.

A.   CORRECT (Dilution, Stop the Auto Makeup) With BG HIS-110A closed, no boric acid will be supplied to the auto makeup blending tee, resulting in a Dilution event as only reactor makeup water is added to the VCT.   Per ALR 00-041D, Step 2, the Crew should stop the auto makeup and record the values from combined makeup flow and boric acid flow counters.

B.   Distractor 1 (Boration, Stop the Auto makeup) is INCORRECT, but plausible.   This answer choice would be right if the given failure was BG HIS-111A, REACTOR M/U WTR TO BA BLENDING TEE closing instead of BG HIS-110A.   The action to stop the auto makeup is correct.

C.   Distractor 2 (Dilution, Reduce Flowrate) is INCORRECT, but plausible.   With BG HIS-110A closed, no boric acid will be supplied to the auto makeup blending tee, resulting in a Dilution event as only reactor makeup water is added to the VCT.   ALR 00-041D, Step 1 RNO provides this direction if the Reactor makeup system were being used to makeup to a system other than the VCT.   If upon reducing makeup water flowrate cause Annunciator 041D to clear, than the crew would return to procedure and step in effect.   Wrong because the auto makeup is being supplied to the VCT and the given alarm is an indication of a dilution in progress that must be stopped for positive control of reactivity.

D.   Distractor 3 (Boration, Reduce Flowrate) is INCORRECT, but plausible.   A Boration would be occurring if the given failure had been BG HIS-111A, REACTOR M/U WTR TO BA BLENDING TEE closing instead of BG HIS-110A.   The answer choice would have been correct per ALR 00-41D, Step 1 RNO if the makeup were directed to anything other than the VCT.   Wrong because an auto makeup results in addition of makeup water to the VCT in response to lowering VCT level.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 5 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	98958
User-Defined ID:	LO98958
Reference:	CVCS
Topic:	#5 004 / K5.20 (New - Low)
RO Importance Rating:	3.6
SRO Importance Rating:	N/A
K/A Number:	004 K 5.20
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Chemical and Volume Control System (CVCS), Knowledge of the operational implications of the following concepts as they apply to the CVCS - Reactivity effects of xenon, boration, and dilution. (CFR: 41.5 / 45.7)</p> <p>Tier 2 Group 1</p> <p>Low Cog Fundamental</p> <p>LO1300400, Chemical and Volume Control System, Objective 12, Describe the boric acid subsystem interface with the CVCS, including normal make-up and emergency supplies to the charging pump suction.</p> <p>Meet K/A since the question specifies a malfunction of the CVCS system and asks for the resulting operational implication on reactivity. The applicant must understand CVCS system design to understand boron is not being added to the system with the given failure.</p> <p><u>Revision History:</u> 1 - Added to exam as Replacement Question 2 - Revised to change second part of the question to improve discriminatory value.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

6

ID: LO112138

Points: 1.00

Given:

- RCS is solid.
- RHR Train 'A' is operating to maintain RCS temperature at 185°F.
- RHR letdown is aligned through BG HCV-128, RHR CLEANUP TO LTDN HX FLOW CTRL.
- BG PCV-131, LTDN HX OUTLET PRESS CTR, is in AUTO set to 325 psig.
- BG TV-130, LTDN HX OUTLET TEMP CTR, is in AUTO set to 115°F.

BG TV-130, controller output signal failed to 100%. With NO Operator action, over the next 30 minutes:

- 1) VCT temperature will \_\_\_\_\_.
- 2) VCT pressure will \_\_\_\_\_,

- A.
  - 1) Lower
  - 2) Rise
- B.
  - 1) Lower
  - 2) Remain Constant
- C.
  - 1) Rise
  - 2) Rise
- D.
  - 1) Rise
  - 2) Remain Constant

Answer: B

**Answer Explanation**

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted sequentially. Correct answer at B.

Solid plant response is very susceptible to small temperature changes. Inlet temp to the Ldn Hx is same as RCS temperature because it does not go through the regenerative HX first. There would be a large delta T and temperature will change. VCT pressure will change due to the lowered temperature of the inlet fluid, the regulator will only raise pressure if it goes below the setpoint to maintain the pressure constant.

The VCT temperature lowers since there is more cooling by the Letdown Hx. The solubility of gas in the coolant rises as the temperature of the coolant lowers, and more gas molecules dissolved in the coolant would result in a reduction of the VCT pressure if not for the pressure regulator maintaining it constant.

A. Distractor 1 (Lower, Rise) is INCORRECT, but plausible. VCT temperature does lower so the first part is correct. The solubility of gas in the coolant rises as the temperature of the coolant lowers, and more gas molecules dissolved in the coolant results in a reduction of the VCT pressure; opposite of the correct answer.

B. Correct - The VCT temperature lowers due to improved cooling by the Letdown Hx. The solubility of gas in the coolant rises as the temperature of the coolant lowers, and more gas molecules dissolved in the coolant would result in a reduction of the VCT pressure if not for the N2 cover gas pressure regulator maintaining the pressure constant.

C. Distractor 2 (Rise / Rise) is INCORRECT, but plausible because this would occur if BG TK-130 closed. The warmer letdown coolant would raise VCT temperature and a rise in the coolant temperature would cause more gas to come out of solution and pressure to rise.

D. Distractor 3 (Rise, Remain Constant) is INCORRECT, but plausible. This is the opposite response, rise in VCT temperature would occur only if BG TK-130 closed. The solubility of the gases in the coolant would lower as the temperature of the coolant rises. This answer choice was selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 6 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	112138
User-Defined ID:	LO112138
Reference:	CVCS
Topic:	#6 004 / K6.26 (Bank - High)
RO Importance Rating:	3.8
SRO Importance Rating:	N/A
K/A Number:	004 K6.26
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Chemical and Volume Control System (CVCS), Knowledge of the effect of a loss or malfunction on the following CVCS components: Methods of pressure control of solid plant (PZR relief and water inventory). (CFR 41.7 / 45.7)</p> <p>Tier 2 Group 1</p> <p>High Cog - Comprehension, controller fail response, solid plant, gas solubility, and system design</p> <p>Bank Question, Previous use on 2013 Wolf Creek NRC exam (93% history)</p> <p>LO1300400, CVCS, Objective 5, Describe the CVCS alignment and control techniques during low pressure letdown with/without solid plant conditions.</p> <p>Meets the K/A since the RCS is solid for the given event and the question asks for the CVCS System (VCT) response to BG TK-130 controller failure.</p> <p><u>Revision History:</u> 1 - Revised question format and updated applicable CFR to 41.13 (from 41.7 / 45.7).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

7

ID: LO100821

Points: 1.00

Given:

- The unit is in MODE 4
- 'A' RHR Train is in service
- RHR HX A BYPASS CTRL Valve, EJ FCV-618, is set to maintain 3400 gpm
- RHR HX A FLOW CTRL Valve, EJ HCV-606, demand position set at 30%
- The Instrument Air supply line to RHR Heat Exchanger Bypass Valve, EJ FCV-618, becomes severed and is completely detached
- No other air operated valves are impacted by the failure.

Based on these conditions, how do the following RHR system parameters change from the initial steady state conditions?

- 1) RHR HX Outlet Temperature
- 2) Total RHR flow

- A.     1) Higher  
          2) Higher
- B.     1) Higher  
          2) Lower
- C.     1) Lower  
          2) Higher
- D.     1) Lower  
          2) Lower

Answer:         D

## Answer Explanation

Answer choices sorted sequentially. Correct answer at D.

A. Distractor 1 (higher/higher) is INCORRECT, but plausible. This would be the right answer if FCV-618 fails open on a loss of air. Wrong because FCV-618 fails closed, which results in RHR flow only through the heat exchanger causing outlet temperature to lower. With demand set at 30% on EJ HCV-606, the overall flow through the RHR system lowers when bypass flow is stopped. Both choices are wrong; the opposite of the correct answer. This distractor was chosen during validations.

B. Distractor 2 (higher/lower) is INCORRECT, but plausible. FCV-618 fails closed on a loss of air, resulting in RHR flow only through the RHR HX with EJ HCV-606 in a fixed position, overall system flow is reduced when bypass flow is lost. The change in temperature is wrong, but the change if flow is right. This answer choice was selected during Operator validations.

C. Distractor 3 (Lower/higher) is INCORRECT, but plausible. The temperature response is right, but the total RHR flow is wrong.

D. CORRECT (lower/lower) Total RHR flow is controlled by FCV-618, RHR HX Bypass, so it will lower as it fails closed with HCV-0606 maintaining a steady 30% demand position. As the bypass flow is stopped, full RHR flows through the heat exchanger. As flow into the heat exchanger rises, the outlet temperature lowers to maintain heat transfer and all bypass flow that mixed in the line is lost.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 7 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	100821
User-Defined ID:	LO100821
Reference:	RHR
Topic:	#7 005 / K6.03 (New - High)
RO Importance Rating:	2.5
SRO Importance Rating:	N/A
K/A Number:	005 K6.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Residual Heat Removal System (RHRS) - Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger (CFR: 41.7 / 45.7)</p> <p>Tier 2 Group 1</p> <p>High Cog - Comprehension and application of system response to loss of air to controlling valves.</p> <p>LO1300500, RHR System, Objective 2, Explain the function, location, operation, and electrical interlocks of the major components.</p> <p>Meets K/A since the given RHR system malfunction changes the amount of flow through the RHR Heat Exchanger. The question asks for the expected system response based on the change of flow through the heat exchanger.</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

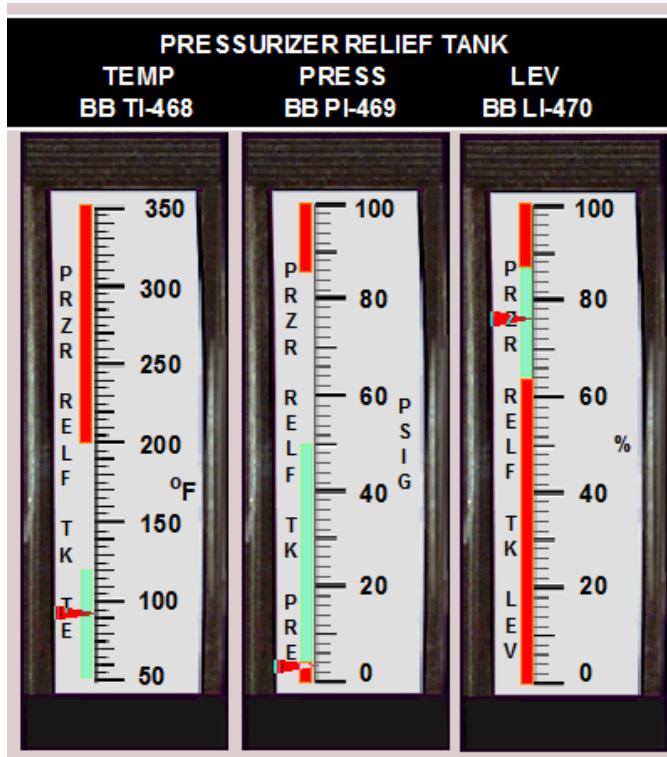
8

ID: LO153645

Points: 1.00

Given:

- The unit is operating at 100% power.
- Initial PRT Conditions are as follows:



- A Pressurizer PORV opened and failed to reseal.
- The crew closed the associated PORV block valve.

Based on these conditions, 1) which of the following PRT Parameters will be the first to be out of normal operating band and 2) what action per SYS BB-202, PRESSURIZER RELIEF TANK OPERATION will the crew take to restore the PRT parameter(s) to normal operating conditions?

- A. 1) Pressure  
2) Vent the PRT through the CTMT Purge System until depressurized.
- B. 1) Level  
2) lower PRT Level by Draining to CTMT Normal Sump until level is reduced to desired level above 64%.
- C. 1) Level  
2) Lower PRT Level and Pressure using the RCDT system until pressure is reduced to desired pressure above 3.5 psig or desired level above 40%.
- D. 1) Pressure  
2) Lower PRT Level and Pressure using the RCDT system until pressure is reduced to desired pressure above 3.5 psig or desired level above 64%.

Answer: D

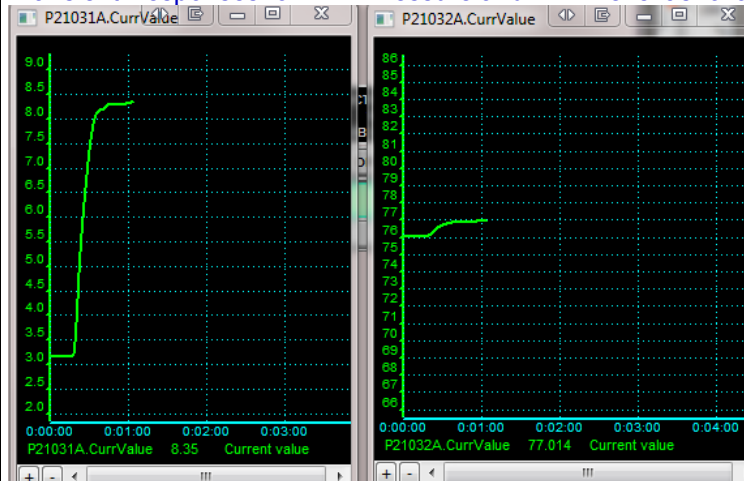
# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

Transient Responses for PRT Pressure and PRT Level as follows:



A. Distractor 1 (Pressure, Vent through CTMT Purge System until depressurized) is INCORRECT, but plausible. This action is directed by SYS BB-202, Section 6.10 for initial fill and vent while establishing Nitrogen cover gas and venting through CTMT Purge System. Section 6.4 vents the PRT to Waste Gas System, but ALR 00-034E, PRT PRESS HI directs performance of section 6.2 for PORV lift (specified K/A); so this option not presented as an answer choice. Also wrong since the minimum allowed PRT pressure is 3.5 psig. This answer choice was selected during Operator validations.

B. Distractor 2 (Level, Drain to Sump) is INCORRECT, but plausible. Given that level is 76%, there is 12% margin before Level out of normal band high (Expected Level change is 1% for the given transient). The PORV lifting results in steam discharge to the PRT which is sensed immediately by change in pressure, and then a change in Temperature as the energy added to the quench tank is absorbed. A change in level is the least likely parameter to change for a PORV Lifting that is isolated by closing the block valve as steam contains less mass than water. Draining the PRT to CTMT sump is directed by SYS BB-203, Section 6.6 and would ONLY be allowed for emergent lowering of PRT level when the RCDT system was not available.

C. Distractor 3 (Level, lower level and pressure using RCDT to 40%) is INCORRECT, but plausible. Given that level is 76%, there is 12% margin before Level is out of normal band high (Expected Level change is 1% for the given transient). The PORV lifting results in steam discharge to the PRT which is sensed immediately by change in pressure, and then a change in Temperature as the energy added to the quench tank is absorbed. A change in level is the least likely parameter to change for a PORV Lifting that is isolated by closing the block valve as steam contains less mass than water. The action is right for lowering the level, but the final value may not be lowered to <64% until the PRT is being drained and vented for maintenance or as directed by GEN 00-006 for lowering to <40% while in Cold Shutdown.

D. CORRECT (pressure, Lower Level and Pressure using RCDT). For the given conditions, PRT Pressure immediately rises out normal operating band (>6 psig) after the PORV lifts and annunciator 34E, PRT PRESSURE HI actuates. ALR 00-034E directs lowering PRT level and pressure per SYS BB-202, section 6.2 using the RCDT system, until desired pressure >3.5 psig, or level >64% is achieved.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 8 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153645
User-Defined ID:	LO153645
Reference:	PRT
Topic:	#8 007 / A2.01 (New - High)
RO Importance Rating:	3.9
SRO Importance Rating:	4.2
K/A Number:	007 A2.01
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Pressurizer Relief Tank/Quench Tank System (PRTS), Ability to (a) predict the impacts of the following malfunctions or operations on the PRTS; and based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations. Stuck open PORV or code safety. (CFR: 41.5 / 43.5 / 45.3 / 45.13)</p> <p>Tier 2 Group 1</p> <p>High Cog - Analysis of given parameters, application of normal limits from memory and selection of correct procedure directed action to restore those limits.</p> <p>LO1300200, RCS, Objective 9, Describe system and integrated plant response to transient and equipment failures.</p> <p>Meets the K/A in that the given event is a PORV that opened and failed to reseal. The question asks the applicant to predict which of the PRT parameters will change to the point at which the use of a procedure is required, and then select the section of the procedure which the ALR directs performing.</p> <p><u>Revision History:</u> 1 - Updated question 1) and "2)", and improved answer explanation section by Including an objective plot of PRT Pressure and PRT Level for the transient, Clarified the noun name of ALR 00-034E, and updated answer explanation wording. 2- Updated Answer Explanation for Distractor D to state 6 psig instead of 6%.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

9

ID: LO153211

Points: 1.00

Given:

- The unit was operating at 100% power when a leak developed in the Component Cooling Water System aligned to the service loop.
- Level in the CCW Surge Tank is at 19% and slowly lowering.
- CCW Surge Tank Makeup Valve LV-002 is NOT open.

In accordance with OFN EG-004, CCW SYSTEM MALFUNCTIONS, what action is required for the given conditions?

- A. Immediately trip the reactor, then trip the RCPs due to loss of all CCW cooling to the RCPs.
- B. Locally open LV-002 by failing the air supply regulator while monitoring Control Room indication.
- C. If LV-002 can NOT be manually opened, take actions to initiate makeup from the Chemical Addition Tank.
- D. If CCW Surge Tank level can NOT be restored using normal M/U, then open ESW M/U valves to control level.

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Trip the reactor) is INCORRECT, but plausible. This action is directed as part of the foldout page #1 for CCW Surge Tank level lowering to <15%. Wrong since level is still above this threshold.

B. Distractor 2 (Locally open makeup valve by failing air) is INCORRECT, but plausible. This valve fails CLOSED on a loss of air. This answer choice was selected during Operator validations.

C. Distractor 3 (initiate makeup from the Chemical Addition Tank) is INCORRECT, but plausible. Chemical addition tank is NOT used for an emergency makeup. OFN EG-004, step 41 directs checking this as a potential safety loop inleakage source.

D. CORRECT (open ESW M/U valves). OFN EG-004, Step 3 RNO directs performing this action as the emergency makeup source for a leak on the service loop.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 9 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153211
User-Defined ID:	LO153211
Reference:	CCW
Topic:	#9 008 / A4.07 (Bank - High)
RO Importance Rating:	2.9
SRO Importance Rating:	N/A
K/A Number:	008 A4.07
Comments:	<p>2019 NRC Exam, K/A Statement, Component Cooling Water System (CCWS), Ability to MANUALLY operate and/or monitor in the control room: Control of minimum level in the CCWS surge tank. (CFR: 41.7 / 45.5)</p> <p>Tier 2 Group 1</p> <p>Copy of Bank question LO58683, previous use on STP 2005 NRC Exam (No history)</p> <p>High Cog - Application of System design and setpoints to determine abnormal operating procedure required action.</p> <p>LO1400800, Component Cooling Water System, Objective 2, Explain the characteristics of the CCW System major components.</p> <p>Meets K/A since the given scenario is a loss of CCW system inventory and lowering surge tank level. Correct answer requires manual operation of emergency system makeup ESW valves.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

10

ID: LO153213

Points: 1.00

Given:

- The unit was operating at 100% power.
- Loop 1 Hot Leg Channel BB PI-411C failed HIGH. All required actions were performed per OFN SB-008, INSTRUMENT MALFUNCTIONS, including tripping the associated bistables.
- Pressurizer Pressure Channel BB PI-458 has now failed high.

OFN SB-008, ATTACHMENT K, CAUTIONS that which of the following reactor trips would be introduced by tripping the associated bistable for the failed Pressure Instrument under these conditions?

- A.  $OP\Delta T$
- B.  $OT\Delta T$
- C. Low PZR Pressure
- D. High PZR Pressure

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 ( $OP\Delta T$ ) is INCORRECT, but plausible. Coincidence is still 1/4 for this reactor trip due to the previous temperature failure. Pressure is NOT an input to  $OP\Delta T$ . This answer choice was selected during Operator validations.

B. CORRECT ( $OT\Delta T$ ). The caution prior to OFN SB-008, Step K11 specifies: Avoid introduction of 2/4  $OT\Delta T$  reactor trip by ensuring other channels are not tripped, TB-411C, TB 421C, TB-431C or TB-441C.

C. Distractor 2 (Low PZR Pressure) is INCORRECT, but plausible. A second Caution prior to step K11 specifies: Avoid introduction of 2/4 low pressurizer pressure signals, which can initiate a reactor trip and SI. Without Operator action, the reactor will trip on low PZR Pressure for a failure HIGH of the upper selected controlling channel. Wrong because there is only a single PZR Pressure instrument,  $OT\Delta T$  is the reactor trip of concern for the given conditions.

D. Distractor 3 (High PZR Pressure) is INCORRECT, but plausible. Due to the failure, 1/4 coincidence is met. Wrong because 2/4 is required for reactor trip.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 10 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153213
User-Defined ID:	LO153213
Reference:	PZR PCS
Topic:	#10 010 / 2.4.20 (New - High)
RO Importance Rating:	3.6
SRO Importance Rating:	N/A
K/A Number:	010 A3.02
Comments:	<p>2019 NRC Exam, K/A Statement, Pressurizer Pressure Control System (PZR PCS), Knowledge of the Operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13)</p> <p>Tier 2 Group 1</p> <p>High Cog - knowledge of actions take per procedure and application of given scenario conditions to determine inputs and required coincidence for reactor trips.</p> <p>Applicable Industry OE 17072, Catawba, Unit 1. OTΔT Reactor Trip due to tripping two sets of bistables.</p> <p>LO1301000, Pressurizer Pressure and Level Control, Objective 8, Explain the operation of the pressurizer sprays and heaters during startup, normal, and transient operations.</p> <p>Meets the K/A because the question tests the Operational implication of a caution prior to performance of an OFN SB-008, INSTRUMENT MALFUNCTIONS step for a failed PZR Pressure channel.</p> <p><u>Revision History:</u> 1 - Reworded the 2nd stem bullet. Updated the question to specify there is a CAUTION in OFN SB-008 that warns of the tested reason for the reactor trip. Added the verbatim OFN SB-008 CAUTION to the answer explanation and improved the wording in the answer explanations for answer choices B and C.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

11

ID: LO153215

Points: 1.00

Which of the following conditions would cause BOTH AUTOMATIC Reactor Trip AND Safety Injection Actuation Signals with the unit operating at 100% power?

- A. General Warning on 2/2 channels.
- B. RCS Pressure at 1930 psig on 2/4 channels.
- C. CTMT Pressure at 3.6 psig on 2/3 channels.
- D. PZR Level at 50% and lowering with charging flow maximized and letdown isolated.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (General Warning on 2/2 channels) is INCORRECT, but plausible. This condition causes a Reactor Trip ONLY, without an SI actuation. This answer choice was selected during Operator validations.

B. Distractor 2 (RCS Pressure at 1930 psig on 2/4 channels) is INCORRECT, but plausible. This pressure is below Reactor Trip setpoint of 1940 psig, but above SI actuation setpoint of 1830 psig. So, the result of this condition is Reactor Trip ONLY, without SI actuation. This answer choice was selected during Operator Validations.

C. CORRECT (CTMT Pressure at 3.6 psig on 2/3 channels). CTMT pressure by itself is NOT a Reactor trip setpoint but is an SI Actuation auto setpoint. The Reactor Trips on Safety Injection Actuation. This is a physical connection/Cause-effect relationship between ESFAS and RPS Systems.

D. Distractor 3 (PZR Level at 50% and lowering with charging flow maximized and letdown isolated) is INCORRECT, but plausible. When this condition is met, OFN BB-007 procedurally directs MANUAL Reactor Trip and Actuation of Safety Injection. Wrong because this condition does not generate either an AUTOMATIC Reactor Trip or Safety Injection Signal.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 11 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153215
User-Defined ID:	LO153215
Reference:	RPS
Topic:	#11 012 / K1.05 (New - Low)
RO Importance Rating:	3.8
SRO Importance Rating:	N/A
K/A Number:	012 K1.05
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Reactor Protection System (RPS), Knowledge of the physical connections and/or cause effect relationships between the RPS and the following systems: ESFAS (CFR: 41.2 to 41.9 / 45.7 to 45.8)</p> <p>Tier 2 Group 1</p> <p>Low cog - application of setpoint memory and answering the question asked.</p> <p>LO1301200, Reactor Protection System (RPS), Objective 2, Explain how other plant systems interface with the RPS.</p> <p>Meets the K/A in that RPS and ESFAS setpoints were tested to differentiate which condition would cause both a Reactor Trip and SI actuation.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

12

ID: LO153647

Points: 1.00

Given:

- A unit startup is in progress. Reactor power is at 40% and rising.
- PA0101, 13.8 KV Bus PA01 Feeder Breaker, tripped open.
- Multiple MCB Annunciators actuate.
- Reactor Trip Breakers Red Lights are LIT.

- 1) What are the potential consequences of this event?
- 2) What action should the crew take NEXT?

- A.
  - 1) Reactor will Trip automatically if power rises to P8 setpoint.
  - 2) Stabilize Reactor Power per GEN 00-004, POWER OPERATIONS.
- B.
  - 1) Reactor will Trip automatically if power rises to P8 setpoint.
  - 2) Trip the Reactor manually and go to EMG E-0, REACTOR TRIP OR SAFETY INJECTION.
- C.
  - 1) DNBR Limits could be violated due to low flow in two RCS loops.
  - 2) Stabilize Reactor Power per GEN 00-004, POWER OPERATIONS.
- D.
  - 1) DNBR Limits could be violated due to low flow in two RCS loops.
  - 2) Trip the Reactor manually and go to EMG E-0, REACTOR TRIP OR SAFETY INJECTION.

Answer: D

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at D

A. Distractor 1 (Reactor auto Trip at P8, GEN 00-004) is INCORRECT, but plausible. If the given power level were <P7 (10%), then a Reactor Trip would NOT be required for the given condition and the crew would stabilize reactor power using GEN 00-003 to keep reactor power <10% to avoid an automatic Reactor Trip due to exceeding P7 with only two RCPs running. When power rises above P8 setpoint, the Reactor will trip on loss of flow in a single loop. Both answer choices are wrong in that the Reactor already failed to trip for the given conditions and the crew should manually trip the Reactor and go to EMG E-0.

B. Distractor 1 (Reactor auto Trip at P8, Trip and go to EMG E-0) is INCORRECT, but plausible. If the given power level were <P7 (10%), then a Reactor Trip would NOT be required for the given condition and the reactor would trip at 10% with only two RCPs running. When power rises above P8 setpoint, the Reactor will trip on loss of flow in a single loop. The action is correct, but the reason is wrong because the Reactor should have already automatically tripped for the given conditions.

C. Distractor 2 (DNBR Limits, GEN 00-004) is INCORRECT, but plausible. The consequence of the failure of the reactor to trip is right, but the action is wrong. For the given power level between P7 (10%), and P8 (48%) a Reactor Trip would NOT be required for loss of flow in a single loop. Since there is a loss of power to two RCPs, the Reactor Failed to Trip and the crew should manually trip the Reactor and go to EMG E-0.

D. CORRECT (DNBR Limits, EMG E-0) For the given conditions with reactor power above P7 (10%), but <P8 (48%), Automatic Reactor Coolant Flow Low Reactor Trip conditions are met due to the loss of two RCPs and a Red First Out, 86B, LO FLOW & P7 RX TRIP would be lit. The basis for the low flow Reactor trip per LCO 3.3.1 is to provide protection against violating the DNBR limit due to low flow. Per ALR 00-086B, since the Reactor failed to trip, Step 1 RNO directs manually tripping the Reactor and going to EMG E-0.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 12 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153647
User-Defined ID:	LO153647
Reference:	RPS
Topic:	#12 012 / A2.06 (New - High)
RO Importance Rating:	4.4
SRO Importance Rating:	4.7
K/A Number:	012 A2.06
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Reactor Protection System (RPS), 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: Failure of RPS signal to trip the reactor (CFR: 41.5 / 43.5 / 45.3 / 45.5)</p> <p>Tier 2 Group 1</p> <p>High Cog - Analysis of presented scenario, application of system knowledge (power supplies), knowledge of RPS setpoints (P7 &amp; P8) to determine consequences of the given malfunction, and selection of a procedure with which to proceed.</p> <p>LO1301200, Reactor Protection System, Objective 3: Explain the automatic actuations provided by the RPS, including basis, setpoints, coincidences, and relationship to permissive interlocks.</p> <p>Meets K/A since the given power supply failure results in the loss of two RCPs, which requires the applicant to predict whether or not the reactor should have tripped and with what procedure they should use to address the given malfunction.</p> <p><u>Revision History:</u> 1 – Specified "13.8KV" Bus for PA01 in the stem. Rephrased answer choices to include Reactor trips are either automatically or manually initiated. Improved wording in answer explanations to match. 2 - Removed "and" from question 2).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

13

ID: LO153349

Points: 1.00

Given:

- The unit was operating at 100% power,
- Vital 120V AC Instrument Bus, NN01 Deenergized.

Given these conditions, what, if any, is the effect on the SSPS Input Bay relays?

- A. NONE of the SSPS input bay relays on either train will de-energize.
- B. Most SSPS channel 1 input bay relays for train 'A' ONLY will de-energize.
- C. Most SSPS channel 1 input bay relays for train 'B' ONLY will de-energize.
- D. Most SSPS channel 1 input bay relays for BOTH trains will de-energize.

Answer: D

## Answer Explanation

Answer choices sorted. Correct answer at D.

A. Distractor 1 (None) is INCORRECT, but plausible because this could be confused with the 48VDC and 15VDC power supplies that exist within the SSPS system. This answer choice was selected during Operator validations.

B. Distractor 2 (A Train Only) is INCORRECT, but plausible. NN01 supplies power to Train 'A' output relays ONLY and NN04 supplies power to Train B. Wrong since NN01 supplies power to BOTH Train input relays. This answer choice was selected during Operator validations.

C. Distractor 3 (B Train Only) is INCORRECT, but plausible as this is the opposite train option if power to only a single train was lost.

D. CORRECT (BOTH) NN01 supplies Input Relays in both SSPS Trains,

### Solid State Protection System Power Supplies

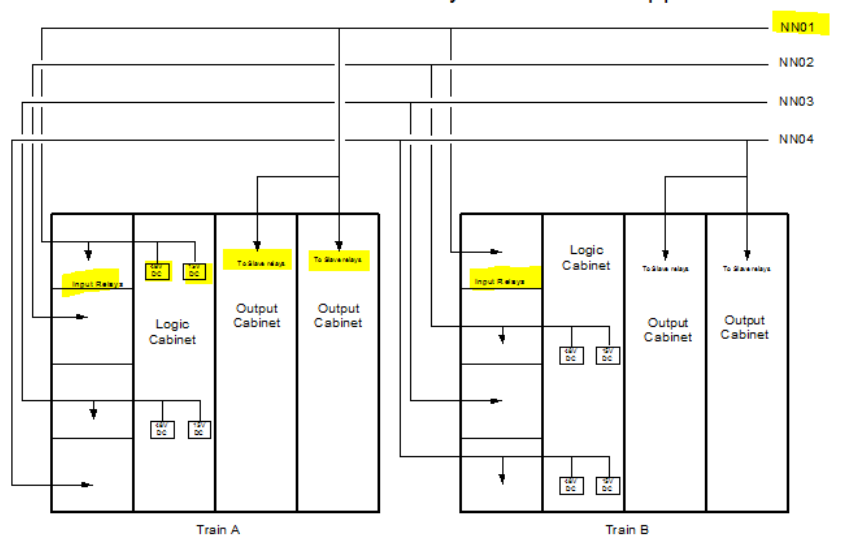


Figure: SSPS Power Supplies

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 13 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153349
User-Defined ID:	LO153349
Reference:	ESFAS
Topic:	#13 013 / K2.01 (Bank - Low)
RO Importance Rating:	3.6
SRO Importance Rating:	N/A
K/A Number:	013 K2.01
Comments:	<p>2019 Wolf Creek, K/A Statement, Engineered Safety Features Actuation System (ESFAS) - Knowledge of bus power supplies to the following: ESFAS/safeguards equipment control. (CFR: 41.7)</p> <p>Tier 2 Group 1</p> <p>Low Cog - knowledge of power supply</p> <p>Copy of Bank question Q46778. Previous use on 2008 DCPN NRC Exam (No History)</p> <p>LO1301301, Engineered Safety Features Actuation Signal (ESFAS), Objective 2, Describe the Engineered Safety Features Actuation system, including functions and interfaces with ESF equipment.</p> <p>Meets the K/A in that the question asks for how ESFAS/Safeguards equipment control is affected by a loss of NN01 power supply.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

14

ID: LO134432

Points: 1.00

A normal unit shutdown is in progress with the following conditions:

- Pressurizer Pressure is 2000 psig
- Steam Line pressure is 800 psig
- AB PI-524A, 'B' S/G PRESS instrument is failed with bistables tripped.
- All other conditions are normal

A large steam line break occurs upstream of 'B' MSIV resulting in a complete depressurization of 'B' S/G in 1 minute. No manual Operator action occurs.

What describes the expected response of the Engineered Safety Features Actuation System (ESFAS) to this event?

- A. Neither SIS nor MSLIS actuate for this condition.
- B. BOTH SIS and MSLIS due to Low 'B' Steam Line pressure.
- C. SIS ONLY due to low 'B' steam line pressure. No MSLIS occurs.
- D. MSLIS ONLY due to high rate of 'B' Steam Line pressure drop. No SIS occurs.

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (Neither) is INCORRECT, but plausible. Required coincidence for MSLIS and SIS is 2/3 channels on 1/4 S/G. Two channels (AB PI-525A and AB PI-526A) are still available on 'B' S/G and will satisfy 2/3 coincidence to actuate ESFAS as designed.

B. CORRECT (Both) For the given RCS Pressure >P11 (1970 psig), SIS and MSLIS will BOTH actuate when steam line pressure drops below 615 psig on any S/G (2/3 channels). See Control Drawing M-744-00042.

C. Distractor 2 (SIS Only) is INCORRECT, but plausible. An additional MSLIS actuation signal for rate (100 psig/50 seconds) is inserted when low steam pressure safety injection is blocked. It is a common misconception that only an SI will occur since the MSLIS Rate is not yet enabled. Wrong since the low steam line pressure SI is NOT blocked for the given conditions and MSLIS will also actuate when steam line pressure drops below 615 psig on any S/G (2/3 channels). This answer choice was selected during Operator validations.

D. Distractor 3 (MSLIS Only) is INCORRECT, but plausible. This would be true if given RCS Pressure <P11 (1970 psig) and if the crew blocked the low steam line pressure SI. Wrong since SI was NOT blocked and would therefore also actuate for the given conditions.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 14 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	134432
User-Defined ID:	LO134432
Reference:	ESFAS
Topic:	#14 013 / A3.02 (Bank - High)
RO Importance Rating:	4.1
SRO Importance Rating:	N/A
K/A Number:	013 A3.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Engineered Safety Features Actuation System (ESFAS), Ability to monitor automatic operation of the ESFAS, including: Operation of actuated equipment. (CFR: 41.7 / 45.5)</p> <p>Tier 2 Group 1</p> <p>High Cog - application of P11 to determine if ESFAS Actuation happened.</p> <p>Copy of Bank Question LO18130 (86% History)</p> <p>LO1301301, Engineered Safety Features Actuation Signal (ESFAS), Objective 3, Explain the ESFAS signals; including systems affected by actuation, actuation setpoints, actuation logics, and actuation signals which are directly generated by other actuation signals.</p> <p>Meets the K/A since the question provides conditions and asks for the expected automatic ESFAS system response (both MSLIS and SIS actuated).</p> <p><u>Revision History:</u> 1 – Specified AB PI-524A for 'B' S/G was failed in the stem to make distractor A plausible and updated answer explanations.</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

15

ID: LO112159

Points: 1.00

Containment Fan Coolers 'A' and 'D' are powered from which buses, respectively?

- A. NG01 and NG02
- B. NG01 and NG04
- C. NG02 and NG03
- D. NG02 and NG04

Answer: B

## Answer Explanation

Answer choices sorted sequentially. Correct answer at B.

A. Distractor 1 (NG01 and NG02) is INCORRECT, but plausible. These are the power supplies for A and B Containment Fan Coolers. This answer choice was selected during Operator validations.

B. CORRECT (NG01 and NG04). Containment Cooling Fans are vane axial fans driven by two-speed motors powered from 480 VAC Safeguard busses NG01, 02, 03 and 04.

C. Distractor 2 (NG02 and NG03) is INCORRECT, but plausible. These are the power supplies for B and C Containment Fan Coolers.

D. Distractor 3 (NG02 and NG04) is INCORRECT, but plausible. These are the power supplies for B and D Containment Fan Coolers.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 15 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	112159
User-Defined ID:	LO112159
Reference:	CTMT COOLING
Topic:	#15 022 / K2.01 (Bank - Low)
RO Importance Rating:	3.0
SRO Importance Rating:	N/A
K/A Number:	022 K2.01
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, CTMT cooling system (CSS), Knowledge of power supplies to the following: Containment cooling fans (CFR: 41.7)</p> <p>Tier 2 Group 1</p> <p>Low Cog - Memory</p> <p>Bank Question, previous use on 2013 Wolf Creek NRC (67% history)</p> <p>LO1302600 Containment Spray and Cooling System, Objective 12, Discuss the power supplies to the Containment Coolers.</p> <p>Meets the K/A in that the questions asks for the power supplies for the Containment Cooling fans.</p> <p><u>Revision History:</u> 1 – Changed question wording to ask the question more directly.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

16

ID: L0153353

Points: 1.00

Given:

- A Large Break LOCA has occurred.
- RCS Pressure is 1400 psig and down fast.
- Containment Pressure is 10 psig rising.

Based on these conditions,

- 1) At what Containment Pressure will the Containment Spray System Actuate?
- 2) At what RWST Level will the crew be required to manually swap the Containment Spray Pump suction to the Containment Sump?

- A. 1) 17 psig  
2) 11%
- B. 1) 17 psig  
2) 36%
- C. 1) 27 psig  
2) 11%
- D. 1) 27 psig  
2) 36%

Answer: C

## Answer Explanation

Answer choices sorted sequentially. Correct answer at C.

A. Distractor 1 (17/11) is INCORRECT, but plausible. A MSLIS Actuation occurs at 17 psig. The RWST level is right.

B. Distractor 2 (17/36) is INCORRECT, but plausible. Both answer choices are wrong, the opposite of the correct answer.

C. CORRECT (27 psig/11). CSAS is generated when CTMT pressure reaches 27 psig. Annunciator 047C, RWST LEVEL LOLO 2 will actuate when RWST level reaches 11%. EMG ES-12, Step 12 directs manual alignment of the CSAS for recirc when RWST level is <12% (Annunciator 047C LIT).

D. Distractor 3 (27 psig / 36%) is INCORRECT, but plausible. The pressure is right, but the level is wrong. When RWST level reaches 36%, Annunciator 047D, RWST LEV LOLO 1 AUTO XFR actuates and the automatic transfer of RHR pump suction to the CTMT sump happens as the crew performs EMG ES-12 actions to complete the transfer to Cold Leg Recirc. Once complete the crew waits until RWST level lowers to 11% to swap CSS pump suction.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 16 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	153353
User-Defined ID:	L0153353
Reference:	CTMT SPRAY
Topic:	#16 026 / A1.01 (New- Low)
RO Importance Rating:	3.9
SRO Importance Rating:	N/A
K/A Number:	026 A1.01
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Containment Spray System (CSS), Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment pressure. (CFR: 41.5 / 45.5)</p> <p>Tier 2 Group 1</p> <p>Low Cog - fundamental knowledge of setpoints</p> <p>LO1302600, Containment Spray and Cooling System, Objective 14, Describe system and integrated plant response to transient and equipment failures.</p> <p>Meets the K/A since the question asks for what Containment Pressure the Containment Spray system will actuate and then asks for the RWST level at which the crew will be required to operate the Containment Spray System controls to swap the pump suction.</p> <p><u>Revision History:</u> 1- Changed cognitive level and LOD from High/3</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

17

ID: LO153204

Points: 1.00

The SM has ordered the Control Room to be evacuated due to a fire.

While performing OFN RP-017, CONTROL ROOM EVACUATION, ATTACHMENT C, REACTOR OPERATOR ACTIONS, the breakers for both Containment Spray pumps are opened.

Why is it necessary to also remove the Control Power fuses from Breaker NB0102 for the 'A' Containment Spray Pump?

- A. To prevent overloading bus NB01.
- B. To prevent the control room fire from spuriously closing the breaker.
- C. To preserve RWST inventory in case the SRO is required to Manually Actuate SI from the ASP.
- D. To prevent the pump from inadvertently starting when RP HIS-1, 2, and 3, CTRL ROOM ISO XFER SWITCHES are taken to the ISOLATE position.

Answer: B

## Answer Explanation

Answer choices are sorted alphabetically and sequentially. Correct answer at B.

A. Distractor 1 (To prevent overloading NB01) is INCORRECT, but plausible. OFN RP-017, Step C6 directs the RO to open all breakers on bus NB02, including the 'B' Containment Spray Pump, to shed all large loads from the NB02 bus prior to starting 'B' EDG in step C7. OFN RP-017 uses 'B' Train Components for establishing hot standby conditions from the ASP. 'A' train components are not used in OFN RP-017.

B. CORRECT (To prevent a control room fire from closing the breaker) E-1F9915, Design Basis Document for Procedure OFN RP-017 specifies the fuses are removed to isolate control power from closing the breaker. Given the SM ordered the Control Room evacuated due to a fire, Spurious Equipment Actuations are possible. The overall mitigating strategy of OFN RP-017 is prevent subsequent fire/physical damage to Control Room circuits from adversely affecting systems needed to maintain Hot Standby (Defeat 'A' Train Components), Transfer critical Train 'B' controls to the ASP and Maintain the plant in Hot Standby from the ASP.

C. Distractor 2 (To preserve RWST inventory in case the SRO is required to manually actuate SI from the ASP) is INCORRECT, but plausible. Per E-1F9915, Design Basis Document for procedure OFN RP-017, the action of opening the breaker for 'A' Containment spray pump is to stop it from depleting RWST inventory if it is already running. This answer choice is wrong, because SI cannot be actuated from the ASP. The scope of OFN RP-017 is to establish and maintain hot standby conditions from ASP without an accident, other than the control room fire, in progress.

D. Distractor 3 (To prevent inadvertent pump start when isolating the CR) is INCORRECT, but plausible. The SRO operates these three switches from the ASP during step A1 of OFN RP-017. These switches energize lockout relays, which change the positions on a number of contacts located in the control circuit for 'B' Train Components. There is no physical connection between the isolation switches for 'A' Train and therefore cannot cause an inadvertent 'A' Train Pump Start.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 17 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153204
User-Defined ID:	LO153204
Reference:	CTMT SPRAY
Topic:	#17 026 / 2.4.34 (New - Low)
RO Importance Rating:	4.2
SRO Importance Rating:	4.1
K/A Number:	026 2.4.34
Comments:	<p>2019 Wolf Creek NRC, Containment Spray System (CSS), Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)</p> <p>Tier 2 Group 1</p> <p>Low Cog - Understanding of basis for procedure step.</p> <p>LO1732427, OFN RP-017, CONTROL ROOM EVACUATION, Objective 4. Explain the basis and knowledge requirements for selected procedure steps.</p> <p>Post exam IMPACT to LO1732427 to improve lesson plan step basis content using E-1F9915, Design basis Document for procedure OFN RP-017.</p> <p>Meets the K/A since the question tests the knowledge of the required RO actions outside the control room specifically for the Containment Spray System.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

18

ID: LO153354

Points: 1.00

Given:

- Preparations to start up the unit are in process.
- The MSIV Bypass Valves are throttled open to warm the Main Steam Lines.

Based on these conditions,

- 1) What is the MAXIMUM differential pressure allowed to open the first MSIV?
- 2) What response, if any, would the crew be REQUIRED to take if a MSLIS were to actuate?

- A. 1) 30 psid  
2) None, MSIV Bypass Valves auto close on MSLIS.
- B. 1) 30 psid  
2) Take Manual Control of AB HIK-15, MS ISO BYPASS VLVS CTRL, and lower output to 0%.
- C. 1) 150 psid  
2) None, MSIV Bypass Valves auto close on MSLIS.
- D. 1) 150 psid  
2) Take Manual Control of AB HIK-15, MS ISO BYPASS VLVS CTRL, and lower output to 0%.

Answer: A

## Answer Explanation

Answer choices sorted sequentially and short to long. Correct answer at A.

A. CORRECT (30 psid, None). The MSIV Bypass valves function to allow for steam line warming downstream of the MSIVs and to equalize pressure across the MSIVs during unit startup. GEN 00-002 and SYS AB-120 are used to accomplish this warmup of the main steamlines. SYS AB-120, step 6.14.14 specifies S/G to Steamline heater d/P must be <30 psid for >30 minutes prior to opening the first MSIV. A MSLIS closes 14 valves, including the 4 MSIV Bypass Valves, so no REQUIRED action by the crew. MSLIS also closes 4 MSIVs, 4 Loop Low Point Drain Valves, and Loops 2 and 3 Warmup steam valves to TDAFW Pump

B. Distractor 1 (30 psid, Manual) is INCORRECT, but plausible. The pressure is right, but no action will be required. Plausible because this would be the correct action if the valves failed to close on MSLIS. SYS AB-120, Step 6.4.11 performs the given Main Steam Line up with the controller in Manual to maintain Main Steam line heatup and minimize any RCS cooldown. Plausible because not all valves are closed by the MSLIS. A caution prior to SYS AB-120, Step 6.4.11 specifies MFP Turbine HP Steamline Drain Valves have no associated automatic closure, so the crew would have to manually close them if those valves were open.

C. Distractor 2 (150 psid, None) is INCORRECT, but plausible. While warming up the main steam lines, the maximum heatup rate allowed is 150 F/hr. The automatic system response to MSLIS and required crew response is right.

D. Distractor 3 (150 psig, Manual) is INCORRECT, but plausible. Both answer choices are wrong; the opposite of the correct answer. This answer choice selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 18 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153354
User-Defined ID:	LO153354
Reference:	MRSS
Topic:	#18 039 / K4.08 (New - High)
RO Importance Rating:	3.3
SRO Importance Rating:	N/A
K/A Number:	039 K4.08
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Main and Reheat Steam System (MRSS), Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: Interlocks on MSIV and bypass valves. (CFR: 41.7)</p> <p>Tier 2 Group 1</p> <p>High Cog - Application of system design and normal operating procedures.</p> <p>LO1503900, Main and Reheat Steam System, Objective 4, Discuss the operation of the Main Steam Isolation Valves.</p> <p>Applicable Wolf Creek OE CR00067275 applies. During shutdown from RF19 (4/7/13) an unanticipated transient occurred when re-opening an MSIV due to high differential pressure across the MSIV.</p> <p>Meets K/A since the question tests the interlocked response for MSIV Bypass valves to a MSLIS actuation signal.</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

19

ID: LO153665

Points: 1.00

Given:

- The unit was operating at 30% power during a startup.
- 'A' MFP was in operation, feeding all four S/Gs.
- 'B' MFP is stopped.
- MCB Annunciator 120A, MFP A TRIP actuated.
- The RO Tripped the Reactor.
- After performance of Immediate Actions, NR S/G Levels are as follows:
  - 'A' 15%
  - 'B' 12%
  - 'C' 10%
  - 'D' 13%

Based on these conditions, which of the following describes the expected Automatic Auxiliary Feedwater (AFW) System response?

- A. NONE of the AFW Pumps are running.
- B. ONLY the Turbine Driven AFW Pump is running.
- C. ONLY the Motor Driven AFW Pumps are running.
- D. BOTH the Turbine Driven AND Motor Driven AFW Pumps are running.

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (NONE) is INCORRECT, but plausible. For the given conditions, the S/G NR Levels are on scale and above 6% so secondary heat sink requirements are met without any AFW Pumps running. This choice is wrong because given S/G levels are <23.5%, so BOTH AFAS-M and AFAS-T signals were generated, starting all three AFW Pumps.

B. Distractor 2 (TDAFW ONLY) is INCORRECT, but plausible. This choice would be possible if an undervoltage condition exists on either NB01 or NB02 and S/G NR Levels remained >23.5%. Wrong because an UV condition was NOT in the given conditions and S/G NR level dropped below 23.5%. This answer choice was selected during Operator validations.

C. Distractor 3 (MDAFW ONLY) is INCORRECT, but plausible. For the given conditions and proper operation of 'B' MFP Trips while in standby per LCO 3.3.2, COND J, this choice would be true if S/G level remained >23.5%. ONLY the AFAS M will actuate when 'A' MFP trips (2/2 coincidence). This choice is wrong, though, because the AFAS-T signal also actuates when NR S/G level drops below 23.5%.

D. CORRECT (BOTH TD AND MD AFW Pumps). For the given conditions with NR S/G Level <23.5%, BOTH AFAS-M and AFAS-T signals were generated, so all three AFW Pumps will auto start as the expected AFW System response.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 19 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153665
User-Defined ID:	LO153665
Reference:	MFW SYSTEM
Topic:	#19 059 / K1.02 (New - Low)
RO Importance Rating:	3.4
SRO Importance Rating:	N/A
K/A Number:	059 K1.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Main Feedwater System, Knowledge of the physical connections and/or cause-effect relationships between the MFW and the following systems: AFW system. (CFR: 4.12 to 41.9 / 45.7 to 45.8)</p> <p>Tier 2 Group 1</p> <p>Low Cog - Memory</p> <p>LO1505900, Main Feedwater, Objective 11, Discuss the instrumentation and controls of the Main Feedwater System, including trips and automatic actions of a Feedwater Isolation Signal (FWIS).</p> <p>Meets the K/A as the MFP Trip results in a cause-effect relationship with the AFW System. The applicant has to know S/G Level setpoints (23.5%) for AFAS Actuation to answer the question.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

20

ID: LO98358

Points: 1.00

With the unit operating at full power,

1) Which of the following failures of AE PT-508, Main Feed Header Pressure Channel, would cause an INITIAL RISE in feedwater flow to all S/G's, and  
2) What procedurally directed action will the crew take in accordance with OFN SB-008, INSTRUMENT MALFUNCTIONS?

- A. 1) Fails LOW.  
2) Take manual control of Main Feedwater pump speed.
- B. 1) Fails LOW.  
2) Take manual control of Main Feedwater Regulating valves.
- C. 1) Fails HIGH.  
2) Take manual control of Main Feedwater pump speed.
- D. 1) Fails HIGH.  
2) Take manual control of Main Feedwater Regulating valves.

Answer: A

## Answer Explanation

Answer choices sorted low to high, short to long. Correct answer at A.

A. Correct - this is an input to the feed pump speed control circuit so when this fails low the MFP will speed up causing an initial SG level rise. Per OFN SB-008, the crew is directed to take manual control of the MFP speed controller.

B. Distractor 1 (Fails low take manual control of main feed reg valves) is INCORRECT, but plausible. Correct failure to cause the initial rise in main feed pump speed to raise flow to all SG but the OFN will have the BOP take manual control of the pump not each feed reg valve. Plausible since this is an action for different failures within the main feed pump and feed reg valves.

C. Distractor 2 (Fails high take manual control of main feed pump speed) is INCORRECT, but plausible. Correct procedure action to take but the failure will cause a lowering of main feed pump to restore program differential pressure for the main feed pump. Plausible if the student confuses what inputs to the main feed pump speed and what affect it would have on the system. This answer choice was selected during Operator validations.

D. Distractor 3 (Fails high take manual control of main feed reg valves) is INCORRECT, but plausible. This failure will cause a lowering of main feed pump to restore program differential pressure for the main feed pump. The OFN will have the BOP take manual control of the pump not each feed reg valve. Plausible if the student confuses what inputs to the main feed pump speed and what affect it would have on the system as well as this action is required for other failures within the feed system.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 20 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	98358
User-Defined ID:	LO98358
Reference:	MFW SYSTEM
Topic:	#20 059 / K3.03 (Bank - High)
RO Importance Rating:	3.5
SRO Importance Rating:	N/A
K/A Number:	059 K3.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Main feedwater (MFW) System, Knowledge of the effect that a loss or malfunction of the MFW will have on the following - S/G (CFR: 41.7 / 45.6)</p> <p>Tier 2 Group 1</p> <p>High Cog - Comprehension</p> <p>Bank Question, previous use on 2015 Wolf Creek and 2007 Callaway NRC exams (100% history)</p> <p>LO1505900, Main Feedwater, Objective 11, Discuss the instrumentation and controls of the Main Feedwater System, including trips and automatic actions of a Feedwater Isolation Signal (FWIS).</p> <p>Meets K/A since a malfunction of the MFW System (AE PT-508) was given, requiring the applicant to determine which action will mitigate the resulting effect on the S/G.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

21

ID: LO153363

Points: 1.00

A fault occurred on NK04 resulting in the loss of the bus and a reactor trip from 100% power.

After the reactor trip, what is 1) the impact to the AFW system, and 2) the procedure the crew will use to control AFW flow for these conditions?

- A. 1) Normal control power to the 'B' AFW pump is lost.  
2) OFN NK-020, LOSS OF VITAL 125 VDC BUS NK01, NK02, NK03 AND NK04, Attachment D.
- B. 1) Normal control power to the 'B' AFW pump is lost.  
2) EMG E-0, REACTOR TRIP OR SAFETY INJECTION.
- C. 1) Normal control power to the TDAFW pump is lost.  
2) OFN NK-020, LOSS OF VITAL 125 VDC BUS NK01, NK02, NK03 AND NK04, Attachment D.
- D. 1) Normal control power to the TDAFW pump is lost.  
2) EMG E-0, REACTOR TRIP OR SAFETY INJECTION.

Answer: B

## Answer Explanation

Answer choices sorted sequentially. Correct answer at B.

A. Distracter 1 (B AFW, OFN NK-020) is INCORRECT, but plausible. The impacted equipment is right, but the procedure is wrong. OFN NK-020 is the procedure the crew would use to restore power to bus NK04; not control AFW Flow after the reactor tripped.

B. CORRECT (B AFW, EMG E-0) Control power to breakers for B Train are lost with NK04 de-energized. The crew will be in EMG E-0 for the reactor trip.

C. Distracter 2 (TDAFW, OFN NK-020) is INCORRECT, but plausible since control power to yellow train is affected, however the TDAFWP is operated using NK03 power. OFN NK-020 is the procedure the crew would use to restore power to bus NK04; not control AFW Flow after the reactor tripped.

D. Distracter 3 (TDAFW, EMG E-0) is INCORRECT, but plausible. The impacted equipment is wrong, but the procedure is right. This answer choice was selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 21 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153363
User-Defined ID:	LO153363
Reference:	AFW
Topic:	#21 061 / A2.03 (Bank - High)
RO Importance Rating:	3.1
SRO Importance Rating:	3.4
K/A Number:	061 A2.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Auxiliary/Emergency Feedwater (AFW) System, Ability to (a) predict the impacts of the following malfunctions or operations on the AFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of dc power (CFR: 41.5 / 43.5 / 45.3 / 45.13)</p> <p>Tier 2 Group 1</p> <p>Copy of LO45457 with previous use on 2009 Callaway NRC Exam. (89% History)</p> <p>High Cog - Knowledge of power supplies, and procedure adherence based on given malfunction</p> <p>LO1506300, DC and Instrument Power, Class 1E, Objective 6, Describe the time critical and time sensitive actions of the DC and Instrument Power Class 1E system including consequences of not completing actions in the required time frame. (Starting B MDAFW Pump within 20 minutes is a TSA upon loss of NK04)</p> <p>Meets the K/A since the question provides a malfunction (Loss of NK04) and asks for the impact of that malfunction and what procedure the crew will use to control the Aux Feedwater System.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

22

ID: LO153370

Points: 1.00

Given:

- The unit is operating at 100% power.
- MCB Annunciator 016A, XPB03/04 XFMR LOCKOUT actuated.

Based on these conditions, which of the following would PROHIBIT automatic closure of PB0401, PB03/PB04 bus tie breaker?

- A. A PB03 bus lockout
- B. A transformer differential on XPB04
- C. A transformer overcurrent on XPB03
- D. A Trip and lockout of PA0208, XPB04 feeder breaker

Answer: A

## Answer Explanation

Answer choices sorted short to long, Correct answer at A.

A. CORRECT (Bus Fault on PB03) The PB03/PB04 bus-tie breaker, PB0401, allows one station service transformer to supply both 4.16 KV service buses. This breaker may be closed from MCB (RL015) if the sync check relay is satisfied and there are no breaker faults **or bus faults on the PB03 or PB04 buses**. The sync check relay inhibits closing until the voltage on the two buses is in phase. This breaker will close automatically following a lockout of one of the PB transformers. The automatic bus transfer is designed to provide essentially continuous power to the loads of the affected bus. If the bus feeder from the faulted transformer fails to open, the stuck breaker protection will trip the bus-tie to prevent feeding the fault from the opposite bus. ALR 00-016A, Step 3 checks this breaker auto closed and provides direction to locally close the breaker per SYS PB-200 if the busses are NOT locked out.

B. Distractor 1 (Transformer differential on XPB04) is INCORRECT, but plausible. A transformer differential relay 287/T would cause a transformer lockout and result in the given annunciator alarm, but per system design for this failure, PB0401, bus-tie breaker would automatically close because neither PB03 nor PB04 bus is locked out.

C. Distractor 2 (Transformer overcurrent on XPB03) is INCORRECT, but plausible. A transformer overcurrent relay 250-251/T actuation would cause the transformer to become locked out and cause the given annunciator to alarm, but per system design for this failure, PB0401, bus-tie breaker would automatically close.

D. Distractor 3 (Trip and lockout of PA0208, XPB04 feeder breaker) is INCORRECT, but plausible. This condition is the symptom of the given alarm. If XPB04 feeder PA0208 had failed to trip, the bus tie breaker PB0401 would have been prohibited from closing. Wrong since it tripped and per system design, the bus tie breaker would have automatically closed for this failure.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 22 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153370
User-Defined ID:	LO153370
Reference:	AC DIST
Topic:	#22 062 / 2.4.31 (New - Low)
RO Importance Rating:	4.2
SRO Importance Rating:	4.1
K/A Number:	062 2.4.31
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, AC Electrical Distribution, Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10 / 45.3)</p> <p>Tier 2 Group 1</p> <p>New - Low cog, application of system design and response to a given annunciator alarm.</p> <p>LO1506205, Power Block AC Electrical Distribution, Objective 2, Explain the purpose/function of the Non-Class 1E 4160V System.</p> <p>Meets K/A since Step 3 of the given ALR checks the bus cross tie breaker auto closed. Given an alarm, this question probes system knowledge to determine what condition would keep the expected auto closure from happening. Mitigation strategy taken by the crew per this alarm response procedure differs based on status of the bus tie breaker operation.</p> <p><u>Revision History:</u> 1 – Updated Distractor B from “Lockout” to “Differential” and updated answer explanation.</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

23

ID: LO153371

Points: 1.00

Given:

- The unit is operating at 100% power.
- MCB Annunciator 026B, NN12 INV TRBL/XFR alarmed.
- The crew determined a fault on inverter NN12 has caused a transfer to the Bypass Xfmr.
- The SM has directed bus NN02 be transferred to Swing Inverter NN16.

Which of the following will meet compliance with Technical Specification requirements and restore the system to Normal Operation?

- A. NN16 must be energized by NK02.
- B. NN16 must be energized by NK04.
- C. NK80 must be placed in the BUS TIE mode.
- D. NN16 must be placed on it's internal Bypass CVT with DC breakers opened.

Answer: A

## Answer Explanation

Note CTV - Constant Voltage Transformer

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (NK02). SYS NN-200B, Section 6.1 verifies at NK80 that NN16 swing inverter is energized from NK02. A note specifies this lineup is required for NN02 to be OPERABLE.

B. Distractor 1 (NK04) is INCORRECT, but plausible. This is a possible NK80 switch lineup and would be true to maintain OPERABILITY of bus NN04 per SYS NN-200, Section 6.3. Wrong because this lineup would result in powering multiple load centers (NN02 and NN04) from a single source (NK04) and bus NN02 would be INOPERABLE. This answer choice was selected during Operator validations.

C. Distractor 2 (BUS TIE Mode) is INCORRECT, but plausible. This is a possible switch lineup that is specifically prohibited by SYS NN-200B as prerequisite 5.2, which verifies NK80 is NOT in the BUS TIE mode.

D. Distractor 3 (Internal Bypass CVT with DC breakers opened) is INCORRECT, but plausible. This is directed by SYS NN-200B, Precaution/Limitation 4.4, which states when NK02 or NK04 DC power is lost, the inverter should be placed on its internal BCVT with DC breakers opened. This alignment results in NN02 being powered, but is NOT OPERABLE without power to inverter being supplied by bus NK02. This answer choice was selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 23 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153371
User-Defined ID:	LO153371
Reference:	DC 1E
Topic:	#23 063 / K4.02 (New - Low)
RO Importance Rating:	2.9
SRO Importance Rating:	N/A
K/A Number:	063 K4.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, DC Electrical Distribution, Knowledge of DC electrical system design feature(s) and/or interlock(s) which provide for the following: Breaker interlocks, permissives, bypasses and cross-ties. (CFR: 41.7)</p> <p>Tier 2 Group 1</p> <p>Low Cog - system knowledge of inverter bus lineup for proper train separation.</p> <p>LO1506300, DC and Instrument Power, Class 1E, Objective 4, Discuss the design of the Class 1E 120VAC Power System.</p> <p>Meets K/A since Breaker interlocks exist on NK80 to ensure Swing Inverter NN16 is powered only by one source, NK02 or NK04. This is accomplished by physical kirk keyed manual locks. This switch could also cross tie the busses and the inverters have internal bypasses CVTs that maintain continuity of power with static switches and 'break-before-make' interlocks.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

24

ID: LO153392

Points: 1.00

Given:

- The crew is responding to a LOCA per EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT.
- Containment Pressure peaked at 18 psig.
- The RO just Reset SI.

Based on these conditions, which of the following pumps would be REQUIRED to be manually restarted if a Loss of Off Site Power were to occur?

- A. ESW Pump
- B. RHR Pump
- C. Containment Spray Pump
- D. Centrifugal Charging Pump

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (ESW Pump) is INCORRECT, but plausible. This ESW pump is started by both the S/D Sequencer and the LOCA Sequencer. In the event of a loss of offsite power after SI is reset, the ESW Pump will auto start on the S/D Sequencer at time 20(25). This answer chose selected during Operator Validations.

B. CORRECT (RHR Pump). The RHR pump is ONLY started by the LOCA Sequencer, which is now reset. A caution prior to the EMG E-1 step that reset SI (Step 4) specifies manual action may be required to restore safeguards equipment to the required configuration. The RHR Pump will have to be manually restarted by the RO for the given scenario.

C. Distractor 2 (Containment Spray Pump) is INCORRECT, but plausible. This pump is also only powered by the LOCA sequencer, but for the given conditions at 18 psig (above CTMT HI-2, but below CTMT HI-3), then a Containment Spray Pump start is NOT required. The pump was NOT running so it will NOT have to be manually restarted. This choice would also have been also been true if CTMT pressure was 27 psig or higher.

D. Distractor 3 (Centrifugal Charging Pump) is INCORRECT, but plausible. This pump is started by BOTH S/D sequencer and LOCA sequencer. In the event of a loss of offsite power after SI is reset, the CCP will auto start on the S/D Sequencer at time 0.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 24 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153392
User-Defined ID:	LO153392
Reference:	EDG ELECT
Topic:	#24 064 / K3.02 (New - High)
RO Importance Rating:	4.2
SRO Importance Rating:	N/A
K/A Number:	064 K3.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Emergency Diesel Generator (EDG) System, Knowledge of the effect that a loss or malfunction of the EDG system will have on the following: ESFAS controlled or actuated systems. (CFR: 41.7 / 45.6)</p> <p>Tier 2 Group 1</p> <p>High Cog - requires application of system knowledge for CS pump operation, understanding differences between S/D and LOCA sequencer and application of procedure performance to answer question.</p> <p>LO1406401, Emergency Diesel Generator System (Electrical) Objective 5, Explain the load shed / Emergency Load Sequencer System purpose(s), function(s), and timings.</p> <p>Meets K/A since the procedurally directed step to "reset SI" results in a loss of EDG system design function and has a direct impact on which ESFAS components will re-start on the Emergency Diesel Generator Shutdown Sequencer in the event of a Loss of Off-Site Power. This vulnerability and required Operator action is specified in a Caution prior to the step that directs the Operator to "Reset SI."</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

25

ID: LO153399

Points: 1.00

Which of the following describes the Process Radiation Monitor "Accident Isolation" Mode of operation?

- A. In response to radiation levels at the HIGH (HiHi) setpoint on GG RE-27, FUEL BLDG EMER EXHAUST, a FBIS will actuate to minimize public exposure.
- B. In response to radiation levels at the ALERT (Hi) setpoint on GT RE-21B, UNIT VENT Wide Range Gaseous Monitors, the sample stream is altered to protect GT RE-21A.
- C. In response to radiation levels at the HIGH (HiHi) setpoint on GK RE-04, CONTROL ROOM AIR SUPPLY, A CRVIS will actuate to ensure continued personnel habitability.
- D. In response to radiation levels at the ALERT (Hi) setpoint on GH RE-10B, RADWASTE BLDG VENT Wide Range Gaseous Monitors, HA HCV-14, WGDT to RW Vent isolates to stop any release in progress.

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (GG RE-27, FBIS) is INCORRECT, but plausible since this is an expected automatic response based on a specific radiation intensity level. Wrong since this protective function does not describe the "Accident Isolation" mode of operation.

B. CORRECT (GT RE-21B, shifts sample stream). The Accident Isolation mode of operation is only applicable to two PRMs, PI Monitors GH RE-10A and GT RE-21A. The sample flow for these two detectors is shifted away from the discharge effluent to the associated room if the associated WRGM detected radiation levels rise from low range to mid range to protect from the adverse effects of high radiation levels. Local red light indication alerts the Operator that the PRM is in Accident Isolation mode. In this mode of operation, the associated vent streams are NOT being sampled for particulate or iodine; only gaseous activity.

C. Distractor 2 (GK RE-04, CRVIS) is INCORRECT, but plausible since this is an expected automatic response based on a specific radiation intensity level. Wrong since this protective function does not describe the "Accident Isolation" mode of operation.

D. Distractor 3 (GH RE-10B, HA HCV-14) is INCORRECT, but plausible. GH RE-10A is one of the two PRMs that will operate in the "Accident Isolation" mode, but the protective function to close HA HCV-14 does not describe this mode of operation. Also wrong because the protective function occurs at the HIGH (HiHi) level, not ALERT (Hi).

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 25 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153399
User-Defined ID:	LO153399
Reference:	PRM
Topic:	#25 073 / K5.03 (New - Low)
RO Importance Rating:	2.9
SRO Importance Rating:	N/A
K/A Number:	073 K5.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Process Radiation Monitoring (PRM) System, Knowledge of the operational implications as they apply to concepts as they apply to the PRM system: Relationship between radiation intensity and exposure limits. (CFR: 41.5 / 45.7)</p> <p>Tier 2 Group 1</p> <p>Low cog - System knowledge</p> <p>LO1407300, Process and Effluent Radiation Monitoring System, Objective 4, Discuss the function of the radiation monitors in the Process and Effluent Radiation Monitoring System, including any protective interlocks.</p> <p>Meets K/A since all four answer choices are based on gaseous radiation levels of intensity and the associated functions are expected responses designed to maintain exposure within limits. Not a collection of true/false statements since three of the statements are true; two of those true statements fail to answer the question asked.</p> <p><u>Revision History:</u> 1- Updated applicable CFR to 41.13 (from 41.5 / 45.7).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

26

ID: LO100526

Points: 1.00

Given:

- The unit is operating at 100% power.
- 'A' Service Water Pump is out of service due to a seized bearing.
- A fault on 4.16 KV BUS SL-31 has caused an electrical fire.
- The crew performed actions in accordance with ALR 008B, SERV WTR PRESS HI LO to place the required ESW trains in service and isolate Service Water system.

After stabilization has occurred, which of the following describes the effect (if any) of these conditions on the temperatures associated with 1) Turbine Building Closed Cooling Water System and 2) Component Cooling Water System.

- A. 1) Stable  
2) Stable
- B. 1) Stable  
2) Rise
- C. 1) Rise  
2) Stable
- D. 1) Rise  
2) Rise

Answer: C

## Answer Explanation

Answer choices sorted by temperature trend. Correct answer at C.

A. Distractor 1 (Stable, Stable) is INCORRECT, but plausible. 2nd part is correct, but TB loads have lost their heat sink and temperatures will rise. This answer choice was selected during Operator validations.

B. Distractor 2 (Stable, Rise) is INCORRECT, but plausible. Both parts are wrong. The opposite of the correct answer.

C. CORRECT (Rise/Stable) TBCCW System heat sink is the Service Water system that is now isolated, so temperatures will rise. CCW system is now being cooled by ESW so temperatures are stable. SYS SL-334, Deenergizing bus SL31 or SL41 references pumps that are without power due to loss of bus SL-31.

D. Distractor 3 (Rise, Rise) is INCORRECT, but plausible. First part is correct, but CCW cooling is maintained stable by ESW.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 26 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	100526
User-Defined ID:	LO100526
Reference:	SWS
Topic:	#26 076 / A1.02 (Bank - Low)
RO Importance Rating:	2.6
SRO Importance Rating:	N/A
K/A Number:	076 A1.02
Comments:	<p>Wolf Creek 2019. K/A Statement: Service Water System (SWS). Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS controls including: Reactor and Turbine Building Close Cooling Water Temperatures. (CFR: 41.5 / 45.5)</p> <p>Tier 2 Group 1</p> <p>Previous use on Seabrook 2013 NRC exam. (90% History)</p> <p>LO1408900, ESW, Objective 3, Evaluate Essential Service Water System interfaces with other plant systems.</p> <p>Meets the K/A since the given conditions results in a loss of the SWS and requires manipulation of controls per ALR 00-008B to place the ESW system in service. The question requires applicant to display system knowledge, including system interrelations to determine which systems still have a heat sink. The two systems questioned are a direct K/A match.</p> <p><u>Revision History:</u> 1- Specified "13.8 KV BUS" for SL-31. 2 - Specified "4.16 KV BUS" for SL-31.</p> <div><b>4.16 KV BUS SL31</b> <b>CWSH</b> <b>1EL-SL025A</b></div>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

27

ID: LO153208

Points: 1.00

With the Instrument Air System Operating with KA HSS-310, SEQUENCER SELECTOR SWITCH in the B-C-A position:

1) Which of the following conditions would cause the running Instrument Air Compressor to trip on high temperature?

2) At what MINIMUM air header pressure will the lagging Air Compressor start?

- A. 1) Trip of the Central Chilled Water System  
2) 110 psig
- B. 1) Trip of the Central Chilled Water System  
2) 114 psig
- C. 1) High Differential Pressure across EF HV-44, ESW TRN B TO AIR COMPRESSOR B  
2) 110 psig
- D. 1) High Differential Pressure across EF HV-44, ESW TRN B TO AIR COMPRESSOR B  
2) 114 psig

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (CW Trip, 110 psig) is INCORRECT, but plausible. Trip of the Central Chilled Water System is plausible because this is the cooling water source for C Air Compressor. This choice would be true if the given switch position was C-A--B. Wrong because B-C-A was given position. 114 psig is the setpoint for the lagging air compressor to auto start. 110 psig is wrong, but plausible as this is the setpoint for automatic isolation of the service air header from the instrument header as KA PV-11 valve auto closes at this setpoint. Both answer choices are wrong; the opposite of the correct answer.

B. Distractor 2 (CW Trip, 114 psig) is INCORRECT, but plausible. The first part is wrong, but the second part is right.

C. Distractor 3 (EF HV-44, 110 psig) is INCORRECT, but plausible. The first part is right, but the second part is wrong. This answer choice selected during Operator validations.

D. CORRECT (EF HV-44, 114 psig) is CORRECT. EF HV-44 closes on a high D/P. High D/P would indicate a break on the ESW line. The lead compressor cycles between 116 and 125 psig. When the lead compressor trips, the lag compressor will cycle between 114 and 123 psig. If pressure drops to 112 psig, the standby compressor will cycle between 112 and 121 psig. On a leak with lowering instrument header pressure, all three air compressors should be running prior to automatic isolation of the service air header at 110 psig.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 27 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153208
User-Defined ID:	LO153208
Reference:	IAS
Topic:	#27 078 / K1.04 (New - High)
RO Importance Rating:	2.6
SRO Importance Rating:	N/A
K/A Number:	078 K1.04
Comments:	<p>2019 NRC Exam, K/A Statement, Instrument Air System (IAS), Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Cooling water to compressor. (CFR: 41.2 to 41.9 / 45.7 to 45.8)</p> <p>Tier 2 Group 1</p> <p>High Cog - Understanding system operation to determine applicable cooling water supplies and knowledge of setpoints</p> <p>LO1407800, Instrument Air System, Objective 4. Determine the functional relationship between the system and interfacing systems.</p> <p>Meets K/A since the questions asks for cause-effect relationship between IAS and cooling water systems. There is also station specific importance and applicable Wolf Creek OE. CR00131452, documented 'B' Instrument Air Compressor tripping on high temperature due to EF HV-044, ESW TRN B TO AIR COMPRESSOR B being closed (4/10/19).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

28

ID: LO153209

Points: 1.00

Given:

- The unit is operating at 100% Power.
- A Containment Entry is in progress to perform maintenance at power.
- The crew entering Containment reported the gasket on the inner lock door has been damaged.
- There is a gouge across the entire sealing surface approximately 1/8 inch deep and 1/2 inch wide and they could hear air flow through the gouge before they equalized pressure.

Which of the following actions must be satisfied to restore or maintain Containment integrity in accordance with Technical Specifications?

- A. Close or verify closed BOTH Air Lock doors within 1 hour.
- B. Close or verify closed BOTH Air Lock doors IMMEDIATELY.
- C. Close or verify closed the OUTER Air Lock door, at a minimum, within 1 hour.
- D. Close or verify closed the OUTER Air Lock door, at a minimum, IMMEDIATELY.

Answer: C

Answer Explanation
Answer choices sorted short to long. Correct answer at C.  A. Distractor 1 (Both doors within 1 hour) is INCORRECT, but plausible. The time frame is right, but for the given loss of CTMT Integrity during normal operations, LCO 3.6.2 only directs the OPERABLE (Inner) door to be verified closed within 1 hour.  B. Distractor 2 (Both doors immediately) is INCORRECT, but plausible. Both parts of the question are wrong; the opposite of the correct answer.  C. CORRECT (Outer door within 1 hour) LCO 3.6.2 requires two containment air locks be OPERABLE. Since the inner door is INOPERABLE, COND A is entered. Required Action A1 verifies the OPERABLE (OUTER) door is closed within 1 hour and locked within 24 hours.  D. Distractor 3 (Outer door immediately) is INCORRECT, but plausible. The action is right, but the time frame is wrong. IMMEDIATE is plausible in that LCO 3.9.4 specifies CORE ALTERATIONS and movement of irradiated fuel assemblies within containment are suspended immediately in the case where one or more containment penetration is not in required status. This answer choice was selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 28 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153209
User-Defined ID:	LO153209
Reference:	CTMT
Topic:	#28 103 / K3.02 (Bank - Low)
RO Importance Rating:	3.8
SRO Importance Rating:	N/A
K/A Number:	103 K3.02
Comments:	<p>2019 NRC Exam, K/A Statement, Containment System, Knowledge of the effect that a loss or malfunction of the Containment system will have on the following: Loss of Containment integrity under normal operations. (CFR: 41.9)</p> <p>Tier 2 Group 1</p> <p>Copy of Bank Question LO59115. Previously used on 2007 Callaway NRC Exam (No history)</p> <p>Low Cog - Memory &lt;1hr Tech Spec</p> <p>LO1303200, Containment, Objective 10, Explain Technical Specifications and requirements associated with the containment system at the level of detail expected for the job position.</p> <p>Meets K/A since question provides a malfunction which affects containment integrity with the reactor at power (Normal operations). The Operationally valid consequence of this failure is compliance with Technical Specifications to remain on line.</p> <p><u>Revision History:</u> 1 - Updated applicable CFR to 41.9 (from 41.7 / 45.6)</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

29

ID: LO153428

Points: 1.00

Given:

- The unit was operating at 100% power when an event occurred that required the crew to reduce power to 90%.
- The crew has entered OFN MA-038, RAPID PLANT SHUTDOWN.

In accordance with OFN MA-038, how is the crew directed to operate the Control Rods and what is the specified Tavg/Tref temperature band for this evolution?

- A. Take Control Rods to MANUAL and maintain Tavg within a band of -5°F to 0°F below Tref.
- B. Take Control Rods to MANUAL and maintain Tavg within a band of -1.5°F to +1.5°F of Tref.
- C. With Control Rods in either Automatic or Manual, maintain Tavg within a band of 0°F to +5°F of Tref.
- D. With Control Rods in either Automatic or Manual, maintain Tavg within a band of -1.5°F to +1.5°F of Tref.

Answer: C

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answers sorted short to long. Correct answer at C.

A. Distractor 1 (Rods in Manual, -5F to 0F) is INCORRECT, but plausible. For normal conditions, the Rod Control should be in AUTO and should remain in AUTO. There is no prohibition to taking rods to Manual for "Precise Control," but the crew may have to take Rods to Manual to achieve the required 0 to +5F specified band. OFN MA-038 Foldout Page item 2 lists Tav<sub>g</sub> requirements for rapid down power, and BD-OFN MA-038 states "The band was picked to maintain Tav<sub>g</sub> higher than Tref to take advantage of the AUTOMATIC control systems. AUTO rod control and steam dumps (if armed) will both act to lower Tav<sub>g</sub> toward Tref during a rapid down power transit." To eliminate possible 2nd correct answer challenge, 0 to +5F band in MANUAL is NOT used. This choice (-5F to 0F) is wrong.

B. Distractor 2 (Rods in MANUAL, within 1.5F) is INCORRECT, but plausible. There is NO requirement to place the rods in Manual and the temperature band corresponds with the GEN 00-004 Normal Temperature Control Band, which is no longer applicable after the crew entered OFN MA-008.

C. CORRECT (Auto or Manual, 0 to +5) OFN MA-038 Foldout Page item 2 lists Tav<sub>g</sub> requirements for rapid down power, and BD-OFN MA-038 states "The band was picked to maintain Tav<sub>g</sub> higher than Tref to take advantage of the automatic control systems. Auto rod control and steam dumps (if armed) will both act to lower Tav<sub>g</sub> toward Tref during a rapid down power transit." For the given scenario, the crew will perform their pre-shift reactivity briefed actions. The ATC will energize PZR Heaters and start the boration while the BOP reduces turbine load to 1100 MWE at 12MW/Min rate with Ovation still in Open Loop Mode. When the temperature error develops, the ATC should monitor the automatic rod control response and then take rods to manual for  $\Delta I$  control when the pre-determined steps are reached per reactivity brief (i.e. CB D at 191 Steps).

D. Distractor 3 (Auto or Manual, within 1.5F) is INCORRECT, but plausible. The method of control is right, but the temperature band is wrong.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 29 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153428
User-Defined ID:	LO153428
Reference:	CRDS
Topic:	#29 001 / K5.97 (New - Low)
RO Importance Rating:	3.3
SRO Importance Rating:	N/A
K/A Number:	001 K5.97
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Control Rod Drive System (CRDS), Knowledge of the following operational implications as they apply to the CRDS: Relationship of T-ave. to T-ref. (CFR: 41.5 / 45.7)</p> <p>Tier 2 Group 2</p> <p>Low Cog - Memory, understanding preferred operation of system to maintain given procedure directed temperature band.</p> <p>LO1300100, Rod Control System, Objective 7, Explain the operation of automatic rod control for speed and direction. (Leaving Rods in AUTO allows the Rod Control System to operate to maintain Tavg/Tref relationship as rods will drive in when 1.5F mismatch exists)</p> <p>Meets K/A since the question provides a scenario in which the crew must monitor and control the Tavg to Tref mismatch, which varies based on the use of either OFN MA-038 or GEN 00-004.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

30

ID: LO153429

Points: 1.00

The Unit was operating at 100% power when a Circulating Water pump tripped with the setback ENABLED. Conditions are as follows:

- Turbine load is steady
- Loop  $\Delta T$ 's indicate 90% power
- Bank D is at 135 steps
- MCB Annunciator 081C, ROD BANK LOLO LIMIT is LIT

Based on these conditions, 1) what is the transient's effect on core power distribution?

2) What Operator action is required to be taken WITHIN 1 hour per Technical Specifications?

- A. 1) ONLY AFD is impacted by the current control rod positions.  
2) Restore rods to within COLR limits.
- B. 1) ONLY AFD is impacted by the current control rod positions.  
2) Verify SDM to be within the limits provided in the COLR.
- C. 1) BOTH AFD and QPTR distribution are impacted by the current control rod positions.  
2) Restore rods to within COLR limits.
- D. 1) BOTH AFD and QPTR distribution are impacted by the current control rod positions.  
2) Verify SDM to be within the limits provided in the COLR.

Answer: B

**Answer Explanation**



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (ONLY AFD, Restore rods to within COLR limit) is INCORRECT, but plausible. For the given conditions, the crew will be in OFN MA-001 for the Turbine Setback. Annunciator 81C actuates when rod position is at or below the variable COLR limit, which is ~138 steps at 90% power. Per LCO 3.1.6, COND A, The crew is required to verify SDM is within the limits provided in the COLR within 1 hour (A.1.1) or imitate boration to restore SDM to within limit (A.1.2), also within 1 hour. In addition, the crew is also required to restore control banks to within limits within 2 hours (A.2), so this choice is wrong since the action is NOT required to be completed within 1 hour.

B. CORRECT (ONLY AFD, Verify SDM is within limits provided in the COLR) For the given conditions, the crew will be in OFN MA-001 for the Turbine Setback. Annunciator 81C actuates when rod position is at or below the variable COLR limit, which is ~138 steps at 90% power. Per LCO 3.1.6, COND A, The crew is required to verify SDM is within the limits provided in the COLR within 1 hour or imitate boration to restore SDM to within limit, also within 1 hour. Per BD LCO 3.2.3, safety analysis for AFD, the AFD is a measure of the axial power distribution skewing to either the top or bottom half of the core. The AFD is sensitive to many core related parameters such as control bank positions, core power level, axial burnup, axial xenon distribution, and to a lesser extent, reactor coolant temperature and boron concentration. Normal Rod Programming ensures QPTR limits are maintained.

C. Distractor 2 (BOTH AFD AND QPTR, Restore rods) is INCORRECT, but plausible. Both the effect on core power distribution is wrong and the action with a 1 hour completion time are wrong. QPTR is NOT affected by insertion of control rods under normal rod programming. Precise radial power distribution measurements are made during startup testing, after refueling, and periodically during power operation. QPTR is NOT affected unless there are rod malfunctions, such as a misaligned or dropped rod(s). The action to restore rods to within limits is a two hour completion time per LCO 3.1.6, COND A.2.

D. Distractor 3 (BOTH AFD and QPTR, Verify SDM) is INCORRECT, but plausible. QPTR is NOT affected by insertion of control rods under normal rod programming, but the action to verify SDM is within limits is an action required to be completed within 1 hour. QPTR is wrong per BD LCO 3.2.3, safety analysis for AFD, the AFD is a measure of the axial power distribution skewing to either the top or bottom half of the core. The AFD is sensitive to many core related parameters such as control bank positions, core power level, axial burnup, axial xenon distribution, and to a lesser extent, reactor coolant temperature and boron concentration. Normal Rod Programming ensures QPTR limits are maintained.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 30 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153429
User-Defined ID:	LO153429
Reference:	RPIS
Topic:	#30 014 / A1.04 (Bank - High)
RO Importance Rating:	3.5
SRO Importance Rating:	N/A
K/A Number:	014 A1.04
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Rod Position Indication, Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RPIS controls, including: Axial and radial power distribution. (CFR: 41.5 / 45.5)</p> <p>Tier 2 Group 2</p> <p>High Cog - Knowledge of Tech Spec required action and operational implication of rods below rod insertion limit (effect on power distribution). Must also display knowledge of reactivity effects caused by boration/dilution to demonstrate knowledge of interaction with the Control rods.</p> <p>ILO Version of LR98109 (No history)</p> <p>LO1301400, Rod Position Indication System, Objective 7, Explain the operation of the Rod Insertion Monitor.</p> <p>Meets the K/A since given conditions provide a change in rod position and ask for required action and how core power distribution is affected.</p> <p><u>Revision History:</u>  1 - Swapped the order the questions were asked and changed distractors for two required actions. Swapped answer choices C and D to maintain short to long answer choice format. Also specified "Per Technical Specifications" as the basis for required actions and updated answer explanations.  2 - Changed the second part to what action would be accomplished WITHIN 1 hour to meet RO knowledge requirements. Also Changed what had been the correct answer to a distractor since it was not an action required WITHIN 1 hour.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

31

ID: LO153439

Points: 1.00

Which of the following single channel Malfunctions in the Excore Nuclear Instrumentation System PREVENTS its associated Reactor Protection System Permissive from functioning?

- A. An OVERCOMPENSATED Intermediate Range Channel N35 prevents P6, Intermediate Range Neutron Flux function.
- B. An UNDERCOMPENSATED Intermediate Range Channel N36 prevents P6, Intermediate Range Neutron Flux function.
- C. A Power Range Channel N43 failure LOW during plant startup prevents P10, Power Range Neutron Flux function.
- D. A Power Range Channel N41 failure HIGH during plant shutdown prevents P10, Power Range Neutron Flux function.

Answer: B

## Answer Explanation

Answer choices sorted sequentially. Correct answer at B.

A. Distractor 1 (P-6, overcompensated) is INCORRECT, but plausible. IR detector compensation will affect P-6 permissive, but the failure is caused by under compensation, the opposite direction. For overcompensation of a single channel, P6 is still actuated on 1/2 coincidence. This answer choice was selected during Operator validations.

B. CORRECT (P6, Under compensated) IRN136 BD OFN SB-008 Att Q 1.4.3, Undercompensation of an intermediate range detector (compensating voltage set too low) will cause the channel to indicate an erroneously high neutron current. This is particularly significant during the neutron decay following a reactor shutdown since it could cause the IR channel to hang up and not decay below the  $1 \times 10^{-10}$  amps required for automatic reinstatement of the source range channels. M-744-00021, P-6: 1 of 2 IR >  $10^{-10}$  amps, P-10: 2 of 4 PR > 10% power.

C. Distractor 2 (P-10, N43 low) is INCORRECT, but plausible. Required coincidence is 2/4, so a failure low on 1/4 detectors will NOT prevent P-10 from functioning.

D. Distractor 3 (P-10, N41 HIGH) is INCORRECT, but plausible. Required coincidence is 2/4, so a failure high on 1/4 detectors will NOT prevent P-10 from functioning.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 31 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153439
User-Defined ID:	LO153439
Reference:	NIS
Topic:	#31 015 / K3.01 (Bank - High)
RO Importance Rating:	3.9
SRO Importance Rating:	N/A
K/A Number:	015 K3.01
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Nuclear Instrumentation System (NIS), Knowledge of the effect that a loss or malfunction of the NIS will have on the following: RPS (CFR: 41.7 / 45.6)</p> <p>Tier 2 Group 2</p> <p>Copy of Bank Question LO5978. Previously used on Callaway 2009 Audit (No History)</p> <p>High Cog - Requires Comprehension to determine the effect of a given malfunction on associated permissive.</p> <p>LO1301501, Excore Nuclear Instrumentation System, Objective 5, Describe the operation of the Excore Nuclear Instrumentation System Intermediate Range Channels.</p> <p>Meets K/A as the question lists four possible NIS malfunctions and asks which one will affect the associated RPS Permissive from functioning.</p> <p><u>Revision History:</u> 1. Changed each answer choice to a sentence to present material in right order and specified the noun names for P6 and P10. Also changed the cognitive level designation from "Low."</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

32

ID: LO153832

Points: 1.00

With the unit operating at 100% power, how will the indicated Subcooled Margin Monitor change, if at all, for 1) a failure LOW or 2) a failure HIGH of a single Wide Range RTD?

- A.     1) No effect  
          2) No effect
- B.     1) No effect  
          2) Indicated subcooling lowers (Degrades)
- C.     1) Indicated subcooling rises (Improves)  
          2) No effect
- D.     1) Indicated subcooling rises (Improves)  
          2) Indicated subcooling lowers (Degrades)

Answer:        B

## Answer Explanation

Answer choices sorted short to long.   Correct answer at B.

A.   Distractor 1 (no effect, no effect) is INCORRECT, but plausible.   First part is right, but the second part is wrong.   The failure LOW will not affect the indication since the high value is selected.   Unlike many of the control systems, a high failure is still used in the calculation and cannot be unselected, so the indication will change for a failure in the HIGH direction.

B.   CORRECT (no effect, subcooling lowers). The system uses the high input, so a low failure will not affect the indication., Unlike other systems such as TCCMS, the failed signal is not removed, so a high failure will cause the calculation to determine that the RCS is above Psat (superheated) and indication will lower / degrade.

C.   Distractor 3 (rise, no effect) is INCORRECT, but plausible.   A low temperature typically means more subcooling, however, the low failure would not be seen by the TCCM since it's auctioneered high.   Both parts are wrong.

D.   Distractor 3 (rise, lower) is INCORRECT, but plausible.   A low temperature would normally raise subcooling while a high temperature lowers subcooling. However, the low failure has no effect on the TCCM (uses the highest input).   The second part is right.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 32 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153832
User-Defined ID:	LO153832
Reference:	ITM
Topic:	#32 017 / K6.01 (Bank - High)
RO Importance Rating:	2.7
SRO Importance Rating:	N/A
K/A Number:	017 K6.01
Comments:	<p>2013 Diablo Canyon. K/A Statement: In-Core Temperature Monitor System (ITM) - Knowledge of the effect of a loss or malfunction of the following ITM system components: sensors and detectors. (CFR: 41.7 / 45.7)</p> <p>Tier 2 Group 2</p> <p>High Cog - Comprehension, failure analysis and system design (auctioneering).</p> <p>Previous use on 2013 Diablo Canyon NRC Exam.</p> <p>LO1301700, Incore Nuclear Instrumentation System, Objective 4, Explain the operation of the incore thermocouple system major components.</p> <p>Meets the K/A since the question asks for expected indication change based on a failure of a single RTD channel, in either direction of failure.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

33

ID: LO153440

Points: 1.00

A Containment Mini-Purge in progress.

A Hi-Hi alarm actuation on which of the following Process Rad Monitors Detectors would cause in a Containment Purge Isolation Signal?

- A. GK RE-04, Control Room Air Supply, Gas Channel
- B. GT RE-22, CTMT Purge Exhaust, Particulate Channel
- C. GG RE-27, Fuel Building Emergency Exhaust, Particulate Channel
- D. GT RE-31, CTMT Atmosphere, Gas Channel

Answer: D

## Answer Explanation

Answer choices sorted sequentially. Correct answer at D.

A. Distractor 1 (GT RE-04, Gas) is INCORRECT, but plausible. The detector is wrong, but they type of detector is right. An alarm on GT RE-04 results in a CRVIS. A CPIS also causes a CRVIS, but a CRVIS does NOT cause a CPIS.

B. Distractor 2 (GT RE-22, Particulate) is INCORRECT, but plausible. The rad monitor is right, but the channel is wrong. GT RE-22 is used while purging containment and provides both CPIS and CRVIS Actuation signals but ONLY on a gas channel. Drawing M-12GT01 lists which channels are responsible for actuation signals. A gas channel not used in conjunction with this PRM or GT RE-33 to avoid cueing. This answer choice selected during Operator validations.

C. Distractor 3 (GT RE-27, Particulate) is INCORRECT, but plausible. Both choices are wrong. GT RE-27 monitors Fuel Building Atmosphere and provides a FBIS Signal. The FBIS signal causes a CRVIS actuation, but not a CPIS actuation. The actuation signals result from gas channels, not particulate.

D. CORRECT (GT RE-31, Gas) GT RE-31 monitors containment atmosphere regardless of containment purge status. A HIHI alarm setpoint on this channel causes both a CRVIS and a CPIS on the gas detector channel. ALR 00-059D, Symptom or entry conditions 2.2 lists GT RE22, 33, 31, 31 gaseous channels, as well as CISA and Manual Initiation as the initiating conditions for a CPIS.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 33 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	153440
User-Defined ID:	LO153440
Reference:	PRM
Topic:	#33 029 / K1.02 (Bank - Low)
RO Importance Rating:	3.3
SRO Importance Rating:	N/A
K/A Number:	029 K1.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Containment Purge System (CPS), Knowledge of the physical connections and/or cause-effect relationships between the Containment Purge System and the following systems: Containment radiation monitor. (CFR: 41.2 to 41.9, 45.7 to 45.8)</p> <p>Tier 2 Group 1</p> <p>Low Cog - System knowledge</p> <p>Copy of Bank Question LR151267 (73% history)</p> <p>LO1302800, Containment Atmosphere and Hydrogen Control Systems, Objective 7, Discuss the design and construction of major system components and controls of the Containment Purge System.</p> <p>Meets the K/A since there is a cause-effect relationship during a CTMT purge with the gas channels associated with any of the four CTMT Process Rad Monitors. Particulate channels are required for RCS Leak Detection, but actuation signals come from gas channels.</p> <p><u>Revision History:</u> 1- Updated applicable CFR to 41.13 (from 41.2 to 41.9, / 45.7 to 45.8).</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

34

ID: LO153686

Points: 1.00

Given:

- Refueling operations are in progress.
- A Spent Fuel Assembly dropped in the spent fuel pool.
- MCB Annunciator 062D, FBIS actuated.
- EC-V995, Fuel Transfer Tube Gate Valve is OPEN.

Based on these conditions, 1) how will the Spent fuel pool level change? 2) Per OFN KE-018, FUEL HANDLING ACCIDENT where should the Fuel Transfer Cart be placed prior to closing EC-V995?

- A. 1) SFP Level will RISE due to Fuel Building Pressure being lower than CTMT Pressure.  
2) In the Refueling Pool.
- B. 1) SFP Level will RISE due to Fuel Building Pressure being lower than CTMT Pressure.  
2) In the Spent Fuel Pool.
- C. 1) SFP Level will LOWER due to Fuel Building Pressure being higher than CTMT Pressure.  
2) In the Refueling Pool.
- D. 1) SFP Level will LOWER due to Fuel Building Pressure being higher than CTMT Pressure.  
2) In the Spent Fuel Pool.

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (Rise, Refueling Pool) is INCORRECT, but plausible. For the given FBIS condition, a D/P will exist between the fuel building and Containment causing water to flow from CTMT to the Fuel Building. Per OFN KE-018, Step 11, The Fuel Handling SRO is directed to ensure the Fuel Transfer Cart is in the SFP prior to closing EC-V995. The change in level is right, but the location of the transfer cart is wrong.

B. CORRECT (Rise, SFP) For the given FBIS condition, a D/P will exist between the fuel building and Containment causing water to flow from CTMT to the Fuel Building. Per OFN KE-018, Step 11, The Fuel Handling SRO is directed to ensure the Fuel Transfer Cart is in the SFP prior to closing EC-V995.

C. Distractor 2 (Lowers, Refueling Pool) is INCORRECT, but plausible. A differential pressure will cause water to sluice from one pool to the other. GEN 00-009, REFUELING, Caution prior to the step that opens EC-V995 warns that a positive pressure in CTMT will displace water to the fuel building and cause a higher level in the Fuel Transfer Canal than in the Refueling pool. The direction of level change is wrong for the given conditions but would be true if the spent fuel assembly was dropped in CTMT and a CPIS actuated. The location of the Fuel Transfer cart is also wrong.

D. Distractor 3 (Lowers, SFP) is INCORRECT, but plausible. The direction of level change is wrong, but the location of the Fuel Transfer cart is right.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 34 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153686
User-Defined ID:	LO153686
Reference:	SFP
Topic:	#34 033 / A3.02 (New - High)
RO Importance Rating:	2.9
SRO Importance Rating:	N/A
K/A Number:	033 A3.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Spent Fuel Pool Cooling System (SFPCS), Ability to monitor automatic operation of the Spent Fuel Pool Cooling System including: Spent Fuel Leak or Rupture. (CFR: 41.7 / 45.5)</p> <p>Tier 2 Group 2</p> <p>High Cog - Knowledge of ventilation actuation results and resulting effects of the system response combined with procedure direction for a fuel handling accident.</p> <p>LO1403300, Fuel Pool Cooling and Cleanup System, Objective 7, Explain the Alarms, controls, indications and interlocks associated with the fuel pool cooling and cleanup system.</p> <p>Meets the K/A since the question specifies a Spent Fuel Leak in the Fuel building, which causes a FBIS, and then asks for the expected automatic response of the level based on the FBIS Actuation. There is NO direct automatic SFP Cooling system response for a Spent Fuel Leak or Rupture. The one action the crew will take per OFN KE-018 for the given scenario is to ensure the Fuel Transfer Cart is in the SFP prior to closing EC-V995.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

35

ID: LO153442

Points: 1.00

The unit tripped from 100% power due to a loss of off-site power. Conditions as follows:

- RCS Cold Leg Temperatures are steady at 557° F.
- RCS Pressure is 2100 psig and rising.
- CETCs are 585° F and rising.
- S/G pressures are steady at 1090 psig.
- S/G NR Levels are being maintained between 29% and 50%.

Based on the given conditions, what is the status of Natural Circulation and how will the crew perform the cooldown per EMG ES-04, NATURAL CIRCULATION COOLDOWN?

Natural Circulation flow is...

- A. established, Maximize TDAFW Pump operation.
- B. established, Dump steam from all four S/G ARVs.
- C. **NOT** established, Maximize TDAFW Pump operation.
- D. **NOT** established, Dump steam from all four S/G ARVs.

Answer: D

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (established, maximize TDAFW Pump Operation) is INCORRECT, but plausible. CETC trend indicates Natural Circulation is NOT established per EMG ES-04, ATT B. Operation of TDAFW Pump is plausible in that other EMG procedures use this method to cool down the RCS as an option when steam dumps and ARVs are NOT available. For the given conditions, the crew will cooldown the RCS using ARVs and feed all four S/Gs to maintain symmetric cooling of all four loops. EMG ES-04, Step 8 directs stopping the TD AFW Pump if both MD AFW Pumps are available once S/G NR Level indications are above the AFAS-T actuation setpoint of 23.5% so that temperatures in 'B' and 'C' loops do not cool down faster than 'A' and 'D' loops.

B. Distractor 2 (established, Dump steam from all four ARVs) is INCORRECT, but plausible. For the given rising in CETC temperatures, Natural Circulation does NOT exist per EMG ES-04, ATT B. The method of cooldown to feed all four S/G and cool down the RCS using ARVs is right. This answer choice was selected during Operator validations.

C. Distractor 3 (Not established, Maximize TDAFW Pump Operation) is INCORRECT, but plausible. The first part is right, but the action is wrong. Operation of TDAFW Pump is plausible in that other EMG procedures use this method to cool down the RCS as an option when steam dumps and ARVs are NOT available. For the given conditions, the crew will cooldown the RCS using ARVs and feed all four S/Gs to maintain symmetric cooling of all four loops. EMG ES-04, Step 8 directs stopping the TD AFW Pump if both MD AFW Pumps are available once S/G NR Level indications are above the AFAS-T actuation setpoint of 23.5% so that temperatures in 'B' and 'C' loops do not cool down faster than 'A' and 'D' loops.

D. CORRECT (Not established, Dump steam from all four ARVs) Both EMG ES-02 and EMG ES-04 provide an attachment with indications of Natural Circulation. For the given conditions, the ARVs are maintaining S/G pressures and RCS Cold Leg temperatures steady. the student will use steam tables to calculate RCS subcooling is >30F (87F) and verify RCS Cold Leg Temperatures are at saturation temperature for S/G pressures. The given trend in CETC temperatures is an indication that Natural Circulation conditions do NOT exist, and crew response is required to feed and steam all four S/Gs per EMG ES-04, Step 14c RNO using ARVs to dump steam while minimizing pressure differential between S/Gs. EMG ES-04, Step 8 verifies S/G level is >23.5% (AFAS-T Setpoint) before providing direction to stop the TDAFW Pump. Stopping the TDAFW Pump is desired to promote symmetric cooldown of all four loops during the Natural Circulation cooldown.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 35 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153442
User-Defined ID:	LO153442
Reference:	S/GS
Topic:	#35 035 / A4.05 (New - High)
RO Importance Rating:	3.8
SRO Importance Rating:	N/A
K/A Number:	035 A4.05
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Steam Generator System (S/Gs), Ability to manually operate and/or monitor in the control room: Level control to enhance natural circulation. (CFR; 41.7 / 45.5 to 45.8)</p> <p>Tier 2 Group 2</p> <p>High Cog - analysis of data to determine natural circulations are NOT established and then demonstrating knowledge of overall mitigative strategy to asymmetrically cooldown the reactor to avoid creating inactive loops.</p> <p>LO1503900, Main and Reheat Steam System, Objective 6, Describe system and integrated plant response to transient and equipment failures.</p> <p>Meets the K/A since the questions asks if natural circulation exists and the correct answer is to feed and steam the S/Gs to enhance the natural circulation that does not exist for the given conditions.</p> <p><u>Revision History:</u> 1 - Changed given S/G NR Levels to a band that is &gt;23.5% and changed the question to make it more Operationally valid per EMG ES-04, specifically how the crew will perform the cooldown. Shuffled answer choices to maintain short to long format and improved the answer explanations to make it clear why operation of the TDAFW pump is NOT a subset second correct answer.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

36

ID: LO112181

Points: 1.00

Given:

- Generator Hydrogen pressure is 45 psig.
- System Operations has requested adjustment of Reactive Power to 200 MVARs out.

Based on these conditions, use the provided Generator Performance Curve to determine the approximate MAXIMUM allowed Main Generator Power.

**(Reference Provided)**

- A. 990 megawatts
- B. 1140 megawatts
- C. 1275 megawatts
- D. 1300 megawatts

Answer: B

**Answer Explanation**

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted sequentially. Correct answer at B.

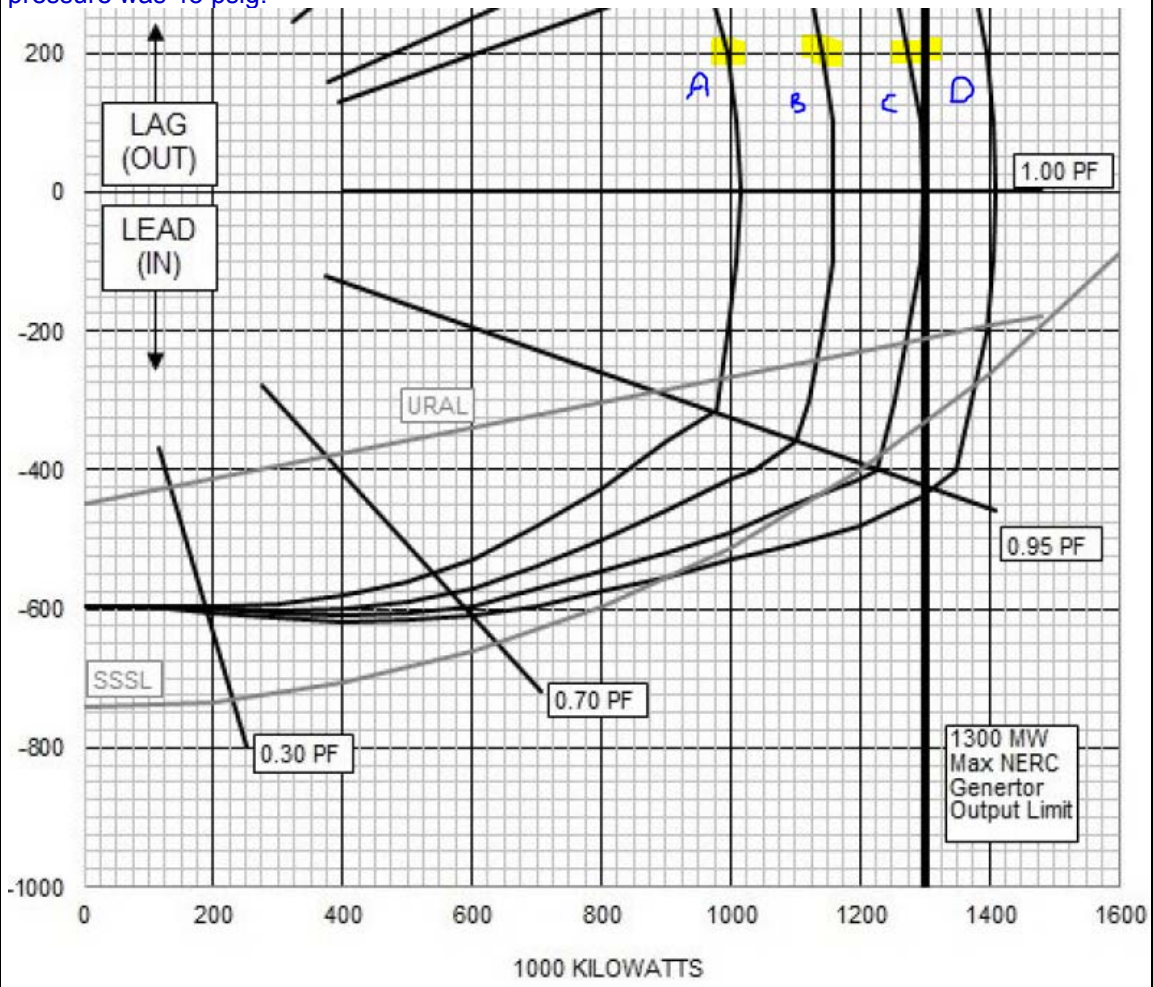
Provided reference: OFN AF-025, Figure 1

A. Distractor 1 (990 MW) is INCORRECT, but plausible. ~990 MW corresponds the maximum allowed power for H2 pressure at 30 psig as the limit line passes between 980 and 1000 MW. Wrong because given H2 pressure is 45 psig.

B. CORRECT (1140 MW) is INCORRECT, but plausible. For 200MVAR out with H2 pressure at 45 psig, the limit line passes between 1125 and 1150 lines. ~1135 MW is the MAXIMUM allowed power level for the given conditions.

C. Distractor 2 (1275 MW) is INCORRECT, but plausible. This is the maximum allowed power for H2 pressure at 60 psig. Wrong because the given H2 pressure was 45 psig.

D. Distractor 3 (1300 MW) is INCORRECT, but plausible. This is the maximum allowed power and would be true if Hydrogen pressure was at 75 psig. Wrong because the given H2 pressure was 45 psig.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 36 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	112181
User-Defined ID:	LO112181
Reference:	MT/G
Topic:	#36 045 / 2.1.25 (Reference) (Modified - Low)
RO Importance Rating:	3.9
SRO Importance Rating:	4.2
K/A Number:	045 2.1.25
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Main Turbine Generator (MT/G) System, Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.2 / 45.6)</p> <p>Tier 2 Group 2</p> <p>Low Cog - Use of figure to determine limit based on given conditions.</p> <p>Provided reference - OFN AF-025, Figure 1</p> <p>Modified version of what was used on 2013 Wolf Creek NRC Exam (600 MVAR out, 60 psig) (100% results).</p> <p>LO1504600, Main Turbine and Auxiliaries, Objective 9, Discuss Main Turbine System peculations, limitations, and operation.</p> <p>Meets K/A since the applicant must use a provided reference to determine maximum allowed Main Turbine Generator power for given conditions.</p> <p><u>Revision History:</u> 1 - Added "approximate" to the question and changed the correct answer to 1140 MW. Also updated answer explanations.</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

37

ID: LO153218

Points: 1.00

Given:

- The unit was operating at 100% power.
- MCB Annunciator 126D, CONDENSATE PUMP TRIP alarmed.
- The Green and Amber lights are lit on AD HIS-2, CNDS PUMP B.

1) How will this malfunction affect the Main Condensate System and 2) What procedure will the crew utilize to lower power to comply with OFN AF-025, UNIT LIMITATIONS?

- A. 1) Running current for the two remaining condensate pumps will rise above the allowed rating, risking pump electrical motor damage.  
2) OFN MA-001, LOAD REJECTION OR TURBINE TRIP
- B. 1) Running current for the two remaining condensate pumps will rise above the allowed rating, risking pump electrical motor damage.  
2) OFN MA-038, RAPID PLANT SHUTDOWN
- C. 1) Main Condensate flow though the two remaining condensate pumps will rise above the maximum runout flowrate, risking pump mechanical damage.  
2) OFN MA-001, LOAD REJECTION OR TURBINE TRIP
- D. 1) Main Condensate flow though the two remaining condensate pumps will rise above the maximum runout flowrate, risking pump mechanical damage.  
2) OFN MA-038, RAPID PLANT SHUTDOWN

Answer: B

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Excessive current, OFN MA-001) is INCORRECT, but plausible. The first part is right, but the procedure is wrong. The crew would use OFN MA-001 in response to a turbine runback, setback or trip; not for planned manipulation of turbine loading. Plausible since turbine load would be reduced if the crew were in that procedure.

B. CORRECT (Excessive current, OFN MA-038). Per OFN AF-025, ATTACHMENT A, Maximum unit load is 1102 MWE (90%) for loss of one condensate pump. This maximum load limit is clarified by two additional considerations. MFP Suction pressure must be restored to a value >340 psig and Motor current for the two remaining Main Condensate Pumps must be reduced to <440 amps since the rating of the Condensate Pump motors is 442 amps. Without reduction of power to reduce running current to within ratings, the Condensate pump motors are subject to electrical damage. OFN AF-025 specifies loading may be reduced using GEN 00-004, OFN MA-038, or OFN AF-025 Attachment D (steam dumps). The crews are trained to reduce power per OFN MA-038 IAW pre-shift reactivity brief for the given failure.

C. Distractor 2 (Runout of Main Condensate Pumps, OFN MA-001) is INCORRECT, but plausible. Per OFN AF-025, ATTACHMENT A, Maximum unit load is 1102 MWE (90%) for loss of one condensate pump. This maximum load limit is clarified by two additional considerations. One is that MFP Suction pressure must be restored to a value >340 psig to maintain MFP NPSH. Without reduction of power to raise MFP Suction pressure, the MFPs (NOT the Condensate Pumps) are subject to possible mechanical damage due to cavitation (not runout). OFN AF-025 specifies loading may be reduced using GEN 00-004, OFN MA-038, or OFN AF-025 Attachment D (steam dumps). OFN MA-001 is not a procedure used to purposely reduce turbine loading.

D. Distractor 3 (Runout of Main Condensate Pumps, OFN MA-038) is INCORRECT, but plausible. The first part is wrong, but the procedure is right. The Main Condensate Pumps are NOT subject to damage due to runout for this condition and limits imposed by OFN AF-025 are to protect Condensate pumps motors from electrical damage due to excessive running current and MFPs from mechanical damage due to cavitating resulting from loss of NPSH. Plausible based on recent Wolf Creek OE where runout flowrates for NCP (150 gpm) and CCPs (556 gpm) have been added to procedures to remind Operators of possible pump damage due to runout conditions (high flow, low back pressure).

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 37 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153218
User-Defined ID:	LO153218
Reference:	MAIN COND
Topic:	#37 056 / A2.04 (New - High)
RO Importance Rating:	2.6
SRO Importance Rating:	2.8
K/A Number:	056 A2.04
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Condensate System, Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps (CFR: 41.45 / 43.5 / 45.3 / 45.13)</p> <p>Tier 2 Group 2</p> <p>High Cog - Analysis of malfunction, understanding impact to system, and selection of the appropriate procedure with which to proceed.</p> <p>LO1505600, Main Condensate System, Objective 9, Describe system and integrated plant response to transient and equipment failures.</p> <p><u>Two applicable Wolf Creek OEs.</u>  1) ICES #314094 (11/15/14). Loss of 'B' Main Condensate pump motor tripped on instantaneous current spike of 492 amps. Crew reduced power and stabilized the plant at 88% power.  2) CR107459 (RF21) NCP operated above the maximum flow rating of 150 gpm with low backpressure which caused pump runout and significant pump damage.</p> <p>Meets K/A since the question provides a loss of operating condensate pump and asks the applicant to predict how that malfunction affects the remaining two main condensate pumps and what procedure the crew will use.</p> <p><u>Revision History:</u>  1 – Rephrased the question and answer choices to eliminate any subjectivity. Rated pump running current WILL be exceed without Operator action, which could result in condensate pump motor damage. Swapped answer choices to maintain short to long format and updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

38

ID: LO153450

Points: 1.00

Given:

- The unit was operating at 100% power.
- 'A' EDG auto started and energized NB01 after the normal feeder breaker tripped open.
- Subsequently, a fire alarm for 'A' EDG room actuated on Panel KC-008.

- 1) What type of detector is utilized in the EDG room?
- 2) Based on the given conditions, the interlock signal from the EDG fire suppression system...

- A. 1) Infrared Flame Detector  
2) shuts down the fuel oil transfer pumps.
- B. 1) Photoelectric Smoke Detector  
2) shuts down the fuel oil transfer pumps.
- C. 1) Infrared Flame Detector  
2) is bypassed and the fuel oil transfer pumps will remain running.
- D. 1) Photoelectric Smoke Detector  
2) is bypassed and the fuel oil transfer pumps will remain running.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (Infrared, shuts down the fuel oil transfer pump) is INCORRECT, but plausible. The detector type is right, but the interlocked response with the EDG running is wrong. This choice would be true if the EDG was in standby. This answer choice selected during Operator Validations.

B. Distractor 2 (Photoelectric, shuts down the fuel oil transfer pump) is INCORRECT, but plausible. Photoelectric smoke detectors employ a photoelectric cell coupled with a specific light source to detect smoke. The photoelectric detector reacts to visible smoke particles. The detector is not sensitive to ionizing radiation and is used in place of ionization detectors in radiation areas exceeding 7.5 mRem per hour. Photoelectric detectors are used in areas housing combustible materials that rapidly produce dense visible smoke. At Wolf Creek, photoelectric detectors are used in limited applications. The fuel oil transfer pump interlock is also bypassed when the EDG is running, so both choices are wrong, the opposite of the correct answer.

C. CORRECT, (Infrared, interlock bypassed) The Infrared flame detector responds to infrared light emitted by a flame. Infrared detectors operate best when located at a distance from the possible source of ignition and are used in areas where the fires hazard emits a bright flame, such as from flammable liquids or combustible gases. At Wolf Creek, infrared flame detectors are installed in the EDG rooms, the Aux Boiler room, the main Steam Enclosure, the Boric Acid Tank Rooms, and the Fuel Building. When the EDG is running, the signal interlock from the EDG fire suppression system is bypassed to allow for continued operation of the fuel oil transfer pumps.

D. Distractor 3 (Photoelectric Smoke, interlock bypassed) is INCORRECT, but plausible. The detector type is wrong, but the second part is right in that the interlocked signal from the EDG fire suppression system is bypassed when the EDG is running.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 38 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153450
User-Defined ID:	LO153450
Reference:	FIRE PROTECTION
Topic:	#38 086 / K4.03 (New - High)
RO Importance Rating:	3.1
SRO Importance Rating:	N/A
K/A Number:	086 K4.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Fire Protection System (FPS), Knowledge of design feature(s) and/or interlock(s) which provide for the following: Detection and location of fire. (CFR: 41.7)</p> <p>Tier 2 Group 2</p> <p>High Cog - Type of detector used and automatic system response/interlock for alarm conditions.</p> <p>LO1408600, Fire Protection System, Objective 3, Explain the characteristics of the system major components.</p> <p>Applicable Wolf Creek OE, Fire in 'B' EDG excitation system during scheduled 24 hour load run on October 6, 2014.</p> <p>Meets K/A since the question asks for a detector type and associated interlock response based on a given fire location.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

39

ID: LO153463

Points: 1.00

The reactor tripped from 100% power and the crew has entered EMG E-0, REACTOR TRIP OR SAFETY INJECTION.

While performing Immediate Actions, how is the Operator directed to verify the Turbine is tripped per EMG E-0, Step 2?

- A. Check Main Stop Valves all closed.
- B. Check Main Control Valves all closed.
- C. Verify Main Generator and Exciter Breakers are open.
- D. Verify MCB Annunciator 114A, TURBINE TRIP is actuated.

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (Check Turbine Stop Valves are closed). Per EMG E-0, Step 2, the crew is directed to "Check Main Stop Valves - ALL CLOSED." This action is accomplished by verify Stop Valve position on Ovation Turbine Control System - Operation Panel (Graphic 5551).

B. Distractor 1 (Check Main Control Valves all closed) is INCORRECT, but plausible. The control valve indication is on the same Ovation Turbine Control System - Operation Panel (Graphic 5551). These valves also close when the Turbine Trips, but this is NOT the set of valves the EMG E-0, Step 2 directs to check closed.

C. Distractor 2 (Verify Main Generator and Exciter Breakers are open) is INCORRECT, but plausible. This action is directed by EMG E-0, Step 7. The main generator and exciter breakers open 33 seconds after the Generator output lowers to at least -5 MW. Wrong because this action does NOT verify the Turbine is tripped per EMG E-0, Step 2.

D. Distractor 3 (MCB Annunciator 114A, Uncontrolled Cooldown) is INCORRECT, but plausible. Annunciator 114A is a "First Out" alarm that actuates when a condition exists that causes a Turbine Trip. If this condition existed with Power above P9 setpoint (50%), the turbine trip would cause a Reactor Trip. For the given conditions (Reactor Trip that causes a Turbine Trip), Annunciator 113A UNIT TRIP TURB TRIP would actuate. Also wrong because EMG E-0, Step 2 does NOT direct verifying Turbine Trip Annunciators. Plausible since EMG E-0, Step 4 directs the Operator to verify Annunciators 00-030, or 031A are lit as a verification that SI is Actuated during the performance of Immediate Actions.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 39 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153463
User-Defined ID:	LO153463
Reference:	REACTOR TRIP
Topic:	#39 EPE 007 / EA1.07 (New-Low)
RO Importance Rating:	4.3
SRO Importance Rating:	N/A
K/A Number:	EPE 007 EA1.07
Comments:	<p>2019 K/A Statement, Ability to operate and monitor the following as they apply to a reactor trip. MT/G trip; verification that the MT/G has been tripped. (CFR: 41.7 / 45.5 / 45.6)</p> <p>Tier 1 Group 1</p> <p>Low cog - Knowledge of Immediate Action steps.</p> <p>LO1732313, EMG E-0, REACTOR TRIP OR SAFETY INJECTION (&amp; BASES), Objective 4, Explain the bases and any knowledge requirements for selected procedure steps.</p> <p><u>Overlap consideration</u> - Question changed after Operator validations to eliminate overlap with #47.</p> <p>Meets the K/A since the question asks how the procedure directs the Operator to verifies the Turbine is tripped following a reactor trip.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

40

ID: LO153464

Points: 1.00

Given:

- A break on the upper section of PZR Level Detector BB LI-560 Reference leg has caused a Reactor Trip and SI actuation.
- Core Exit TCs stabilize at 550°F.
- RCS pressure is stabilizing at 1400 psig.
- PZR level is 60% and rising.
- Cold leg injection flow is 800 gpm. (Assume RCS temperature remains constant)

Based on these conditions and with NO Operator action, RCS pressure and ECCS flow respond over the next 30 to 120 minutes?

- A. RCS pressure will rise and ECCS flow will rise
- B. RCS pressure will rise and ECCS flow will lower
- C. RCS pressure will lower and ECCS flow will rise
- D. RCS pressure will lower and ECCS flow will lower

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distracter 1 (Pressure rises, flow rises) is INCORRECT, but plausible. The first part is right since PZR will become solid resulting in RCS pressure rise, but the second part is wrong. The corresponding change in RCS pressure causes the opposite response and ECCS flow will lower.

B. CORRECT (Pressure rises, Flow lowers) Since given RCS pressure is below shutoff head for SI pumps with a small break LOCA (Vapor space accident) in progress, PZR level will continue to rise until water solid at which time the difference between injection flow and break flow will cause RCS pressure to rise and ECCS flow rate to drop.

C. Distracter 2 (Pressure lowers, flow rises) is INCORRECT, but plausible. The RCS pressure flow relationship is right, but given a steady temperature with RCS pressure stabilized, the opposite response is expected as PZR Level rises to solid plant condition. This choice is more consistent with expected response during a Large Break LOCA where break size exceeds capacity of ECCS pumps causing RCS pressure to lower and ECCS flow to rise. This answer choice was selected during Operator Validations.

D. Distracter 3 (Pressure lowers, ECCS flow lowers) is INCORRECT, but plausible. No mechanism exists for a vapor space accident to stabilize PZR Level given pressure difference between ECCS pumps and the vapor space break, so level and pressure will rise, which will cause ECCS flow to lower. The first part is wrong, but the second part is right.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 40 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153464
User-Defined ID:	LO153464
Reference:	VAPOR SPACE
Topic:	#40 APE 008 AK1.02 (Bank - High)
RO Importance Rating:	3.1
SRO Importance Rating:	N/A
K/A Number:	APE 008 AK1.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Pressurizer Vapor Space Accident, Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident: Change in leak rate with change in pressure. (CFR: 41.8 / 41.10 / 45.3)</p> <p>Tier 1 Group 1</p> <p>High Cog - Expected Plant response to a given malfunction. Application of pump theory to understand pressure rises, causing flow to lower.</p> <p>Edited version of Bank question LO18231 (91% history)</p> <p>LO1732320, EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Objective 2, Describe the Major Actions and Available Options for the procedure. Understanding expected pressure response for a given LOCA will help the crew understand the mitigating actions required, in this case to transition to EMG ES-11 at Step 24 to cool down and depressurize the RCS to minimize break flow.</p> <p>Meets the K/A since given LOCA Location is on the PZR Reference leg and the question asks how Pressure and ECCS flow respond without operator action during this Vapor Space Accident.</p> <p><u>Revision History:</u> 1 –Specified the noun name for BB LI-460, removed expected change in PZR Level from the answer choices and modified the remaining choices to 2x2 format using RCS pressure and ECCS flow. Swapped answer choices to maintain short to long format and updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

41

ID: LO153467

Points: 1.00

Given:

- The unit tripped, and safety injection actuated.
- The crew is performing EMG E-0, REACTOR TRIP OR SAFETY INJECTION.
- RCS Pressure is at 1550 psig and down slow.
- CTMT Humidity and Temperature are rising.
- CTMT Pressure is 6 psig and rising.
- CTMT Sump levels are rising.

Based on these conditions, what additional parameter will the crew use to diagnose the event in progress and why?

- A. Tavg, because it will lower ONLY during a Large Break LOCA.
- B. CTMT Radiation levels, because they will rise ONLY during LOCA.
- C. Steam Generator Pressures, because they will lower ONLY during a Steam Line Break.
- D. Steam Generator Levels, because they will rise due to swell ONLY during a Steam Line Break.

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (Tavg only lowers during a Large Break LOCA) is INCORRECT, but plausible. A rapidly lowering Tavg is a diverse indication that also indicates excessive steam demand, such as due to a steam line break in CTMT. S/G pressures and CTMT radiation levels are more useful as diagnostic tools as a Large Break LOCA could also cause rapidly lowering Tavg. For the given RCS pressure at 1550 psig, a Small Break LOCA is in progress.

B. CORRECT (CTMT Rad Levels during a LOCA). Per EMG E-0, Step 18, The primary indicator that the RCS is NOT INTACT in CTMT is Containment Radiation. The previous steps check S/G Pressure and Level, so the presence of CTMT radiation in addition to degraded conditions in CTMT will drive the crew to transition to EMG E-1 if Containment Radiation was NOT normal before isolation.

C. Distractor 2 (Slowly lowering S/G Pressures only during a Steam Line Break) is INCORRECT, but plausible. For the event in progress, a rapidly lowering S/G pressure, or completely depressurized S/G would be indication of a steam line break in CTMT. It is expected for S/G pressures to be slowly lowering during a LOCA event due to cooldown and TDAFW Pump operation for 'B' & 'C' S/Gs.

D. Distractor 3 (Rapidly rising S/G levels due to swell indicates a Steam line break) is INCORRECT, but plausible. Swell is a phenomenon that is observable at power for a steam leak. However, S/G levels shrink off-scale low following a reactor trip from power and if rapidly rising S/G level were detected, the crew should take EMG E-0 foldout page action to isolate flow to check for Ruptured S/G criteria. This answer choice was selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 41 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153467
User-Defined ID:	LO153467
Reference:	SB LOCA
Topic:	#41 EPE 009 / EK3.18 (New - Low)
RO Importance Rating:	3.9
SRO Importance Rating:	N/A
K/A Number:	EPE 000 EK3.18
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of the REASONS for the following responses as they apply to the small break LOCA: Monitoring containment radiation levels (CFR: 41.5 / 41.10 / 45.6 / 45.13)</p> <p>Tier 1 Group 1</p> <p>Low Cog - Simple Diagnostics</p> <p>LO1732313, EMG E-0, REACTOR TRIP OR SAFETY INJECTION (&amp; BASES), Objective 4, Explain the bases and any knowledge requirements for selected procedure steps.</p> <p>Overlap consideration - Question is different from #98. The installed CTMT area radiation monitors were NOT used as answer choices in #98.</p> <p>Meets K/A since a SBLOCA condition was given and the question asks for which parameter could be used to diagnose the event. A change in containment area radiation levels (SE SD-39, -40, 41, &amp; 42) would help identify the event as a LOCA. To distinguish between Steam Line Break and LOCA is WHY CTMT Radiation Level are Monitored.</p> <p><u>Revision History:</u> 1- Rephrased the question and all four answer choices to make more direct and remove ambiguity &amp; possible 2nd correct answer challenges. Also updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

42

ID: LO153648

Points: 1.00

Given:

- A Large Break LOCA occurred.
- The crew is performing EMG ES-13, TRANSFER TO HOT LEG RECIRCULATION.

Upon completion of EMG ES-13, 1) which pumps will be aligned for Hot Leg recirculation and 2) why is establishing hot leg recirculation desired?

- A. 1) RHR and SI Pumps ONLY  
2) To preclude boron precipitation in the core region, which could potentially hinder core cooling.
- B. 1) RHR and SI Pumps ONLY  
2) To remove Decay Heat from the core that is NOT removed by cold leg recirculation only.
- C. 1) RHR, SI, and CCPs  
2) To preclude boron precipitation in the core region, which could potentially hinder core cooling.
- D. 1) RHR, SI and CCPs  
2) To remove Decay Heat from the core that is NOT removed by cold leg recirculation only.

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (RHR and SI Pumps ONLY, Preclude Boron Precipitation) EMG ES-13, Steps 1-3 align RHR for Hot Leg Recirc, Steps 5 and 6 align SI Pumps for Hot Lg Recirc. The CCPs remain aligned for Cold Leg Recirc. The basis per BD-EMG E-1, Step 33 is that the ECCS is realigned to hot leg recirculation 10 hours after SI initiation as this is the minimum time when boric acid concentrations could approach the solubility limit in the reactor core region following a double-ended guillotine break. Performing this transfer 10 hours later precludes boron precipitation from the boric acid solution which could potentially hinder core cooling. NOTE, a pending change is expected for EMG E-1 which could change the time of initiation for switch to hot leg recirculation. This time is not important to satisfy the K/A (Pump Operation during a LB LOCA).

B. Distractor 1 (RHR and SI Pumps ONLY, Remove Decay Heat) is INCORRECT, but plausible. The pump operation is right, but the reason for performing EMG ES-13 is wrong. The ECCS is designed to provide sufficient decay heat removal during Cold Leg Recirculation.

C. Distractor 2 (All pumps, Preclude boron precipitation) is INCORRECT, but plausible. The CCPs remain aligned for Cold Leg Recirc. The reason is right. This answer choice selected during Operator validation.

D. Distractor 3 (All pumps, Remove Decay Heat) is INCORRECT, but plausible. Both answer choices are wrong; the opposite of the correct answer.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 42 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	153648
User-Defined ID:	LO153648
Reference:	LB LOCA
Topic:	#42 EPE 011 / EK2.02 (New - High)
RO Importance Rating:	2.6
SRO Importance Rating:	N/A
K/A Number:	EPE 011 EK2.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Large Break LOCA, Knowledge of the interrelations between the Large Break LOCA and the following: Pumps (CFR: 41.7 / 45.7)</p> <p>Tier 1 Group 1</p> <p>High Cog - System knowledge and procedure adherence.</p> <p>LO1732323, EMG ES-13, TRANSFER TO HOTLEG RECIRCULATION, Objective 4, Explain the bases and any knowledge requirements for procedure steps.</p> <p>Meets the K/A since the given condition is a Large Break LOCA and question asks how the pumps are operated for a given procedure as well as the basis for why the procedure is performed.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

43

ID: LO153511

Points: 1.00

Given:

- The unit is operating at 100%.
- The crew is responding to high RCP vibrations per OFN BB-005, RCP MALFUNCTIONS.
- 'A' RCP Frame Vibration is at 5.1 MILS and rising at a rate of 0.3 MILS/HR.

Based on these conditions, which of the following action sequences is the crew REQUIRED to take per OFN BB-005 and why?

- A. Manually Stop 'A' RCP and THEN Trip the Reactor to limit any potential RCP damage.
- B. Manually feed 'A' S/G to a level of 70% NR and THEN Stop 'A' RCP to compensate for the expected S/G Level Shrink when stopping the pump.
- C. Reduce power to <48% per OFN MA-038, RAPID PLANT SHUTDOWN and THEN Stop 'A' RCP to prevent an automatic Reactor Trip.
- D. Manually Trip the Reactor and THEN stop the 'A' RCP to ensure initial conditions assumed in the Departure from Nucleate Boiling Safety Analyses remain satisfied.

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Stop 'A' RCP, THEN Trip Reactor) is INCORRECT, but plausible. Given that the Immediate Shutdown Criteria is met for Frame Vibration, the pump should be stopped, but only after tripping the Reactor.

B. Distractor 2 (Manually feed 'A' S/G to 70%) is INCORRECT, but plausible. This action is directed by OFN BB-005, ATT B for power levels <48% for both a controlled and Immediate RCP shutdowns. Wrong since initial power was 100%. The crew is required to Trip the Reactor and stop the RCP NEXT per ATT B for the given conditions. This answer choice was selected during Operator validations.

C. Distractor 3 (Reduce power to <48%) is INCORRECT, but plausible. OFN BB-005, ATT C, Step C1.b.1) RNO directs lowering power level to 30% prior to tripping the reactor and then stopping the RCP. The Note prior to Step C1 specifies that "Below P-9 (48% power), the Reactor will NOT automatically trip when one Reactor Coolant Pump is secure. The choice is wrong for the given rate of change, but this choice would be the correct answer is Frame vibration was between 3 and 5 MILS. Wrong since given Frame Vibration is >5 MILS. The crew is required to perform Immediate RCP Shutdown per ATT B for the given conditions. The given Frame Vibration value could also be confused with Shaft Vibration. Immediate Shutdown Criteria for Shaft Vibration is 20 MILS.

D. CORRECT (Trip the Reactor and THEN stop 'A' RCP). Per OFN BB-005, ATT B, since the reactor is critical with power level >48%, the crew is required to trip the reactor and stabilize the plant using EMGs while continuing OFN BB-005 actions to include stopping the affected RCP. LCO 3.4.1, DNB basis specifies the requirements of the LCO for RCS Pressure / Temperature / Flow represent the initial conditions for DNB limited transients analyzed in the plant safety analysis. Reducing flow while the reactor is critical places the unit outside of the applicable safety analysis unnecessarily.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 43 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153511
User-Defined ID:	LO153511
Reference:	RCP MALFUNCTION
Topic:	#43 APE 015/017 / AK3.03 (New - High)
RO Importance Rating:	3.7
SRO Importance Rating:	N/A
K/A Number:	APE 015/017 AK3.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Reactor Coolant Pump (RCP) Malfunctions, Knowledge of the REASONS for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Sequence of events for manually tripping reactor and RCP as a result of an RCP malfunction. (CFR: 41.5 / 41.10 / 45.6 / 45.13)</p> <p>Tier 1 Group 1</p> <p>High Cog - Requires application of procedure knowledge and a reason for why that action is required.</p> <p>NOTE OFN BB-005, was revised on 8/29/19 to update Appendix C for Controlled shutdown of RCPs based on existing 'A' RCP #1 Seal leakoff. This question still valid since an Immediate shutdown is required.</p> <p>LO1732415, RCP MALFUNCTIONS (OFN BB-005), Objective 4, Explain the basis and knowledge requirement for specific procedure steps. (Foldout step for Immediate Pump Shutdown per APPENDIX B.)</p> <p>Meets K/A in that the given malfunction is high vibration on a RCP that meets immediate shutdown criteria. The question tests the sequence for manually tripping the reactor and then the RCP and why.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

44

ID: LO153512

Points: 1.00

Given:

- The unit is in MODE 5 with Reduced Inventory conditions and 'A' RHR in service.
- 'A' RHR Pump discharge pressure is oscillating
- NPIS trend for 'A' RHR pump amps is oscillating
- EJ FI-618, RHR 'A' discharge flow is oscillating between top and bottom of scale
- BB LI-53B/54B, RCS LEVEL NR COLD CAL LOOP4/LOOP1, at 12" WC and lowering

Based on these conditions, what action is the crew REQUIRED to take NEXT per OFN EJ-015, LOSS OF RHR COOLING?

- A. Stop 'A' RHR Pump using EJ HIS-1
- B. Throttle open EJ FCV-618, RHR HX BYPASS FLOW CONTROL VALVE
- C. Throttle closed EJ HCV-606, RHR A HX OUTLET FLOW CONTROL VALVE
- D. Throttle closed BG HC-128, RCS CLEANUP TO LETDOWN HEAT EXCHANGER FLOW CONTROL

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (Stop 'A' RHR Pump). For the given conditions, 'A' RHR Pump is cavitating with indicated flow oscillations >1000 gpm (EJ FI-618 is scaled between 0 and 5500 gpm). OFN EJ-015 fold out page directs stopping 'A' RHR pump for these conditions. RHR flow oscillations in excess of 1000 gpm while in reduced inventory may lead to complete air binding of the pump. If this flow oscillation condition exists, the pump should be immediately secured.

B. Distractor 1 (Throttle OPEN EJ FCV-618) is INCORRECT, but plausible. OFN EJ-015 foldout page and Step 4 RNO direct throttling this valve CLOSED as necessary to stop cavitation while referring to FIGURE 1. For the given RCS level 12" WC, there is no RHR flow that would cause cavitation to stop.

C. Distractor 2 (Throttle closed EJ HCV-606) is INCORRECT, but plausible. This valve is operated per OFN EJ-015 to maintain desired RCS temperature. Manipulation of this valve will not improve cavitation conditions and is NOT the next action the crew is directed to take per OFN EJ-015. This answer choice was selected during Operator validations.

D. Distractor 3 (Throttle BG HC-128) is INCORRECT, but plausible. This action is directed by OFN EJ-015, Step 5 to help recover RCS loop level to >20 inches. This action is taken AFTER stopping the pump. Wrong because it is not the NEXT step.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 44 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153512
User-Defined ID:	LO153512
Reference:	LOSS OF RHR
Topic:	#44 APE 025 / AA1.09 (New - High)
RO Importance Rating:	3.2
SRO Importance Rating:	N/A
K/A Number:	APE 025 AA1.09
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of Residual Heat Removal System (RHRS), Ability to operate and/or monitor the following as they apply to the Loss of RHRS. LPI pump switches, ammeter, discharge pressure gage, flow meter, and indications. (CFR: 41.7 / 45.5 / 45.6)</p> <p>Tier 1 Group 1</p> <p>High Cog - Analysis of given conditions and application of foldout page direction.</p> <p>LO1732425, OFN EJ-015 and OFN BB-031 SHUTDOWN EMERGENCIES, Objective 4, Explain the basis and knowledge requirement for specific OFN EJ-015 Steps.</p> <p>Meets K/A since the question provides RHR system pump cavitation conditions and asks what action(s) the crew should take per OFN EJ-015, LOSS OF RHR.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

45

ID: LO59496

Points: 1.00

Given:

- The unit is operating at 100%.
- 'B' ESW Pump is running for surveillances testing.
- 'B' CCW Train is supplying the Service Loop.
- MCB Annunciator 104D, DI WTR PRESS LO actuated
- EG HIS-2, DI WTR TO CCW SURGE TANK B is open.
- 'B' CCW Surge Tank level is 44% and slowly lowering.
- The crew entered OFN EG-004, CCW SYSTEM MALFUNCTIONS.

Based on these conditions, a possible cause for the loss of CCW inventory is due to a leak in the...

- A. CCW Heat Exchanger
- B. Seal Water Heat Exchanger
- C. CVCS Letdown Heat Exchanger
- D. Spent Fuel Pool Cooling Heat Exchanger

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (CCW Heat Exchanger) is INCORRECT, but plausible. The direction of leakage to / from this heat exchanger depends on service water header pressure. A note prior to OFN EG-004, Step 41 specifies "CCW Heat Exchanger can be a source of inleakage or outleakage depending on pump configuration." With an ESW pump running, any leakage in the CCW Heat Exchanger would be into the CCW system causing level to rise. If NO ESW pump was running, any leakage in the CCW Heat Exchanger would be out of the CCW system to the Service Water system.

B. CORRECT (Seal Water Heat Exchanger) Seal Water Heat Exchanger pressure is slightly above VCT pressure (maintained about 25 psig) well below CCW system pressure. Any leakage from the Seal Water Heat Exchanger will be from the CCW system. OFN EG-004, Step 15 provides guidance for bypassing the Seal Water Heat Exchanger in the event of CCW Leakage into the VCT.

C. Distractor 2 (CVCS Letdown Heat Exchanger) is INCORRECT, but plausible. CVCS Letdown Heat Exchanger pressure is at RCS pressure, well above the CCW System pressure, so any leakage in this heat exchanger will cause CCW Surge Tank level to rise. OFN EG-004, Step 35 provides guidance for isolation of Letdown Heat exchanger if that is the source of inleakage to the CCW System.

D. Distractor 3 (Spent Fuel Pool Cooling Heat Exchanger) is INCORRECT, but plausible. Spent Fuel Pool Cooling system is operated at a pressure higher than CCW System pressure, so any leakage in this heat exchanger would be into the CCW System. OFN EG-004, Step 38 provides guidance for checking Spent Fuel Pool Cooling as a source of Inleakage to the CCW System.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 45 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	59496
User-Defined ID:	LO59496
Reference:	LOSS OF CCW
Topic:	#45 APE 026 / AA2.02 (Bank - High)
RO Importance Rating:	2.9
SRO Importance Rating:	3.5
K/A Number:	APE 026 AA2.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of Component Cooling Water (CCW), Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: the cause of possible CCW loss. (CFR: 43.5 / 45.13)</p> <p>Tier 1 Group 1</p> <p>High Cog - Application of system knowledge and procedure direction.</p> <p>Bank Question (No history)</p> <p>LO1732414, OFN EG-004, CCW MALFUNCTIONS, Objective 2, Recognize the available situations which are addressed by OFN EG-004.</p> <p>Meets K/A since the question provides a set of CCW system conditions and asks for the possible cause of the loss of CCW.</p> <p><u>Revision History:</u> 1- Fixed Typo in stem</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

46

ID: LO153518

Points: 1.00

Given:

- The unit is operating at 100% power.
- PZR Pressure is 2235 psig.
- PZR Pressure control is in AUTOMATIC.
- The Master Pressurizer Pressure Controller malfunctions and the output drifts slowly from 50% to 83% and components reposition.

After placing the Pressurizer Master Pressure Controller in MANUAL, what action will the Reactor Operator take with the Master Pressurizer Pressure Controller in response to the failure?

- A. Operate the UP arrow pushbutton, which will close both spray valves ONLY.
- B. Operate the DOWN arrow pushbutton, which will close both spray valves ONLY.
- C. Operate the UP arrow pushbutton, which will close both spray valves and the 'A' PORV.
- D. Operate the DOWN arrow pushbutton, which will close both spray valves and the 'A' PORV.

Answer: C

## Answer Explanation

Answer choices sorted short to long. CORRECT answer at C.

A. Distractor 1 (Up, Close Spray Valves ONLY) is INCORRECT, but plausible. The direction of control is right and this choice would be true if the given output failure remained <81.25% (2335 psig). Since the output rose to >81.25% (2335 psig), then PORV BB PCV-455 also opened on controller output signal. This answer choice was selected during Operator validations.

B. Distractor 2 (Down, Close Spray Valves ONLY) is INCORRECT but plausible. Both answer choices are wrong; the opposite of the correct answer.

C. CORRECT (Up, Spray AND PORV). For the given conditions, output rises to >82.25% (2335 psig), both Spray valves will be fully open and PORV BB PCV-455 will also be open. Actual pressure drops and Reactor will Trip and SI will Actuate on Low pressure without Operator response. The Operator must operate the UP arrow output push button to LOWER the output to raise actual pressure. The Operator should manipulate this UP pushbutton until output is <42.2% (2210 psig). This action will close the PORV, close both spray valves, maximize variable heater current and energize both sets of PZR Backup heaters to stop the pressure drop transient.

D. Distractor 3 (Down, Spray valves and PORV) is INCORRECT, but plausible as the output will be drifting up for the given conditions, so the applicant might think pushing the down pushbutton would counteract that failure. This is wrong, though, as the controller output buttons drive the output in the opposite direction of what is pushed. To stop the actual pressure drop, the Operator must push the Up push button to lower the output. The affected components are right.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 46 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153518
User-Defined ID:	LO153518
Reference:	PZR PCS MALF
Topic:	#46 APE 027 / AA1.03 (Bank - High)
RO Importance Rating:	3.6
SRO Importance Rating:	N/A
K/A Number:	APE 027 AA1.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement: Pressurizer Pressure Control System (PZR PCS) Malfunction. Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: Pressurizer control when on a steam bubble. (CFR 41.7 / 45.5 / 45.6)</p> <p>Tier 1 Group 1</p> <p>High Cog - Application of output signal response to determine plant response and required Operator Action to counteract this change in plant condition.</p> <p>Edited Version of LO100403, which was based on Seabrook 2013 Exam Question. (History 21/27 - 78%)</p> <p>LO1732418, OFN SB-008, INSTRUMENT MALFUNCTIONS, Objective 3, Explain the Major Actions accomplished by the procedure. (Check if RCS instrument channel is malfunctioning: PZR Pressure Master (BB) or PZR Spray Controller) ATTACHMENT V.)</p> <p>Meets the K/A since a controller malfunction was given and the question asked which action was required by the magnitude of the change in controller output. A steam bubble exists during normal 100% power operation and the given output causes a PORV to open.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

47

ID: LO153524

Points: 1.00

Given:

- The unit is operating at 100%.
- AE FK-510, S/G A MFW REG VLV CTRL failed LOW.
- MCB Annunciator 085A, SG LEV LOLO RX TRIP, red first out is LIT
- Both reactor trip switches fail to trip the Reactor
- NO rod bottom lights are lit

Based on these conditions, what action(s) should the BOP take NEXT and why?

- A. Insert control rods in manual to lower reactor power.
- B. Open PG19 and PG20 breakers to immediately add negative reactivity.
- C. Close main steam isolation valves to prevent a low steam line SI on rate.
- D. Press both main turbine trip pushbuttons to prevent an uncontrolled RCS cooldown.

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Insert Control Rods) is INCORRECT, but plausible since this is the action the RO is performing per AP 15C-003 (Wolf Creek Directives) as directed by EMG FR-S1, step 1. Wrong because this is NOT the next step the BOP will take.

B. Distractor 2 (Open PG19 and 20) is INCORRECT, but plausible. This is the SECOND thing the BOP will do after tripping the Turbine as directed by Step 1 RNO. Also wrong because this action does not immediately add negative reactivity. This action removes power from RDMG sets so that the rods will eventually drop when the control rod drive mechanisms lose power. This answer choice was selected during Operator validations.

C. Distractor 3 (Close MSIVs) is INCORRECT, but plausible. There are foldout page actions in EMG E-0 to close these valves if there was a loss of Off-Site power, or if there were any indications of a faulted S/G, or if the Turbine failed to trip. None of these conditions were given, and even if they were, the FIRST step is to trip the turbine.

D. CORRECT (Trip the Turbine to prevent uncontrolled RCS Cooldown). This step is directed by EMG FR-S1 and is the FIRST action the BOP will take. Since the red first out did not trip the reactor nor did both trip switches the crew will enter EMG FR-S1 from EMG E-0. The BOP will trip the turbine and then open PG19 and 20 in that order. Since this is NOT a loss of feed ATWS, the bases for the turbine trip is to prevent an uncontrolled cooldown of the RCS due to the steam flow to the turbine.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 47 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153524
User-Defined ID:	LO153524
Reference:	EMG FR-S1
Topic:	#47 EPE 029 / 2.2.44 (Bank - Low)
RO Importance Rating:	4.2
SRO Importance Rating:	4.3
K/A Number:	EPE 029 2.2.44
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Anticipated Transient without Scram (ATWS), Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. (CFR: 41.5 / 45.5 / 45.12)</p> <p>Tier 1 Group 1</p> <p>Low Cog - Immediate Operator Action per EMG FR-S1</p> <p>Edited copy of Bank question LO93696 (No history)</p> <p>LO1732339, EMG FR-S1 / S2, LOSS OF SUBCRITICALITY, Objective 3, Explain the basis and knowledge requirement for specific EMG FR-S1 procedure steps.</p> <p><u>Overlap Consideration</u> - Question #39 was changed to be different from this question</p> <p>Meets the K/A since the question provides an ATWS scenario and asks for the expected BOP response, which is specified by station directives in AP 15C-003. The question also asks "Why" to test understanding of why those actions are taken.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

48

ID: LO91780

Points: 1.00

Given:

- A Reactor Trip and Safety Injection occurred from 100% power.
- All EMG E-0, REACTOR TRIP OR SAFETY INJECTION, ATTACHMENT F Actions are performed.
- Containment Spray has actuated.
- Steam Generator A/B/C/D Pressure 425 psig and lowering.
- Steam Generator A/B/C/D Flow 3E6 lbm/hr and lowering.
- All four MSIVs are mechanically stuck open and all attempts to close have failed.

Based on these conditions, which of the following procedures will the crew use to stabilize the plant?

- A. EMG ES-03, SI TERMINATION
- B. EMG E-2, FAULTED STEAM GENERATOR ISOLATION
- C. EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT
- D. EMG C-21, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (EMG ES-03) is INCORRECT, but plausible. For any given steam line break, the overall mitigating strategy is to isolate the faulted S/G and terminate SI prior to overfilling the PZR. For the given conditions, all four S/Gs are faulted and unable to be isolated, so EMG C-21 will be used. EMG C-21, terminates SI between steps 19 and 32, which will stabilize plant conditions and eventually cooldown and depressurize the RCS for placing RHR in service for shutdown cooling without entry to EMG ES-03.

B. Distractor 2 (EMG E-2) is INCORRECT, but plausible. For the given conditions, the crew will enter EMG E-2 from EMG E-0, Step 16. Since MSIVs are stuck open and unable to be closed, the crew will transition to EMG C-21 at Step 3 of EMG E-2 to stabilize the plant. EMG C-21 foldout page and Caution prior to step 1 specify if any S/G pressure rises and ST termination using steps 19 through 32 of the procedure is NOT in progress, the crew should transition back to EMG E-2. For the given MSIV condition, EMG E-2 will NOT be used to stabilize the plant. This answer choice was selected during Operator validations.

C. Distractor 3 (EMG E-1) is INCORRECT, but plausible. Given that a Safety Injection has occurred, and CS has actuated (>17 psig CTMT pressure), EMG E-1 is procedure that could be entered from EMG E-0, Step 18 or EMG C-21, Step 11 if RCS pressure was <325 psig. EMG E-1 will NOT be used to stabilize the plant conditions for the given conditions. This answer choice was selected during Operator validations.

D. CORRECT (EMG C-21) For the given stuck open MSIV conditions, the crew will enter EMG C-21 to stabilize plant conditions. By the end of the crew's performance of EMG C-21, SI will be terminated, and the RCS will be cooled down to place RHR shutdown cooling in service.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 48 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	91780
User-Defined ID:	LO91780
Reference:	EMG C-21
Topic:	#48 WE12 / EA2.1 (Bank - Low)
RO Importance Rating:	3.2
SRO Importance Rating:	4.0
K/A Number:	WE12 EA2.1
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Uncontrolled Depressurization of all Steam Generators, Ability to determine and interpret the following as they apply to the Uncontrolled Depressurization of all Steam Generators, Facility conditions and selection of appropriate procedures during abnormal and emergency operations. (CFR: 43.5 / 45.13)</p> <p>Tier 1 Group 1</p> <p>Low cog - Identification of procedure entry conditions</p> <p>LO17322334, EMG C-21, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, Objective 1, Identify the procedure entry conditions.</p> <p>Meets K/A since the question provides a scenario in which all four MSIVs are stuck open resulting in an uncontrolled depressurization of all S/Gs and asks which procedure the crew will use to stabilize the plant.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

49

ID: LO153537

Points: 1.00

Given:

- The unit is operating at 59% power with both MFPs in service.
- MCB Annunciator 112D, TSI ALARM actuated.
- Ovation TSC Graphic 6103, SGFP A VIBRATION & TEMPERATURE MONITORING, shows HIHI Vibration alarm for 'A' MFP.

1) In response to high vibrations 'A' MFP will trip...

2) Based on these conditions, per ALR 00-120A, MFP A TRIP, a Manual Reactor Trip \_\_\_\_\_ required.

- A. 1) ONLY manually if push buttons FC HS-018A and FC HS-018B are depressed.  
2) is
- B. 1) ONLY manually if push buttons FC HS-018A and FC HS-018B are depressed.  
2) is NOT
- C. 1) EITHER automatically when the high vibration setpoint is exceed OR manually if push buttons FC HS-018A and FC HS-018B are depressed.  
2) is
- D. 1) EITHER automatically when the high vibration setpoint is exceed OR manually if push buttons FC HS-018A and FC HS-018B are depressed.  
2) is NOT

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (Manually using FC HS-018A/B, is) is INCORRECT, but plausible. The first part is right, but the second part is wrong. This choice would be true if given power level were >62%. Wrong since given power level is 59%.

B. CORRECT (Manually using FC HS-018A/B, is NOT) Per ALR 00-120A, Step 1, 'A' MFP is tripped by Depressing BOTH FC HS-018 A and FC HS-018B. The MFP will physically trip if either push button is tripped. Per ALR 00-120A, Step 2, since given power level is <62%, manual reactor trip is NOT required, and the crew will proceed to step 3.

C. Distractor 1 (Either Auto or Manual, is) is INCORRECT, but plausible. There is NO automatic MFP trip based on high vibration. Plausible because there is Main Turbine High Vibration Trip, which is enabled for the given power level <65% (Per Gen 00-004, paragraph 6.2.8). Per ALR 00-112D, Operator Action is required to manually trip the MFP and for the given power level at <62%, the Reactor is NOT required to be tripped per ALR 00-120A. Both parts of the answer choice are wrong.

D. Distractor 2 (Either Auto or Manual, is NOT) is INCORRECT, but plausible. There is NO automatic MFP trip based on high vibration. Plausible because there is a Main Turbine High Vibration Trip, which is enabled for the given power level <65% (Per GEN 00-004, paragraph 6.2.8). Per ALR 00-112D, Operator Action is required to manually trip the MFP. The second part is right since the given power level at 59% is <62%, a Manual Reactor Trip is NOT procedurally required per ALR 00-120A.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 49 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153537
User-Defined ID:	LO153537
Reference:	LOSS OF MFW
Topic:	#49 APE 054 / 2.1.31 (New - High)
RO Importance Rating:	4.6
SRO Importance Rating:	4.3
K/A Number:	APE 054 2.1.31
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of Main Feedwater, Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. (CFR: 41.10 / 45.12)</p> <p>Tier 1 Group 1</p> <p>High Cog - Analysis of given conditions, selection of required controls and application of procedure action based on system limits.</p> <p>LO4705900, Main Feedwater System Lab, Objective 2, Recognize alarms associated with the Main Feedwater System.</p> <p>Meets K/A in that the given conditions require the crew to stop a MFP and the question specifies where the controls are located and whether or not, based on initial conditions, the loss of feedwater flow requires a reactor trip.</p> <p><u>Revision History:</u> 1- Deleted stem bullet for CRS directing manual trip of MFP. Changed the first part of the question to test if the MFP will automatically trip on high vibration or not. Updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

50

ID: LO153754

Points: 1.00

Given:

- A Station Blackout has occurred.
- The crew has performed EMG C-0, LOSS OF ALL AC POWER, Steps 1 through Step 25, **Check if S/Gs Are Not Faulted.**
- AC Emergency Bus NB01 is now powered from the Station Blackout Diesel Generator after the RO completed actions of OFN NB-030, LOSS OF AC EMERGENCY BUS NB01 (NB02).

Based on these conditions, which of the following describes how the crew will proceed?

- A. Return To Procedure and Step in Effect.
- B. Continue in EMG C-0 with Step 26, **Check If S/G Tubes Are Intact:**
- C. Go to Step 44 and prepare to manually restart Individual NB01 Loads.
- D. Go to Step 44 and monitor S/D Sequencer Actuation of all NB01 Loads.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (Return to Procedure and Step in Effect) is INCORRECT, but plausible. This would be true per Step 14 if power had been restored prior to placing NB01 loads in PTL in Step 15. After the completion of Step 15, the crew is required by foldout page to go to step 44 when power is restored to either NB01 or NB02.

B. Distractor 2 (Continue in EMG C-0, Step 26) is INCORRECT, but plausible. This would be true if not for the foldout page direction to go to Step 44 if power is restored to NB01 or NB02 during the performance of Steps 15 through 44. Wrong since the given step is Step 25, so the crew should proceed to Step 44 and continue in EMG C-0.

C. CORRECT (Go to Step 44 and prepare to manually restart NB01 loads) EMG C-0, Foldout page Step 2 specifies IF power is restored to NB01 or NB02 during performance of Steps 15 through 44, THEN go to Step 44. With all the NB01 loads (except ESW pump) placed in PTL per Step 15, the crew is required to go to Step 44 for the given conditions. S/G Pressures are stabilized in Step 45, SI is Reset in Step 46, and per Step 47 RNO, the crew will manually load equipment, as necessary to support recovery actions. Since power is restored via SBO, there is a cable load limit and the crew is directed to allow a 30 second time interval between motor starts when manually loading 4.16 KV loads and non-safety related loads to prevent a trip at 936 amps (per NOTE prior to Step 44).

D. Distractor 3 (Go to Step 44 and monitor S/D Sequencer Actuation of all NB01 loads) is INCORRECT, but plausible. The direction to proceed to step 44 is right, but all the loads except ESW Pump are placed in PTL in Step 15 to defeat automatic loading of large loads on the AC emergency bus. Also, wrong because the EDG Output breaker must be closed with both the normal and alternate feeder breakers open for the S/D Sequencer to Actuate. For the given conditions, NB01 is powered by locally closing breaker NB0114, so all three feeder breakers will be open, therefor actuation conditions are NOT met for either S/D or LOCA sequencers.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 50 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153754
User-Defined ID:	LO153754
Reference:	STATION BLACKOUT
Topic:	#50 APE 055 / 2.1.20 (New - High)
RO Importance Rating:	4.6
SRO Importance Rating:	4.6
K/A Number:	EPE 055 2.1.20
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Station Blackout, Ability to interpret and execute procedure steps (CFR: 41.10 / 43.5 / 45.12)</p> <p>Tier 1 Group 1</p> <p>High Cog - Application of foldout page direction and understanding knowledge of completed steps and system knowledge.</p> <p>LO1732329, EMG C-0, LOSS OF ALL AC POWER, Objective 3, Explain the bases and knowledge requirements for procedure actions.</p> <p>Meets the K/A since the applicant is given a restoration of power while performing a specific Station Blackout procedure step and asked how the crew will proceed.</p> <p><u>Revision History:</u> 1- Improved clarity in the stem by specifying power was restored to NB01 and that steps 1-25 were completed. Added noun name for Step 26 in the answer choice and shuffled A and B answer choices to maintain short to long format. Updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

51

ID: LO153560

Points: 1.00

Given:

- While operating at 100% power, a reactor trip occurred due to a loss of offsite power.
- The crew has entered EMG ES-04, NATURAL CIRCULATION COOLDOWN.
- SI is Blocked.
- Normal Letdown is NOT in service.
- The crew is performing an RCS cooldown while maintaining RCS Pressure between 1600 psig and 1920 psig per Step 21, **Establish Required RCS Subcooling**.

Based on these conditions,

1) How is the crew maintaining RCS Pressure?

2) What is the MINIMUM Target Core Exit Thermocouple Temperature the crew will achieve to establish subcooling at 100°F prior to recommencing RCS Depressurization per EMG ES-04, Step 22, **Continue RCS Cooldown and Depressurization**?

- A. 1) A PORV  
2) 505°F
- B. 1) A PORV  
2) 605°F
- C. 1) Normal Spray  
2) 505°F
- D. 1) Normal Spray  
2) 605°F

Answer: A

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted sequentially. Correct answer at C.

A. CORRECT (PORV, 505F) Per EMG ES-04, Step 21, since Letdown was NOT inservice, the RNO directs arming COPP and using a single PORV to maintain RCS Pressure between 1600 and 1920 psig. For the given RCS pressure band, the crew should cooldown to below the temperature that would maintain 100F subcooling for 1600 psig (1615 psia). The Saturation Temperature for 1615 psia is ~605F, so the target CETC is 505F will satisfy step 21c and allow the crew to proceed to Step 22 and allow RCS pressure to drop below 1600 psig.

B. Distractor 1 (PORV, 605F) is INCORRECT, but plausible. The method of pressure control is right, but the target temperature is wrong. The target CETC value corresponds to the value from the steam tables for 1600 psig (1615 psia) without applying the definition of "subcooling." This distractor satisfies the K/A to define subcooling and use steam tables given a loss of Off-Site power.

C. Distractor 2 (Normal Spray, 505F) is INCORRECT, but plausible. Use of Normal spray is usually the preferred method of pressure control, but due to the given LOOP, there are NO RCPs running, so Normal Spray is NOT available. For the given RCS pressure band, the crew should cooldown to below the temperature that would maintain 100F subcooling for 1600 psig (1615 psia). The Saturation Temperature for 1615 psia is ~605F, so the target CETC is 505F will satisfy step 21c and allow the crew to proceed to Step 22 depressurize the RCS to <1600 psig.

D. Distractor 3 (Normal Spray, 605F) is INCORRECT, but plausible. Use of Normal Spray is usually the preferred method of pressure control, but due to the given LOOP, there are no RCPs running, so Normal spray is NOT available. The given target CETC temperature corresponds to saturation conditions and not 100F subcooled conditions, so both answer choices are wrong.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 51 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153560
User-Defined ID:	LO153560
Reference:	LOOP
Topic:	#51 APE 056 / AK1.03 (New - High)
RO Importance Rating:	3.1
SRO Importance Rating:	N/A
K/A Number:	APE 056 AK1.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of Offsite Power, Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Definition of subcooling; use of steam tables to determine it (CFR: 41.8 / 41.10 / 45.3)</p> <p>Tier 1 Group 1</p> <p>High Cog - Application of procedure knowledge based on given event and use of steam tables to determine target temperature based on the provided minimum subcooling value.</p> <p>LO1732317, EMG ES-04/05/06 NATURAL CIRCULATION COOLDOWN, Objective 3, Explain the basis and any knowledge requirements for EMG ES-04 procedure steps.</p> <p>Meets the K/A in that a LOOP is the given event and the question requires use of steam tables to determine saturation conditions and knowledge of the definition of subcooling to subtract 100F from the value the applicant looks up. The question is enhanced by an Operationally valid question regarding how the crew is controlling RCS pressure during cooldown.</p> <p><u>Revision History:</u> 1- Clarified question wording and updated answer explanations.</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

52

ID: LO108057

Points: 1.00

Given:

- The unit is operating at 100% power.
- The main feeder breaker to 480 VAC Bus NG01 tripped on overcurrent.
- No Operator action has been taken.

Which of the following describes the effect on the unit electrical alignment?

- A. Battery Charger NK25 is powered. 120 VAC Bus NN01 is powered by Battery NK11.
- B. Battery Charger NK21 has lost power. 120 VAC Bus NN01 is powered by Battery NK11.
- C. Battery Charger NK21 is powered. 120 VAC Bus NN01 has transferred to the alternate supply.
- D. Battery Charger NK25 has lost power. 120 VAC Bus NN01 has transferred to the alternate supply.

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (NK25 is powered, NN01 powered from NK11) is INCORRECT, but plausible. NK25 battery charger is powered by NG01, so it is now without power. The second part is right in that Battery NK11 maintains continuity of power to bus NK01, which continues to supply bus NN01.

B. CORRECT (NK21 has lost power, NN01 powered from NK11). NK21 battery charger is powered by NG01 and is now without power. Battery NK11 maintains continuity of power to NK01 so that bus NN01 is now being supplied by Battery NK11.

C. Distractor 2 (NK21 is powered, NN01 transferred) is INCORRECT, but plausible. Charger NK11 is powered by NG01, so it is now without power. Continuity of power to bus NN01 is maintained by Battery NK11 so the normal power supply to NN01 via inverter NN11 is unaffected. Plausible because the backup power to NN01 comes from NG01 via a 7.5kVa Bypass Constant Voltage Transformer (BCTC) and static transfer switch.

D. Distractor 3 (NK25 has lost power, NN01 transferred) is INCORRECT, but plausible. The first part is right since NK25 is without power. Continuity of power to bus NN01 is maintained by Battery NK11 so the normal power supply to NN01 via inverter NN11 is unaffected. Plausible because the backup power to NN01 comes from NG01 via a 7.5kVa Bypass Constant Voltage Transformer (BCTC) and static transfer switch.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 52 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	108057
User-Defined ID:	LO108057
Reference:	LOSS OF DC
Topic:	#52 APE 058 / AK1.01 (Bank - High)
RO Importance Rating:	2.8
SRO Importance Rating:	N/A
K/A Number:	APE 058 AK1.01
Comments:	<p>2019 Wolf Creek NRC, K/A Statement: Loss of DC Power - Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation. (CFR 41.8 / 41.1 / 45.3)</p> <p>Tier 1 Group 1</p> <p>High Cog - Analysis, diagnosis and application of system knowledge.</p> <p>Bank Question, Last used on 2013 Calloway NRC Exam.</p> <p>LO1732430, OFN NK-020, LOSS OF NK BUS (125VDC VITAL), Objective 3, Examine the available options for procedure actions.</p> <p>Meets the K/A since given condition removes input power to an NK battery charger and tests how the unit automatically responds to the event. Question also tests normal alignment of battery chargers to eliminate distractors.</p> <p><u>Revision History:</u> 1- Clarified in the stem that NG01 is a 480V VAC Bus and modified the order of two answer choices for consistency. Also updated the answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

53

ID: LO153561

Points: 1.00

Given:

- The unit is operating at 100% power.
- A lightning strike disabled the XNB01 Transformer.
- All Emergency Systems Operated as designed.

Based on these conditions, 1) What actions, if any, are the crew REQUIRED to take per OFN NB-030, LOSS OF AC EMERGENCY BUS NB01(NB02) for the ESW System and 2) Why?

- A. 1) Monitor for proper automatic response for BOTH ESW Train components.  
2) S/D Sequencers on BOTH Trains actuated, so both ESW Pumps auto started, all four Service Water/ESW Valves auto closed and both ESW TO UHS valves auto opened.
- B. 1) Start ESW Pump 'B', Open EF HIS-37, ESW TRN A TO UHS, AND close the two Yellow Train Service Water/ESW Valves cross connect valves.  
2) ONLY the Red Train S/D Sequencer Actuated and Yellow Train Service Water/ESW Valves must be manually closed to ensure proper train isolation and separation with ESW Pumps running.
- C. 1) Start ESW Pump 'B' and Open EF HIS-38, ESW TRN B TO UHS, ONLY.  
2) ONLY the Red Train S/D Sequencer Actuated and Red Train Service Water/ESW Valves closed, isolating SW cooling to Yellow Train ESW loads.
- D. 1) ENSURE ESW Pump 'A' Started, Manually Open EF HIS-37, ESW TRAIN A to UHS, and Red Train Service Water/ESW Valves to restore SW Cooling to 'B' ESW loads.  
2) Since the LOCA Sequencer did NOT actuate, Normal Service Water alignment may be restored.

Answer: C

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (Monitor automatic response on BOTH trains) is INCORRECT, but plausible. S/D Sequencer Actuation is Train Specific and for the given failure of XNB01, only the NB01 (Red Train) S/D sequencer actuated. Manual Action is required to restore cooling to Yellow Train ESW components for the given conditions.

B. Distractor 2 (Start B ESW and operate Yellow Train valves to ensure proper train separation) is INCORRECT, but plausible. Starting the pump and opening the discharge valve to the UHS is right since only the Red train S/D sequencer actuated, but OFN NB-030 does NOT require closing the two yellow train SW/ESW cross connect valves (EF HIS-25 and EF HIS-26). Proper train separation is met when red train cross-connect valves (EF HIS-23, EF HIS-24) auto close.

C. CORRECT (Start B ESW and open UHS discharge ONLY, Red Train S/D Sequencer Actuated, so restoration of cooling is required for Yellow Train). For the given conditions, the loss of XNB01 causes an undervoltage start of 'A' EDG and restoration of power to Vital AC Emergency Bus NB01 in ~12 seconds. When the Red Train S/D Sequencer actuates, 'A' ESW Pumps and Red Train ESW Valves reposition, (UHS Valve Open, Cross Connect Valves Closed). This isolates SW cooling to Yellow Train ESW components, which are Manually restored per OFN NB-030, ATT A, Step A2 by manually starting B ESW Pump and Opening EF HIS-38 discharge to UHS valve.

D. Distractor 3 (Open Red Train cross connect valves since LOCA Sequencer did NOT actuate) is INCORRECT, but plausible as opening these valves would restore cooling to Yellow Train ESW, however, the valves still have a CLOSE signal from the S/D Sequencer until reset, so they will NOT be able to be manually opened. The required action is to start B ESW Pump and open B ESW Return to UHS valve EF HIS-38. Also wrong since EF HIS-37, ESW TRAIN A TO UHS valve auto opened for the given conditions.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 53 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153561
User-Defined ID:	LO153561
Reference:	LOSS OF ESW
Topic:	#53 APE 062 / AK3.01 (New - High)
RO Importance Rating:	3.2
SRO Importance Rating:	N/A
K/A Number:	APE 062 AK3.01
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of the REASONS for the following responses as they apply to the Loss of Nuclear Service Water: The conditions that will initiate the automatic opening and closing of the SWS isolation valves to the nuclear service water coolers. (CFR: 41.4 / 41.8 / 45.7)</p> <p>Tier 1 Group 1</p> <p>Higher Order Cog - Analysis of given conditions, application of system design/response and selection of the reason why the step is required.</p> <p>LO1732444, OFN NB-030, LOSS OF AC EMERGENCY BUS NB01(NB02) and OFN NB-042, LOOP WITH EDG PARALLELED, Objective 4, Explain the basis and knowledge requirement for specific OFN NB-030 steps. (Step A2)</p> <p>Meets K/A since the given condition causes a loss of a 4160 VAC vital bus which causes a loss of cooling to the non-affected ESW train due to system design and automatic closure of the SW cross connect isolation valves. The question asks for both the required action and WHY that action is required.</p> <p><u>Revision History:</u> 1- Modified distractor B to improve plausibility. Specified "ONLY" in the correct answer to avoid subset 2<sup>nd</sup> correct answer choice with the new distractor B. Updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

54

ID: LO153573

Points: 1.00

Given:

- The unit was operating at 100% Power
- Electrical disturbances are causing grid stability issues.
- The TSO dispatch ordered Wolf Creek to lower turbine load in anticipation of loss of one or more off-site supply lines.
- The crew completed power reduction to 90% per OFN MA-038, RAPID PLANT SHUTDOWN.
- The High Limiter Active on Ovation Graphic 5551 is clear.

As the crew continues to lower turbine load, which of the following is the preferred method of turbine load control and why?

- A. Megawatt Mode to control a steady Main Generator Output.
- B. Megawatt Mode to maintain steady conditions on the primary side.
- C. First Stage Pressure Mode to control a steady Main Generator Output.
- D. First Stage Pressure Mode to maintain steady conditions on the primary side.

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (MW, to maintain a steady Main Generator Output) is INCORRECT, but plausible. This is the reason why MW Mode is selected under normal conditions. Wrong for the given grid instability conditions as the turbine control system will operate erratically to maintain the specified MW output, which is connected to the unstable grid. Grid fluctuations will cause uncontrolled changes in Reactor Power if the turbine is connected in the MW Mode.

B. Distractor 2 (MW, to maintain steady conditions on the primary side) is INCORRECT, but plausible. Operation in the MW mode will cause fluctuations on the primary side for the given grid instability conditions.

C. Distractor 3 (FSP, to maintain a steady Main Generator Output) is INCORRECT, but plausible. The mode of control is right, but it is the MW Mode of control that is selected to maintain a Main Generator Output).

D. CORRECT (FSP, to maintain steady conditions on the primary side). The note prior to OFN MA-038, Step 2 specifies the FSP mode is selected if a secondary side transient requires changing turbine load or there is a need to keep primary side more stable. For the given grid instability causing fluctuations, FSP mode is desired to precisely control reactor power.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 54 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153573
User-Defined ID:	LO153573
Reference:	GRID DISTRURBANCE
Topic:	#54 APE 077 / AK2.07 (New - High)
RO Importance Rating:	3.6
SRO Importance Rating:	N/A
K/A Number:	APE 077 AK2.07
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Generator Voltage and Electric Grid Disturbances, Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: Turbine / Generator Control. (CFR: 41.4 / 41.5 / 41.7 / 41.10 / 45.8)</p> <p>Tier 1 Group 1</p> <p>High Cog - Requires understanding of how turbine operating modes while connected to an unstable grid will impact the primary.</p> <p>LO1732446, OFN MA-038, RAPID PLANT SHUTDOWN, Objective 4, Explain the basis and knowledge requirement for selected procedure steps. (Step 2 and notes prior to Step 2)</p> <p>Meets the K/A since grid instability condition was given, and the question asks for how the turbine / generator control system is operated as a result.</p> <p><u>Revision History:</u> 1- Specified in the stem the crew had lowered power using OFN MA-038 and changed the cognitive level to High.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

55

ID: LO88719

Points: 1.00

Given:

- The unit tripped and SI Actuated.
- The crew responding per EMG E-0, REACTOR TRIP OR SAFETY INJECTION.
- CTMT Atmosphere Pressure is steady at 1 psig.
- CTMT Normal Sump Levels are steady at 1995'-6"
- Area Radiation Monitor RE-19, AUX BLD GND FLOOR CORRIDOR, is in ALARM.
- LF LI-103, AUX BLD SUMP LEV, is rising.
- S/G Pressures are at 1125 psig and steady.
- RCS pressure 1800 psig and down slow.

Based on these conditions, which procedure will the crew transition to NEXT?

- A. EMG ES-03, SI TERMINATION
- B. EMG E-2, FAULTED S/G ISOLATION
- C. EMG C-12, LOCA OUTSIDE CONTAINMENT
- D. EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT

Answer: C

## Answer Explanation

Answer choices sorted short to long Correct answer at C.

A. Distractor 1 (EMG ES-03) is INCORRECT, but plausible. EMG E-0 provides this direction at Step 19 RNO if conditions to reduce ECCS flow are met. Given that RCS pressure is less than the actuation setpoint and trending down, this choice is wrong.

B. Distractor 2 (EMG E-2) is INCORRECT, but plausible as a transition from Step 16 if any S/G pressures were lowering in an uncontrolled manner. A faulted S/G could be the reason for SI Actuation, but for the given S/G pressures at the ARV setpoint and above 615 psig, there is no faulted S/G and the crew will NOT transition to EMG E-2 for the given conditions.

C. CORRECT (EMG C-12) For the given conditions, the crew will transition to EMG C-12 at Step 26 due to abnormal radiation levels in the Aux Building.

D. Distractor 3 (EMG E-1) is INCORRECT, but plausible. This is the normal procedure used to mitigate a LOCA due to either stuck open PORV (Step 11), stuck open Safety (Step 13), or for a break inside Containment (Step 18). For the given conditions, the LOCA is outside of CTMT, so the crew will transition directly to EMG C-12 at Step 26. This answer was choice selected during Operator validations due to misconception that you cannot transition directly from EMG E-0 to EMG C-12; only from EMG E-1.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 55 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	88719
User-Defined ID:	LO88719
Reference:	LOCA OUTSIDE CTMT
Topic:	#55 WE04 / EA2.1 (Bank - Low)
RO Importance Rating:	3.4
SRO Importance Rating:	4.3
K/A Number:	WE04 EA2.1
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, 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. (CFR: 43.5 / 45.13)</p> <p>Tier 1 Group 1</p> <p>Low cog - procedure entry conditions.</p> <p>Edited bank Question. (History 100%)</p> <p>LO1732333, EMG C-12, LOCA OUTSIDE CONTAINMENT, Objective 1, Identify the procedure entry conditions.</p> <p>Meets the K/A since the given conditions indicate a LOCA outside containment and the question asks which procedure the crew will use to address this condition.</p> <p><u>Revision History:</u> 1. Changed the opening stem statement from SBLOCA to trip and SI, removed the RWST Level and added S/G pressures, also specified RCS Pressure at 1800 psig to make Distractor A plausible. Changed Distractor C from EMG ES-12, which isn't a likely transition from EMG E-0. Resorted answer choices to maintain short to long format and updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

56

ID: LR153649

Points: 1.00

Given:

- A Large Break LOCA has occurred.
- The crew completed all required actions of EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION and are performing Step 22, **Verify ECCS Pumps Not Affected By Sump Blockage**.
- Pump Discharge Pressure, Flow, and Current all indicate cavitation exists on BOTH RHR Trains.

Based on these conditions, which of the following actions will the crew take NEXT per EMG ES-12?

- A. Secure ECCS Pumps on a single train and check if indications of cavitation stop.
- B. Transition to EMG C-11, LOSS OF EMERGENCY COOLANT RECIRCULATION.
- C. Transition to EMG C-13, CONTROL ROOM RESPONSE TO SUMP BLOCKAGE.
- D. Throttle RHR flow control valves, EJ HIC-606 and EJ HIC-607, until indications of cavitation stop.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (Secure ECCS Pumps on a single train) is INCORRECT, but plausible. EMG ES-12, Step 22 RNO provides direction to stop ECCS pumps as necessary to prevent damage IF indications of cavitation exist only on a single train. This choice is wrong since indication of cavitation exists on both trains. This answer choice was selected during Operator validations.

B. Distractor 2 (Transition to EMG C-11) is INCORRECT, but plausible. This procedure transition would have occurred earlier in the performance of EMG ES-12 at step 15 if at last one flow path from the containment sump to the RCS could NOT be established or maintained. For the given set of conditions, the challenge to ECCS flow is due to sump blockage, and not due to inability to establish cold leg recirculation. This choice is wrong because for the given conditions, EMG ES-12, Step 22 directs transition to EMG C-13. This answer choice was selected during Operator validations due to the misconception that EMG C-13 is only entered from EMG C-11. EMG C-13 is entered from two procedures EMG E-12, Step 22 (given condition) and EMG C-11, Step 1.

C. CORRECT (Transition to EMG C-13). Per EMG E-12, Step 22, for the given indications of cavitation on BOTH trains, the crew is directed to transition to EMG C-13 to address sump blockage.

D. Distractor 3 (Throttle RHR Flow) is INCORRECT, but plausible. This action is directed in other procedures, such as by EMG C-13 Step 2.c.RNO only if indications of cavitation have NOT stopped after securing the SI and CCPs taking suction from the RHR pumps. Wrong since this is NOT the NEXT action taken. The next physical action taken by the crew after transitioning to EMG C-13 is to stop the SI Pumps and CCPs having suction from the affected RHR Train.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 56 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153649
User-Defined ID:	LR153649
Reference:	LOSS OF RECIRC
Topic:	#56 WE11 / EK2.2 (New - High)
RO Importance Rating:	3.9
SRO Importance Rating:	N/A
K/A Number:	WE11 EK2.2
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of the interrelations between the Loss of Emergency Coolant Recirculation and the following, Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility. (CFR: 41.7 / 45.7)</p> <p>Tier 1 Group 1</p> <p>High Cog - Analysis of given conditions and procedure navigation (from memory).</p> <p>LO1732336, EMG C-13, CONTROL ROOM RESPONSE TO SUMP BLOCKAGE, Objective 1, Identify procedure entry conditions.</p> <p>Meets K/A since given conditions constitute a loss of Emergency Coolant Recirculation due to sump blockage. Applicant must understand the ECCS System alignment for actions completed per EMG ES-12 for decay heat removal and display knowledge of the actions required to protect the core given indications of cavitation (improper system operation).</p> <p><u>Revision History:</u> 1 – Added “Per EMG ES-12” to end of question.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

57

ID: LO153586

Points: 1.00

Given:

- The unit is in MODE 4 with startup preparations in progress.
- MCB Annunciator 058A, VCT LVL HI BORON DILUTION, actuated.
- VCT Level is 71% and rising slowly.
- Makeup to the VCT is NOT in progress.
- The RO reported Source Range count rate is rising and the SUR meter is above 0 dpm.

Based on these conditions, what action will the crew take per OFN BG-009, EMERGENCY BORATION to establish proper Emergency Boration?

- A. Align RWST to CCP Suction and verify flow rate >80 gpm.
- B. Perform ATTACHMENT A, ESTABLISHING ALTERNATE BORATION FLOWPATH.
- C. Perform ATTACHMENT B, EMERGENCY BORATION USING SI AS BORATION FLOWPATH.
- D. Start at least one Boric Acid Transfer Pump, open BG HIS-8104, Emergency Borate to Charging Pump Suction Valve, and verify flow rate >30 gpm.

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Align RWST to CCP Suction and verify flow rate >80 gpm) is INCORRECT, but plausible. The action to establish this lineup is directed by OFN BG-009 step 2 RNO if unable to perform the preferred BAT/BG HIS-8014 lineup and in step 4 RNO if unable to establish boration injection flow at >30 gpm with the given dilution event in progress. This choice is also wrong because the required flowrate is >90 gpm for this method of emergency boration.

B. Distractor 2 (Perform ATTACHMENT A) is INCORRECT, but plausible. This action is directed per OFN BG-009, Step 4 RNO if unable to establish Charging flow >90 GPM with CCP suction aligned to the RWST. Wrong because the preferred method is using a BAT Pump and flowing through BG HIS-8104. This is the third method of providing emergency boration flow.

C. Distractor 2 (Perform ATTACHMENT B) is INCORRECT, but plausible. The action is directed by OFN BG-009, Step 1 RNO if the charging system was NOT aligned for injection. Wrong because for the given conditions, the charging system is aligned for injection. The action is also wrong for given plant conditions since SI pumps are tagged out per LCO 3.4.12, Low Temperature Overpressure Protection (LTOP) while in MODE 4.

D. CORRECT (Start one BAT pump and open BG HV-8104 and verify flow >30 gpm). For the given conditions, charging system is aligned for normal operation, so per Step 2, the crew will start one BAT pump and open BG HIS-8104. Flow is verified to be >30 gpm in Step 4.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 57 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153586
User-Defined ID:	LO153586
Reference:	OFN BG-009
Topic:	#57 APE 024 / AK3.01 (New - High)
RO Importance Rating:	4.1
SRO Importance Rating:	N/A
K/A Number:	APE 024 AK3.01
Comments:	<p>K/A Statement, Emergency Boration, Knowledge of the REASONS for the following responses as they apply to Emergency Boration: When emergency boration is required. (CFR: 41.5 / 41.10 / 45.6 / 45.13)</p> <p>Tier 1 Group 2</p> <p>High Cog - Analysis of procedure entry conditions and preferred methods of Emergency Boration.</p> <p>LO1732419, OFN BG-009, EMERGENCY BORATION, Objective 1, Identify the procedure entry conditions.</p> <p>Meets the K/A since the given event requires evaluation of Emergency Boration procedure entry conditions and then the selection of the Emergency Boration method that would be used. The reason for method selection is based on given MODE 4 / LTOP initial conditions.</p> <p><u>Revision History:</u> 1 – Modified question to make 2x2 format by eliminating distractors A and D. Arranged the answer choices in short to long format and updated answer explanations. 2 - Modified question and answer choices to focus on the method of boration. 3 – Corrected Typo in Question.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

58

ID: LO153584

Points: 1.00

Given:

- The unit is operating at 100% power.
- BB LS-459, PZR LEV CTRL SEL is selected to L459/L460 position.
- BG FI-121A, CHG HDR FLOW indication has risen from 86 gpm to 125 gpm.
- Letdown Isolated.

Based on these conditions, what Pressurizer Level Instrument Channel malfunction has occurred?

- A. BB LI-459 failed LOW
- B. BB LI-459 failed HIGH
- C. BB LI-460 failed LOW
- D. BB LI-460 failed HIGH

Answer: A

## Answer Explanation

Answer choices sorted sequentially. Correct answer at A.

A. CORRECT (BB LI-459 failed LOW) for the given change in Charging Header Flow rate and letdown isolation, the upper selected PZR Level channel failed LOW. For this failure, actual PZR level rises due to the loss of letdown and excessive charging flow based on a false low level signal. Without Operator Action the unit will trip on PZR Level high at 92% on the remaining 2/3 channels.

B. Distractor 1 (BB LI-459 failed HIGH) is INCORRECT, but plausible. This is the right instrument failure, but the wrong direction. For a failed high upper selected PZR Level channel, Charging low and actual level would lower until letdown isolated at 17% on the lower selected channel (BB LI-460). Charging flow is the key parameter to diagnose which channel and in which direction the instrument failed.

C. Distractor 2 (BB LI-460 LOW) is INCORRECT, but plausible. The direction of failure is right and a failure LOW of this channel would result in letdown isolation, but a failure of the lower selected channel will NOT cause a change in charging flow. This answer choice was selected during Operator validations.

D. Distractor 3 (BB LI-460 HIGH) is INCORRECT, but plausible. Both the channel and direction of failure are wrong; the opposite of the correct answer. Both charging flow and letdown are unaffected by failure of the lower selected channel high. This failure will cause partial reactor trip (Annunciator 83C) and a High PZR Level Alarm (Annunciator 32A).

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 58 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153584
User-Defined ID:	LO153584
Reference:	PZR LCS MALF
Topic:	#58 APE 028 / AA2.03 (New - High)
RO Importance Rating:	2.8
SRO Importance Rating:	3.3
K/A Number:	APE 028 AA2.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Pressurizer (PZR) Level Control Malfunction, Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunction: Charging Subsystem flow indicator and controller (CFR: 43.5 / 45.13)</p> <p>Tier 1 Group 2</p> <p>High Cog - Diagnostics of instrument failure given plant response on the system and parameter specified by the K/A (with no other diverse MCB alarm indications).</p> <p>LO1732418, OFN SB-008, INSTRUMENT MALFUNCTIONS, Objective 4, Explain the plant response for each instrument failure identified in the procedure: (PZR Level Channel Malfunction, Attachment J)</p> <p>Meets the K/A since the question provides a change in charging flow and asks for which level channel failed based on the system response.</p> <p><u>Revision History:</u> 1 – Changed the cognitive level designation to "High"</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

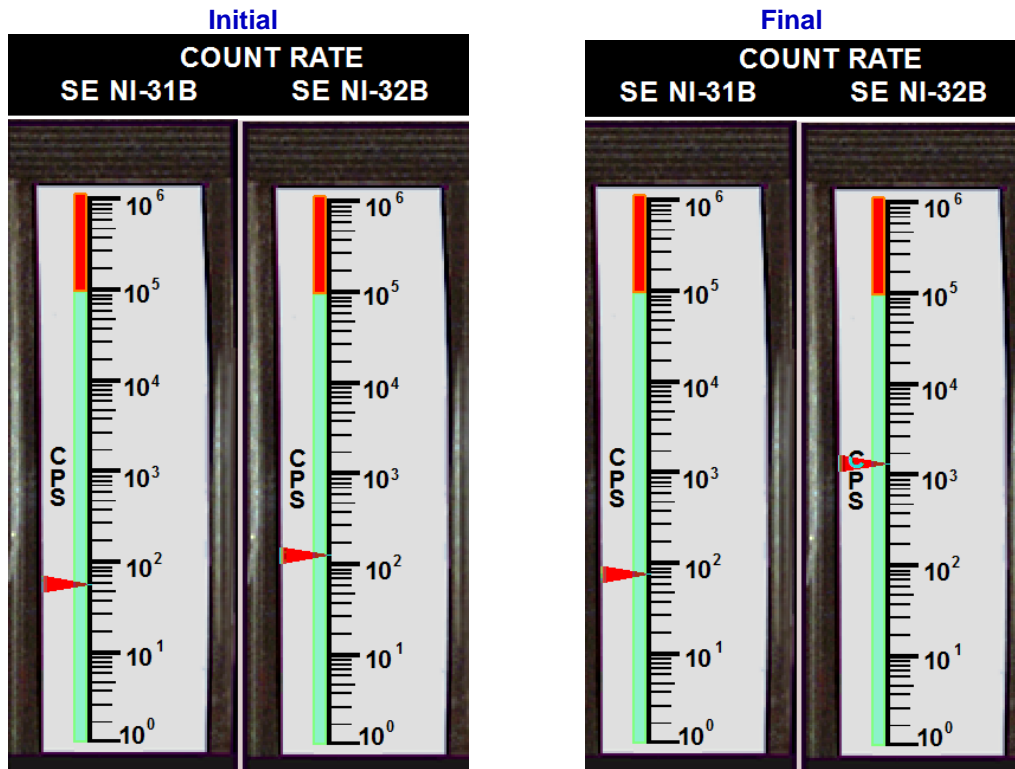
59

ID: LO153589

Points: 1.00

Given:

- The unit is in MODE 3 heating up after a refueling outage.
- 'A' Bank of Shutdown Rods were pulled 228 steps in preparation for the Reactor Startup
- The change in SR NIs indications are as follows:



Based on these conditions, 1) Which of the following Nuclear Instruments is malfunctioning and 2) What action is the crew REQUIRED to take per OFN SB-008, INSTRUMENT MALFUNCTIONS?

- A. 1) SE NI-31B  
2) Stop the reactor startup until the channel is restored.
- B. 1) SE NI-31B  
2) Block SE NI-31B Reactor Trip signal by depressing SE HS-5. SR TRIP BLOC/RESET.
- C. 1) SE NI-32B  
2) Stop the reactor startup until the channel is restored.
- D. 1) SE NI-32B  
2) Block SE NI-32B Reactor Trip signal by depressing SE HS-10. SR TRIP BLOC/RESET.

Answer: C

**Answer Explanation**



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted sequentially. Correct answer at C.

A. Distractor 1 (SE NI-31B, Stop Reactor Startup) is INCORRECT, but plausible given that the indications on SE NI-31B rose, but not as far as SE NI-32B. The applicant must demonstrate understanding of expected change in SR counts to know this detector is functioning and the other detector has an abnormal jump in counts based on just pulling one set of bank rods. The Action is right. This answer choice was selected during Operator Validations.

B. Distractor 2 (SE NI-31B, Block Reactor Trip Signal) is INCORRECT, but plausible as this action is directed by OFN SB-008, Step P10 and would have been correct if the initial power level were higher (>P6 setpoint). Both the detector and the action are wrong; the opposite of the correct answer.

C. CORRECT (SE NI-32B, Stop the Startup) SE NI-32B is malfunctioning as count rate should NOT have changed by a full decade with just a single bank pull. OFN SB-008, Attachment P, Step P7 directs stopping any power rise until SR Instruments are OPERABLE.

D. Distractor 3 (SE NI-32B, Block Reactor Trip Signal) is INCORRECT, but plausible. The failed instrument is right, but the action is wrong. This action is directed by OFN SB-008, Step P10 and would have been correct if the initial power level was higher (>P6 setpoint).

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 59 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	153589
User-Defined ID:	LO153589
Reference:	LOSS OF SRNI
Topic:	#59 APE 032 / AA2.02 (New - High)
RO Importance Rating:	3.6
SRO Importance Rating:	3.9
K/A Number:	APE 032 AA2.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of SR nuclear instrumentation, Ability to determine and interpret the following as they apply to the loss of SR nuclear instrumentation: Expected change in source range count rate when rods are moved. (CFR: 43.2)</p> <p>Tier 1 Group 2</p> <p>High Cog - Application of expected plant response combined with procedure direction.</p> <p>LO1732418, OFN SB-008, INSTRUMENT MALFUNCTIONS, Objective 3, Explain the major actions accomplished by the procedure. (Check if a Nuclear Instrument system channel is malfunctioning: Source Range Neutron Flux (SE) channel Malfunction, Attachment P.)</p> <p>Meets the K/A since source range count rates are provided before and after a bank of rods are pulled and the question asks which detector is malfunctioning. The applicant must display knowledge of the expected change in source range count rates for the withdrawal of a single bank of shutdown rods to answer the question.</p> <p><u>Revision History:</u> 1 – Specified Shutdown Bank ‘A’ Rods were pulled 228 steps (fully withdrawn).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

60

ID: LO107784

Points: 1.00

The unit is shutting down from 100% power in response to a Steam Generator tube leak.

Based on these conditions, what is the expected trend of chemistry leak rate calculations during the transition to MODE 3 and why? (Assume the flaw size remains constant.)

- A. Leakage rate will remain the same because isotopes analyzed are independent of power.
- B. Leakage rate will LOWER due to improved solubility of the analyzed isotopes in the RCS during cooldown.
- C. Leakage rate will RISE because primary to secondary pressure difference is higher as S/G Pressure lowers during power reduction.
- D. Leakage rate will LOWER because primary to secondary pressure difference is lower as S/G Pressure rises during power reduction.

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Remain the same) is INCORRECT, but plausible. The difference in D/P will affect the analysis due to less radionuclides escaping from RCS to S/G.

B. Distractor 2 (Leakage lowers due to improved solubility of analyzed isotopes) is INCORRECT, but plausible. The first part is correct, but solubility is not a factor for chemistry sample consideration.

C. Distractor 3 (Leakage rise as D/P rises due to S/G pressure lower) is INCORRECT, but plausible. This is the opposite of the expected response S/G pressure rises as power is reduced, resulting in less D/P and therefore less leakage.

D. CORRECT (Leakage lowers as D/P lowers due to S/G Pressure rise) As power is reduced, the pressure in the S/Gs will rise, resulting in a smaller D/P across the tube boundaries, thus a reduction in leak rate.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 60 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	107784
User-Defined ID:	LO107784
Reference:	SG TUBE LEAK
Topic:	#60 APE 037 / AK1.02 (Bank - Low)
RO Importance Rating:	3.5
SRO Importance Rating:	N/A
K/A Number:	APE 037 AK1.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Steam Generator Tube Leak, Knowledge of the operational implication of the following concepts as they apply to Steam Generator Tube Leak: Leak rate vs. pressure drop. (CFR: 41.8 / 41.10 / 45.3)</p> <p>Tier 1 Group 2</p> <p>Low Cog - Fundamental knowledge</p> <p>Edited Bank Question - changed third distractor for psychometric balance so that D/P in either direction was used instead of a third chemistry consideration. (100% history)</p> <p>LO1732436, OFN BB-07A, STEAM GENERATOR TUBE LEAKAGE, Objective 4, EXPLAIN the basis and knowledge requirements for specific procedure steps. (Leak rate must be calculated by chemistry to determine applicable tech specs and required actions)</p> <p>Meets the K/A since a Steam Generator Tube Leak condition was given and the question asked how the leak rate changed based on the reduction of power to shutdown. The applicant has to apply knowledge to know how S/G Pressure changes as power is reduced, thereby affecting the D/P and the resulting change in leak rate.</p> <p><u>Revision History:</u> 1 - Edited Distractor A to clarify solubility of analyzed isotopes, swapped distractors A and B to maintain short to long format, and updated answer explanation. Also updated applicable CFR to 41.14 (From 41.8 / 41.10 / 45.3).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

61

ID: LO153598

Points: 1.00

Given:

- The unit was operating at 100% power when condenser air leakage caused Main Condenser Vacuum to degrade.
- The crew performed a downpower per OFN MA-038, RAPID PLANT SHUTDOWN to establish LP Turbine Pressure within Normal Operating Region per OFN AF-025, UNIT LIMITATIONS, FIGURE 2.
- Reactor power was lowered to 89% in 2 minutes.
- LP Turbine Exhaust Pressures as listed on Ovation Graphic Display 5551 all as follows:  
COND A - 4.9 IN HGA,  
COND B - 5.1 IN HGA,  
COND C - 5.3 IN HGA

Based on these conditions, what is the expected Steam Dump System Response and why?

- A. Steam Dumps are armed and ALL are open since the C-7 load rejection signal actuated.
- B. Steam dumps are NOT armed and ALL are closed since the C-7 load rejection signal did NOT actuate.
- C. Steam Dumps are NOT armed and ALL are closed since the C-9 Condenser Available conditions are NOT satisfied.
- D. Steam Dumps are armed, but ONLY the COND A Steam Dump Valves are open due to actuated C7 Load rejection signal and C-9 Condenser Availability conditions.

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Armed and all open due to C-7) is INCORRECT, but plausible. For the given conditions, Condenser A C-9 is satisfied so 7 of 12 valves will be open. Condensers B and C C-9 are not satisfied, so the remaining 5 Steam Dump valves are closed. Wrong because NOT all 12 valves are open.

B. Distractor 2 (Not Armed and closed due to C-7) is INCORRECT, but plausible. C-7 is actuated for all three groups of valves for a 10% step change in power or for a 5%/min change in 2 minutes. For the given conditions (11% in 2 minutes), C-7 load rejection is actuated.

C. Distractor 3 (Not Armed and ALL closed due to C-9) is INCORRECT, but plausible. Each condenser has it's own C-9 condition with 2/2 coincidence. For the given conditions, C-9 Condenser is available for the A LP Condenser. The 7 valves associated with this condenser are armed and open, making this choice wrong.

D. CORRECT (Steam Dumps are Armed, but only COND A steam dumps open). For the given air leakage, the crew entered OFN AF-025 and performed ATTACHMENT F for loss of vacuum. The crew lowered reactor power to meet Figure 2 requirements (5.4 in HG at 90% power). For the given rate Steam dumps are armed (C-7 actuated), but only one of 3 condensers (A) has a valid C-9 Condenser Available signal allowing the 7 steam dumps associated with Condenser A to be open for temperature control.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 61 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	153598
User-Defined ID:	LO153598
Reference:	LOSS OF CONDENSER VACUUM
Topic:	#61 APE 051 / AK3.01 (New - High)
RO Importance Rating:	2.8
SRO Importance Rating:	N/A
K/A Number:	APE 051 AK3.01
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of Condenser Vacuum, Knowledge of the REASONS for the following responses as they apply to the Loss of Condenser Vacuum: Loss of Steam Dump Capability upon loss of condenser vacuum. (CFR: 41.5 / 41.10 / 45.6 / 45.13)</p> <p>Tier 1 Group 2</p> <p>High Cog - Application of setpoint for both C7 and C9 and system knowledge to know C9 signals are independent to each condenser.</p> <p>LO1504100, Steam Dump System, Objective 5, Describe Steam Dump System and integrated plant response to plant transients and equipment failures.</p> <p>Meets the K/A since the question provides condenser vacuums and asks how the Steam Dumps valves respond based on the condenser vacuum Permissive/Control C-9 status and whether or not the steam dump system armed (C-7).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

62

ID: LO88759

Points: 1.00

The crew is responding to a LOCA with subsequent ECCS failures in accordance with EMG FR-C2, RESPONSE TO DEGRADED CORE COOLING.

- MCB Annunciator 034B PZR PRESS HI is LIT
- RCS pressure is rising
- Core Cooling has NOT been restored

Based on these Conditions, which of the following describes the REQUIRED operation of the Pressurizer PORVs per EMG FR-C2?

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

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Leave closed and isolated to prevent further loss of RCS inventory) is INCORRECT, but plausible. EMG FR-C2, Step 4 checks status of the PORVS in step 4 to ensure RCS vent paths are closed, unless PZR Pressure is >2335 psig. For the given conditions, PZR pressure is >2310 psig and rising to the PORV setpoint and should be allowed to perform it's design function. Conservation of inventory is plausible since other procedure employ this as a mitigation strategy.

B. Distractor 2 (Manually open to depressurize the RCS to facilitate SI accumulator injection) is INCORRECT, but plausible. The PORVS are not used to depressurize the RCS (except as overpressure control) in EMG FR-C2. Plausible because they are used in EMG FR-C1 to accomplish this function if CETC's are >1200F and an Idle RCS cooling loop is unavailable. (Step 23 RNO). This answer choice selected during Operator Validations.

C. Distractor 3 (Leave closed and isolated until required to establish a vent path prior to RCP restart) is INCORRECT, but plausible. PORVS are left in service for overpressure protection.

D. CORRECT (Verify they operate automatically or operate manually for RCS overpressure control if necessary) The mitigating strategy of EMG FR-C2 is to establish ECCS flow and then depressurize S/G to cooldown and depressurize the RCS. The PORVs are not used to reduce pressure in this procedure. Step 4 of EMG FR-C2 directs the crew to ensure the PORVs are operating as designed for overpressure protection.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 62 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	88759
User-Defined ID:	LO88759
Reference:	DEGRADED CORE COOLING
Topic:	#62 WE06 / EK1.3 (Bank - High)
RO Importance Rating:	3.7
SRO Importance Rating:	N/A
K/A Number:	WE06 EK1.3
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Degraded Core Cooling, Knowledge of the operational implications of the following concepts as they apply to the Degraded Core Cooling, Annunciators and conditions indicating signals, and remedial actions associated with the Degraded Core Cooling. (CFR: 41.8 / 41.10 / 45.3)</p> <p>Tier 1 Group 2</p> <p>High Order Cog - Application of annunciator setpoints to procedure requirements and overall mitigative strategy of a procedure.</p> <p>Bank question - (History 9/13 - 69%)</p> <p>LO1732341 Inadequate/Degraded/Saturated Core Conditions, Objective 7, Explain the basis and any knowledge requirements for procedure steps of EMG FR-C2.</p> <p>Meets the K/A since a Degraded Core Cooling condition is given as well as an annunciator for high pressure. The question asks for the action to be taken in response to the given condition per EMG FR-C2, DEGRADED CORE COOLING.</p> <p><u>Revision History:</u> 1 - Specified "Per EMG FR-C2" at end of question, added "Manually" to distractor B and answer explanation.</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

63

ID: LO153599

Points: 1.00

EMG ES-03, SI TERMINATION, Step 1, **Reset SI**, specifies both reset pushbuttons (SB HS-42A and SB HS-43A).

What is/are the consequence(s) if ONLY the YELLOW train reset pushbutton was depressed?

- A. SI Actuate light on SB069 would extinguish and auto actuation would occur 60 seconds later.
- B. SI Actuate light on SB069 remains lit. Red train components can be placed in non-SI positions.
- C. SI Actuate light on SB069 remains lit. Red train components can NOT be placed in non-SI positions.
- D. SI Actuate light on SB069 would extinguish. Red train components can NOT be placed in non-SI positions.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (extinguish, auto actuation 60 seconds later) is INCORRECT, but plausible. The light remains lit until BOTH trains of SSPS are reset. Resetting SI prevents future auto actuation. Reactor Protection System Permissive P-4 is generated when both the Reactor Trip Breakers are opened and the P-4 Permissive allows Operator block of an automatic SIS after a 60 second time delay. After the 60 second delay, the Operator may reset SIS. This feature prevents further automatic SIS until P-4 is cleared by closing the Reactor Trip Breakers. ECCS components must be manually restarted if SI action is required after SI is reset. A Caution prior to step 1 warns the Operator of the requirement to restart ECCS components manually if a LOOP were to occur after SI is reset.

B. Distractor 2 (Remains LIT, Non-SI positions) is INCORRECT, but plausible. The first part is correct, but the Red Train components will NOT be able to reposition to NON-SI positions until reset. This answer choice was selected during Operator validations.

C. CORRECT (SI Actuate light on SB069 remains lit. Red train components can NOT be placed in non-SI positions). The two SSPS cabinets are connected via a data-OR cable, tied between the two trains, allowing sharing of multiplexed information before the data leaves the train. So, one train's SSPS is reset, the other's is not, but the SI actuate light would remain lit.

D. Distractor 3 (extinguish, NOT be placed in non-SI positions) is INCORRECT, but plausible. The light remains lit until BOTH trains of SSPS are reset. The second part is correct. The Steam Dump P-12 bypass interlock switches work in this manner; the light extinguishes after the first manipulation of AB HS-63 (-64) when taken to BYP INTLK position. This answer choice was selected during Operator validations due to this misconception.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 63 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153599
User-Defined ID:	LO153599
Reference:	SI TERMINATION
Topic:	#63 WE02 / EA1.3 (Bank - Low)
RO Importance Rating:	3.5
SRO Importance Rating:	N/A
K/A Number:	WE02 EA1.3
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, SI Termination, Ability to operate and/or monitor the following as they apply to the SI Termination, Desired operating results during abnormal and emergency situations. (CFR: 41.7 / 45.5 / 45.6)</p> <p>Tier 1 Group 2</p> <p>Low Cog - Fundamental</p> <p>Edited copy of Bank question LO13896 (89% history)</p> <p>LO1732316, EMG ES-03, SI TERMINATION, Objective 3, Explain the bases and any knowledge requirements for procedure steps. (Step 1 and Caution prior to step 1)</p> <p>Meets the K/A since the crew is terminating SI in the given scenario. The question asks system response if only one train of SI was reset to test if desired operating results were obtained.</p> <p><u>Revision History:</u> 1 – Improved answer explanation for distractor A to discuss significance of 60 seconds.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

64

ID: LO153600

Points: 1.00

Given:

- The unit tripped due to a Loss Offsite Power.
- 'A' S/G Pressure is 1260 psig.
- 'A' S/G NR level is 72%.

Based on these conditions, 1) which of the following procedure entry conditions are met and 2) what guidance does that procedure provide if the crew enters it, at CRS Discretion.

- A.     1) EMG FR-H2, RESPONSE TO STEAM GENERATOR OVERPRESSURE  
          2) Initiate Blowdown flow from 'A' S/G.
- B.     1) EMG FR-H2, RESPONSE TO STEAM GENERATOR OVERPRESSURE  
          2) Cool down the RCS using 'B,' 'C,' and 'D' S/Gs.
- C.     1) EMG FR-H3, RESPONSE TO STEAM GENRATOR HIGH LEVEL  
          2) Initiate Blowdown flow from 'A' S/G.
- D.     1) EMG FR-H3, RESPONSE TO STEAM GENRATOR HIGH LEVEL  
          2) Cool down the RCS using 'B,' 'C,' and 'D' S/Gs.

Answer:        B

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted sequentially by procedure number and then short to long. Correct answer at B.

A. Distractor 1 (EMG FR-H2, Initiate Blowdown from 'A' S/G) is INCORRECT, but plausible. Entry conditions are met for EMG FR-H2 since given S/G pressure is >1234 psig. The action to place blowdown in service is NOT directed by EMG FR-H2, but is plausible since directed by EMG FR-H3, Step 12 as an action that would lower high S/G Level. S/G level is high in the given conditions, but not so high that entry conditions are met to enter EMG FR-H3.

B. CORRECT (EMG FR-H2, Cooldown RCS using intact S/Gs). Entry conditions are met for EMG FR-H2 since given S/G pressure is >1234 psig. The action to cool down the RCS using Intact S/Gs is directed by EMG FR-H2, Step 9 and is the mitigating action taken that will lower the S/G pressure in 'A' S/G if unable to bleed steam from it in step 6 using ARVs. If the crew could have bled steam from the ARVs, they would NOT have been required to enter EMG FR-H2. From BD-EMG FR-H2 Step 9: Excessive heat transfer from the primary may be the cause of the affected S/G over pressurization. Therefore, a check on RCS hot leg temperatures is made to determine this. If RCS hot leg temperatures are greater than saturation temperature for the lowest steamline safety valve set pressure minus instrument uncertainties, a cooldown is initiated by dumping steam from the unaffected S/G(s) to aid in reducing the temperature and pressure in the affected S/G(s).

C. Distractor 2 (EMG FR-H3, Initiate Blowdown) is INCORRECT, but plausible. This answer choice would be true if given S/G level was >78% and S/G pressure was <1234 psig. Wrong because entry conditions are NOT met for EMG FR-H3 since given S/G level is <78%. The action to place blowdown in service is directed by EMG FR-H3, Step 12 as an action that would lower high S/G Level.

D. Distractor 3 (EMG FR-H3, Cooldown the RCS using B,C and D S/Gs) is INCORRECT, but plausible. The entry conditions for EMG FR-H3 are NOT met, but the action is directed by EMG FR-H2 as the action the crew would take to lower S/G pressure.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 64 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153600
User-Defined ID:	LO153600
Reference:	SG OVERPRESSURE
Topic:	#64 WE13 / 2.4.6 (New - Low)
RO Importance Rating:	3.7
SRO Importance Rating:	4.7
K/A Number:	WE13 2.4.6
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Steam Generator Overpressure, Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)</p> <p>Tier 1 Group 2</p> <p>Low Cog - Overall mitigative strategy of a given procedure.</p> <p>LO1732344, EMG FR-H2, H3, H4 and H5 Yellow Path Heat Sink Functional Restoration Procedures, Objective 3, Explain the bases and any knowledge requirement for procedure EMG FR-H2 Steps.</p> <p>Meets the K/A in that the question provides a S/G overpressure condition and asks for the YELLOW PATH procedure and mitigating strategy that the crew might take with CRS discretion to enter the procedure.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

65

ID: LO153601

Points: 1.00

Given:

- A Large Break LOCA occurred.
- The crew completed EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION.
- CTMT Pressure is 6 psig and down slow after peaking at 25 psig.
- CTMT Recirc Sump level is 2005 ft 2 in and up slowly
- MCB Annunciator 055A, ESW PMP A PRESS LO is LIT.
- 'A' ESW Pump pressure is steady at 135 psig.
- KC HIS-253, FIRE PROTECTION SYS OUTER CTMT ISO VLV, has a green light lit.
- Motor Driven Fire Pump FP02A is running.
- The crew is transitioning to EMG FR-Z2, RESPONSE TO CONTAINMENT FLOODING

Based on these conditions, the design basis post-LOCA Flood Level...

- A. has been exceeded and the source of flooding is from the ESW System.
- B. has been exceeded and the source of flooding is from the Fire Protection System.
- C. has NOT YET been exceeded and the source of flooding is from the ESW System.
- D. has NOT YET been exceeded and the source of flooding is from the Fire Protection System.

Answer: A

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at C.

A. CORRECT (has been exceeded, ESW) The note prior to EMG FR-Z1, Step 1 provides the design basis post-LOCA Flood level at 2004' 6". USAR Section 6.3.2.2 also states: "Location of all motor-operated valves within the containment was examined to identify any motor operators which may be submerged following a postulated LOCA. Based on a maximum post-LOCA flood level at EI.2004'-6", none of the valves require qualification for submerged operation. Any submerged valves are either; not required for accident mitigation, not closed prior to being flooded, or not required to change position after a LOCA." Given the ESW PMP A PRESS LO and 135 psig discharge pressure on A ESW pump, the applicant can determine this is the flooding source with knowledge of normal ESW operating system parameters (~150 psig). CTMT Flooding due to ESW leak in CTMT was a major concern until Water Hammer modification of the ESW system was installed.

B. Distractor 2 (has been exceeded, FP) is INCORRECT, but plausible. The design flood level has been exceeded, but the flooding source is not right. Given green light lit (Close indication) on KC HIS-253, there is no introduction of Fire Protection water to Containment even though given conditions show enough demand on the fire protection system to cause the Motor Driven Fire Pump to auto start.

C. Distractor 2 (has NOT YET been exceeded, ESW System) is INCORRECT, but plausible. Entry conditions to EMG FR-Z2 are met when CTMT Level is >2003' 11" or [2003' 7"]. The note prior to EMG FR-Z2, Step 1 specifies the design flood level is 2004' 6". Since the given level in CTMT exceeds this value, the Design Basis post-LOCA flood level is exceeded due to introduction of water from an additional source. For the given conditions ESW system leakage is that source. This answer choice was selected during Operator validations.

D. Distractor 3 (has NOT YET been exceeded, FP System) is INCORRECT, but plausible. Both parts are wrong, the opposite of the correct answer.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 65 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153601
User-Defined ID:	LO153601
Reference:	CTMT FLOODING
Topic:	#65 WE15 / EK2.1 (New - High)
RO Importance Rating:	2.8
SRO Importance Rating:	N/A
K/A Number:	WE15 EK2.1
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Containment Flooding, Knowledge of the interrelations between the Containment Flooding and the following: Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features. (CFR: 41.7 / 45.7)</p> <p>Tier 1 Group 2</p> <p>High Cog - Analysis of given conditions and application of system knowledge to determine source of leakage and display knowledge of design basis setpoints.</p> <p>LO1732351, EMG FR-Z2, RESPONSE TO CONTAINMENT FLOODING, Objective 4, Explain the bases and any knowledge requirements for procedure steps.</p> <p>Meets K/A since the given failure is Flooding in CTMT. The design bases flooding level at 2004 ft 6 in ensures components are able to fulfill their intended safety functions. Water levels above this value will result in the motor operated valves becoming submerged. Applicant must interpret given indication to determine ESW system is NOT operating normally.</p> <p><u>Revision History:</u> 1- Updated applicable CFR to 41.9 (from 41.7 / 45.7).</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

66

ID: LO153650

Points: 1.00

In accordance with AP 21-001, CONDUCT OF OPERATIONS, which of the following actions is the board Operator allowed to take WITHOUT receiving a peer check?

- A. Hanging a Clearance Order on a Main Control Board Handswitch.
- B. Performing a normal periodic dilution of the RCS for temperature control.
- C. Taking Manual Control of a Feed Reg Valve for a failed channel per OFN SB-008, INSTRUMENT MALFUNCTIONS.
- D. Changing turbine loading for performance of STS AC-001, MAIN TURBINE VALVE CYCLE TEST IF Just In Time Training was previously conducted.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (Hanging a Clearance Order) is INCORRECT, but plausible. AP 21-001, Section 6.8.3.6 specifies Peer checks are required during CO placement. The SM may approve an exception of CO placement peer checks in High Radiation or Contaminated Areas. This exception does NOT apply to placement of a Clearance Order in the Main Control Room, so this choice is wrong.

B. Distractor 2 (Normal dilution for temperature control) is INCORRECT, but plausible. This is a routinely performed evolution (every couple of hours) so the operators are very proficient at performance of this routine task and not very likely to cause an error caught by a peer checker. However, AP 21-001, Section 6.8.3.4 specifies peer checks shall be performed for all planned reactivity changes. Normal dilution for temperature control is a planned reactivity change, so this choice is wrong. AP 21-001, Section 6.1.2.3 also lists manual boration/dilution as an example of a planned reactivity evolution that requires Peer Check.

C. CORRECT (Manual Control of FRV for a Failed channel per OFN SB-008). AP 21-001, Section 6.8.3.3 specifies use of peer checking while in the OFN network should be suspended, when appropriate, to avoid delay in responding to plant transients. Taking Manual Control to stop a transient caused by a failed controlling channel is an example of when it is "appropriate" for the board operator to perform an action WITHOUT a peer check and is allowed by AP 21-001.

D. Distractor 3 (Changing Turbine Loading for STS AC-001 after JITT) is INCORRECT, but plausible. This evolution constitutes a Planned Reactivity Evolution and therefore requires a Peer Check per AP 21-001, Section 6.8.3.4.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 66 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153650
User-Defined ID:	LO153650
Reference:	CONDUCT OF OPS
Topic:	#66 2.1.1 (New - Low)
RO Importance Rating:	3.8
SRO Importance Rating:	4.2
K/A Number:	2.1.1
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of conduct of operations requirements. (CFR: 41.10 / 45.13)</p> <p>Tier 3 Group 1</p> <p>Low Cog - Procedure requirements from memory</p> <p>LO1733258, AP 21-001, CONDUCT OF OPERATIONS, Objective 1, Discuss the purpose/scope and selected knowledge requirements of procedure AP 21-001, CONDUCT OF OPERATIONS. (Section 6.8.3 Peer Checks)</p> <p>Meets K/A in that Peer Check requirements are specified in AP 21-001, CONDUCT OF OPERATIONS. The question tests the associated knowledge requirements.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

67

ID: LO153604

Points: 1.00

Which of the following would indicate a loss of the NPIS Computer?

- A. MODE status flashing Orange
- B. NPIS alarm points flashing Red
- C. Time and Date flashing Magenta
- D. Alarm screen points flashing "BAD"

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (Mode status flashing Orange) is INCORRECT, but plausible. Per OFN RJ-023, Symptoms or Entry Conditions, the mode status will be flashing MAGENTA (instead of Orange) is an indication of a loss of NPIS. Orange is the color associated with reaching the Hi or Alert Alarm setpoint.

B. Distractor 2 (NPIS alarm points flashing Red) is INCORRECT, but plausible. Per OFN RJ-023, Symptoms or Entry Conditions, the NPIS monitors in the Control Room going Blank would be an indication of a loss of NPIS. Red is the alarm color associated with the sensed parameter exceeding it's HiHi alarm setpoint.

C. CORRECT (Time and Date flashing magenta) Per OFN RJ-023, NPIS MALFUNCTIONS Symptoms or Entry Conditions, the time and Date flashing magenta is an indication of the loss of the NPIS computer, which would result in the crew being unable to monitor system or component status.

D. Distractor 3 (Alarm screens flashing "BAD") is INCORRECT, but plausible. BAD is one of the Seven R\*Time quality codes. This would be true for an indication of a sensor error from the Data Acquisition System (Unknown value), not for a complete Loss of NPIS. BAD is also the result for a calculation whose value may not be valid due to lack of sufficient input points with acceptable quality. (For example, Input values are outside sensor range)

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 67 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153604
User-Defined ID:	LO153604
Reference:	CONDUCT OF OPS
Topic:	#67 2.1.19 (Bank - Low)
RO Importance Rating:	3.9
SRO Importance Rating:	3.8
K/A Number:	2.1.19
Comments:	<p>K/A Statement, Ability to use plant computers to evaluate system or component status. (CFR: 41.10 / 45.12)</p> <p>Tier 3 Group 1</p> <p>Copy of LO68595 (1/1- 100% history)</p> <p>LO1408300, Nuclear Plant Information System, Objective 4, Locate data for plant operations using the Nuclear Plant Information System (NPIS).</p> <p>Meets Generic K/A for ability to use plant computers to evaluate (a non-specific) system or component status as this ability is lost when the NPIS Computer fails.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

68

ID: LO153755

Points: 1.00

The unit is in MODE 5 preparing for Refueling outage.

Per GEN 00-009, REFUELING OPERATIONS, at what point of the refueling process does the unit enter MODE 6.

- A. When the Reactor Vessel head is removed.
- B. When all Reactor Vessel Studs are removed.
- C. When the first Reactor Vessel stud is detensioned.
- D. When the first spent fuel assembly is removed from the Reactor Vessel.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (When head removed) is INCORRECT, but plausible. Head removal is directed by step 6.1.15 per FHP 02-007A, REACTOR VESSEL CLOSURE HEAD REMOVAL and is a significant step of the refueling process. Wrong because the unit is already in MODE 6 when the first head bolt is detensioned.

B. Distractor 2 (When all Studs are removed) is INCORRECT, but plausible. The transition from MODE 6 to MODE 5 is NOT made until the LAST stud is tensioned and has elongation verified per GEN 00-009, Step 6.3.11. This choice is wrong because the transition to MODE 6 from MODE 5 occurs when the FIRST stud is detensioned.

C. CORRECT (When the first Reactor Vessel stud is detensioned.) Per GEN 00-009, step 6.1.10, WHEN the MODE change is authorized, THEN enter MODE 6 as follows:

1. DIRECT the OCC Manager to begin detensioning Reactor vessel head.
2. WHEN first Reactor Vessel stud is detensioned, THEN PERFORM the following:
  - a. In Control Room log, RECORD date and time the unit entered MODE 6.
  - b. ANNOUNCE entry into MODE 6 on the plant page system.

D Distractor 3 (When the first spent fuel assembly is removed from the Reactor Vessel) is INCORRECT, but plausible. Removal of the first spent fuel assembly is directed by GEN 00-009, step 6.2.7 to use FHP 02-011, FUEL SHUFFLE AND POSITION VERIFICATION. Core alterations are in progress at this point of the refueling progress. Wrong because the unit was already in MODE 6 when the first head bolt was detensioned.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 68 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153755
User-Defined ID:	LO153755
Reference:	CONDUCT OF OPS
Topic:	#68 2.1.41 (New - Low)
RO Importance Rating:	2.8
SRO Importance Rating:	3.7
K/A Number:	2.1.41
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of the Refueling process (CFR 41.2, 41.10, 43.6, 45.13)</p> <p>Tier 3 Group 1</p> <p>Low Cog - Tech Spec Mode definition based on Refueling procedure.</p> <p>LO1732109, GEN 00-009, REFUELING, Objective 5, Explain the major steps of procedure GEN 00-009.</p> <p>Meets K/A as the question provides four steps in the refueling process and then asks for which one constitutes a MODE change. This is significant because that is when Refueling Tech Specs (LCO 3.9) become applicable. This question demonstrates knowledge of the refueling process at the RO Level.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

69

ID: LO153606

Points: 1.00

Given:

- The unit is shutdown for refueling outage.
- A planned maintenance activity has resulted in an ORANGE Risk Designation.

In accordance with AP 22B-001, OUTAGE RISK MANAGEMENT, which of the following describes the effect of this Risk Color Designation on the applicable Shutdown Safety Function?

- A. Shutdown Safety Function is Satisfied. Plant and equipment availability conditions that provide the minimum equipment, systems, or trains plus at least one additional equivalent function ("N+1")
- B. Some reduction exists for the Shutdown Safety Function. Plant and equipment availability conditions that meet the criteria for the minimum equipment, system, or train requirements ("N")
- C. Margin of safety provided by the Shutdown Safety Function has been lost. Plant and equipment availability conditions that do not meet criteria for the minimum equipment, system, or train requirements (less than "N").
- D. Shutdown Safety Function is considered degraded below normal safe outage conditions. Plant and equipment availability conditions that meet the criteria for the minimum equipment, system, or train requirements ("N"), but the minimum conditions are at risk of negative impact from other equipment, system, or train conditions, or plant equipment and availability is one requirement less than minimum and the Shutdown Safety Function has not been lost.

Answer: D

Answer Explanation
Answer choices sorted short to long. Correct answer at D.
A. Distractor 1 (N+1) is INCORRECT, but plausible. Per AP 22B-001, paragraph 4.11.1, this definition corresponds to a GREEN Risk Condition.
B. Distractor 2 (N) is INCORRECT, but plausible. Per AP 22B-001, paragraph 4.11.2, this definition corresponds to a YELLOW Risk Condition.
C. Distractor 3 (less than N) is INCORRECT, but plausible. Per AP 22B-001, paragraph 4.11.4, this definition corresponds to a RED Risk Condition.
D. CORRECT (Margin to N has been Lost) Per AP 22B-001, paragraph 4.11.3, this is the correct definition of the given ORANGE Risk Condition.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 69 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153606
User-Defined ID:	LO153606
Reference:	EQUIPMENT CONTROL
Topic:	#69 2.2.18 (New - Low)
RO Importance Rating:	2.6
SRO Importance Rating:	3.9
K/A Number:	2.2.18
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc. (CFR: 41.10 / 43.5 / 45.13)</p> <p>Tier 3 Group 2</p> <p>Low Cog - Procedure definition</p> <p>LO1814001, Operations Risk Management, Objective 5, Discuss the major steps and definitions of procedure AP 22B-001, including the Shutdown Safety Functions.</p> <p>Overlap Consideration - Same K/A as 2019 Audit Exam #97. That SRO Only question covered Fluid Path Evaluations.</p> <p>Meets the generic K/A since the question asks for how shutdown risk level designated as ORANGE is defined per the station procedure that is used to evaluate and manage shutdown risk.</p>



# EXAMINATION ANSWER KEY

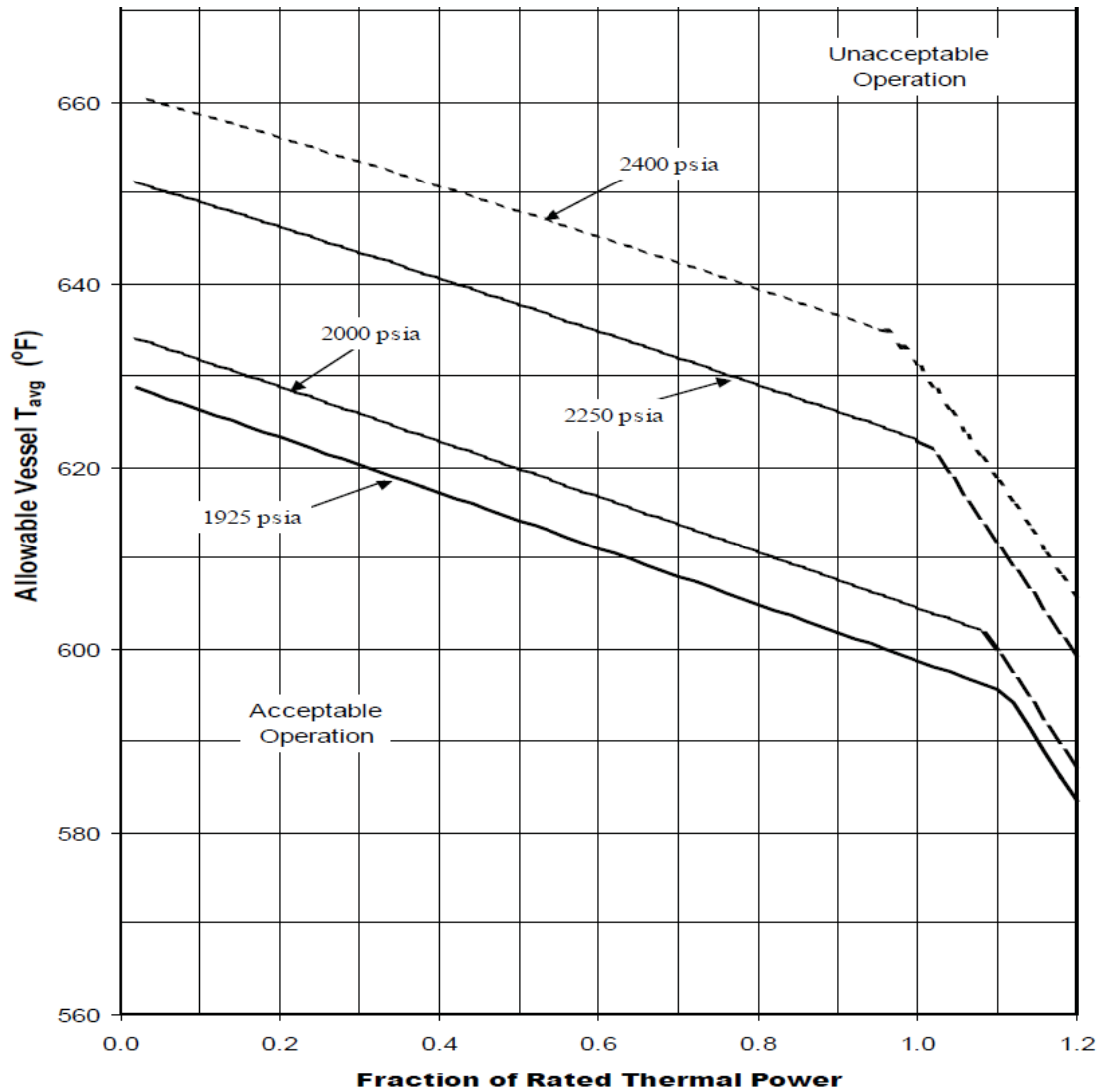
2019 Wolf Creek ILO NRC, Rev 3

70

ID: LO153625

Points: 1.00

Using the Figure from Core Operating Limits Report below, which of the following combinations of plant parameters would result in EXCEEDING the Safety Limit Limiting Conditions of Operations.



	PRZR Pressure	Thermal Power	Highest Tavg
A.	1985 psig	85%	600°F
B.	2200 psig	40%	630°F
C.	2235 psig	100%	635°F
D.	2335 psig	105%	600°F

Answer: C

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

## Answer Explanation

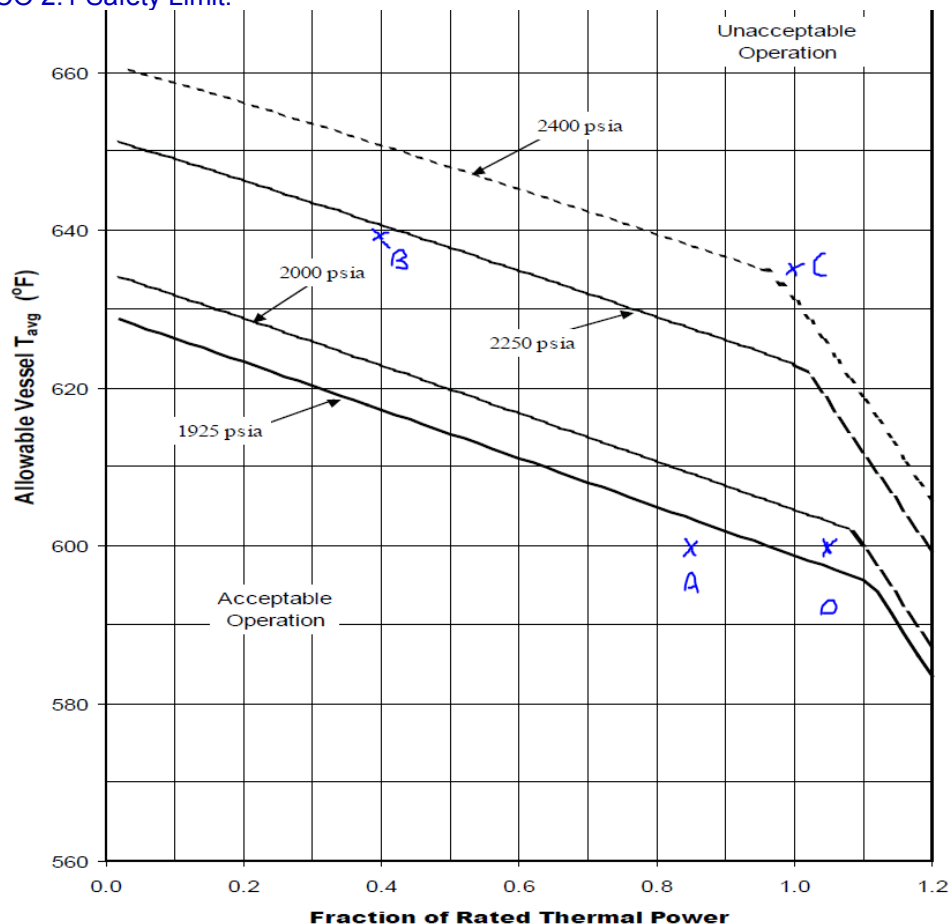
Answer choices sorted sequentially by RCS pressure. Correct answer at C.

A. Distractor 1 (1985 psig, 85%, 600F) is INCORRECT, but plausible. This set of parameters falls within the Acceptable Operation portion of the 1925 psia curve. Plausible if the student considers the given 1985 psig as exceeding the 1925 psia lowest line.

B. Distractor 2 (2200 psig, 40%, 630F) is INCORRECT, but plausible. This set of parameters falls just within the Acceptable Operation portion of the 2250 psia curve. This choice would be true if given RCS Pressure were <2000 psia.

C. CORRECT (2235 psig, 100%, 635F). This set of parameters EXCEEDS the Safety Limit Tech Spec as the plot falls in the UNACCEPTABLE Operation portion of the curve. Per LCO 2.1.1, In MODES 1 and 2, the combination of THERMAL POWER, Reactor Coolant System (RCS) highest loop average temperature, and the pressurizer pressure shall not exceed the limits specified in the COLR. The provided figure is Figure 2.1 from the COLR which specifies the Safety Limit LCO.

D. Distractor 3 (2235 psig, 105%, 600F) is INCORRECT, but plausible. This set of parameters falls within the Acceptable Operation portion of the 2250 psia curve. Plausible because the given 105% exceeds the maximum allowed power level per GEN 00-004, wrong because the given set of conditions, including Temperature and pressure, does NOT exceed LCO 2.1 Safety Limit.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 70 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153625
User-Defined ID:	LO153625
Reference:	EQUIPMENT CONTROL
Topic:	#70 2.2.22 (Bank - High)
RO Importance Rating:	4.0
SRO Importance Rating:	4.7
K/A Number:	2.2.22
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)</p> <p>Tier 3 Group 2</p> <p>High Cog - requires applicant to use a provided graph to plot system parameters and apply PZR Pressure curves to evaluate if safety limits are violated.</p> <p>Copy of Bank Question Q17002 (95% history)</p> <p>LO1732700, Introduction to Technical Specifications, Objective 5, Describe the safety limits contained in Technical Specifications.</p> <p>Meets the K/A since question provides the COLR safety limit curves and asks the applicant to specify which set of parameters would violate Tech Spec Safety limits.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

71

ID: LO153836

Points: 1.00

Given:

- The unit is in MODE 5.
- The crew is preparing to release Gas Decay Tank #6 (THA01G).

Based on these conditions, which of the following is the Responsibility of the Reactor Operator per AP 07B-001, RADIOACTIVE RELEASES?

- A. Performing the release.
- B. Performing a review of the release calculations.
- C. Performing a Source Check of GH RE-10A, RADWASTE BLDG VENT.
- D. Performing a review of the conditions specified on the Release Permit and starting additional SW Pumps, if necessary.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (Perform the release) is INCORRECT, but plausible. Per AP 07B-001, Paragraph 5.5.3, Performing the release is a responsibility of Operations department, but this task will be performed by the Rad Waste Operator from the Rad Waste Building. Wrong because performing the release is NOT the responsibility of the RO.

B. Distractor 2 (Reviewing release calculations) is INCORRECT, but plausible. Per AP 07B-001, Paragraph 5.1.2 Providing a second review of the release calculations is the responsibility of a qualified Chemistry Technician. Wrong because reviewing release calculations is NOT the responsibility of the RO.

C. CORRECT (Source Check) Per AP 07B-001, Paragraph 5.5.1, Operations is responsible for performing a check source per STN SP-001, PROCDSS RADIATION MONITORING SYSTEM SOURCE CHECK. This task is performed by the RO.

D. Distractor 3 (Reviewing conditions specified and determining if other actions are necessary) is INCORRECT, but plausible. Per AP 07B-001, Paragraph 5.2, The Chemistry Supervisor is responsible to evaluate the conditions specified and determine if other actions are necessary when approving the release permit. Paragraph 5.6.1 also specifies the SM should evaluate the release conditions as specified on the release permit prior to approving the release. The RO may evaluate conditions as specified on the release permit but determining if any other actions are necessary makes this distractor wrong as this is NOT the RO's responsibility per AP 07B-001.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 71 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	153886
User-Defined ID:	LO153836
Reference:	RADIATION CONTROL
Topic:	#71 2.3.11 (New - Low)
RO Importance Rating:	3.8
SRO Importance Rating:	4.3
K/A Number:	2.3.11
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Ability to control radiation releases. (CFR: 41.13)</p> <p>Tier 3 Group 3</p> <p>Low Cog - Procedure knowledge</p> <p>LO1714002, Offsite Dose Calculation Manual, Objective 1, Discuss the purpose, scope, and overall content of AP 07B-003, Offsite Dose Calculation Manual.</p> <p>Meets the K/A since the question asks for the RO responsibility associated with performing a Radioactive Release.</p> <p><u>Revision History:</u> 1 - Question replaced for better RO/SRO Knowledge level. 2 - Question replaced for better Generic Knowledge.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

72

ID: LO98387

Points: 1.00

Which of the following evolutions will raise dose rates in areas where personnel may be present?

- A.     Batching boric acid
- B.     Adding hydrogen peroxide to the RCS
- C.     Removing the Cation Bed from service
- D.     Making up to the Reactor Makeup Water Storage Tank

Answer:        B

## Answer Explanation

Answer choice sorted short to long.   Correct answer at B.

A.   Distractor 1 (batching boric acid) is INCORRECT, but plausible.   This is adding water from the RMWST to the batch add tank and adding boric acid bags.   There is no caution in SYS BG-206 for changing rad levels for this evolution.   Plausible because this evolution takes place in the aux building

B.   CORRECT (Adding Hydrogen Peroxide to the RCS) SYS BG-207 discusses that HP must be aware that this is being done so room can be high rad.   This evolution takes place in the aux building.

C.   Distractor 2 (Removing the Cation Bed from service) is INCORRECT, but plausible since this action would be taken in a radiation area, however, this action would not raise dose rates.

D.   Distractor 3 (Makeup to Reactor makeup water storage tank) is INCORRECT, but plausible.   This will only add pure water to a tank that makes up to the RCS water.   Plausible because there is a precaution in SYS BL-120 that states venting of this tank could cause contamination.   The distractor is discussing makeup to the tank not venting of it.   This evolution takes place in the turbine building.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 72 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	1
Difficulty:	2.00
System ID:	98387
User-Defined ID:	LO98387
Reference:	RADIATION CONTROL
Topic:	#72 2.3.14 (Bank - Low)
RO Importance Rating:	3.4
SRO Importance Rating:	3.8
K/A Number:	2.3.14
Comments:	<p>2019 Wolf Creek NRC, K/A Statement - Knowledge of rad or contamination hazards that may arise during normal abnormal or emergency conditions or activities. (CFR: 41.1 / 43.4 / 45.10)</p> <p>Tier 3 Group 3</p> <p>Bank question, last use on 2015 Wolf Creek NRC Exam (100% history)</p> <p>Low Cog - Fundamental</p> <p>LO1733204, Radiation Protection, Objective 1, Discuss the requirements of procedure AP 25B-001, RADIATION WORKER GUIDELINES pertaining to the responsibilities of rad workers, exposure limits, and contamination controls.</p> <p>Meets KA asks for knowledge of changing rad levels while performing normal activities.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

73

ID: LO153377

Points: 1.00

When performing steps in the EMG procedures, when can you also perform steps in an OFN procedure?

- A. At any time as long as the OFN does not interfere with EMG actions.
- B. ONLY when needed to help mitigate the event identified in the EMG.
- C. At any time EXCEPT during performance of Red or Orange Path FRP's.
- D. ONLY when during performance of the OFN, the provided direction is to Trip the reactor while continuing in the OFN.

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (at any time as long as the OFN does NOT interfere with EMG actions. AP 15C-003, step 6.2.3: "While performing EMGs, plant conditions may indicate the need to correct problems not directly related to the event mitigation strategy. The operator may perform OFNs and ALRs which address these problems as long as the actions do not interfere with performance of the EMGs.

B. Distractor 1 (Only when needed) is INCORRECT, but plausible. EMGs contain optimal recovery guidelines to provide directions for design basis accidents and monitor for degradation of critical safety functions. OFNs may also be performed for concurrent issues provided they do not interfere with EMG performance and the crew is made aware of the actions taken by the Operator branched to perform the OFN.

C. Distractor 2 (at any time except during performance of FRPs) is INCORRECT, but plausible. There are no requirement to exclude OFN steps during performance of FRs, the performance of FRPs demonstrates CSF Status is degrading, so it is plausible/prurient to think there might be a prohibition at this time. Certain procedures, such as the transfer to Cold Leg recirculation specific the crew is to focus on that procedure while the rest of the crew monitors. This answer choice was selected during Operator Validations.

D. Distractor 3 (ONLY during performance of OFN that directs reactor trip and continuing in the OFN) is INCORRECT, but plausible. There are OFNs that provide this direction, such as OFN BB-005, but those OFN Actions are NOT only restricted to those procedures that provide this guidance.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 73 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153377
User-Defined ID:	LO153377
Reference:	EMERGENCY PROCEDURES
Topic:	#73 2.4.11 (Bank - Low)
RO Importance Rating:	4.0
SRO Importance Rating:	4.2
K/A Number:	2.4.11
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)</p> <p>Tier 3 Group 4</p> <p>Copy of Bank Question Q19592, previous use on 2001 Wolf Creek NRC exam. (78% history)</p> <p>LO1733203, Procedure Usage, Objective 7, Discuss the priority of procedures that deal with abnormal conditions IAW AP 15C-003.</p> <p>Meets generic K/A for knowledge of abnormal conditions procedures and when they can be used in conjunction with emergency procedures per station directives.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

74

ID: LO153376

Points: 1.00

Assuming that the entry conditions for each of the following procedures exists, which procedure takes priority for crew implementation per AP 15C-003, PROCEDURE USER'S GUIDE FOR ABNORMAL PLANT CONDITIONS?

- A. EMG C-0, LOSS OF ALL AC POWER
- B. EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION
- C. EMG FR-C1, RESPONSE TO INADEQUATE CORE COOLING
- D. EMG C-11, LOSS OF EMERGENCY COOLANT RECIRCULATION

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (EMG C-0) Per AP 15C-003, Section 6.2.2, Under certain plant conditions, procedures of "Lower Priority" may take precedence over procedures of "Higher Priority." For example, The EMG network procedures are written assuming there is power available to at least one train of safeguards equipment. If busses NB01 and NB02 are both deenergized, the Operator must go to the "lower priority" EMG C-0 even though a "higher priority" FRP may be in effect.

B. Distractor 1 (EMG ES-12) is INCORRECT, but plausible as EMG ES-12 takes precedence over all procedures except EMG C-0 until completion of the transfer to cold leg recirculation. During a Loss of All AC, there is no power to the ECCS equipment, so the crew should be focused on restoration of power to a Vital AC Bus.

C. Distractor 2 (EMG FR-C1) is INCORRECT, but plausible. As the second highest priority CSFST, this procedure would usually take precedence except for EMG FR-S1, EMG C-0, or EMG ES-12. AP 15C-003 specifies the process to transfer ECCS Cooling flow could cause a RED or ORANGE path Core Cooling CSF indication, but that procedure would NOT be entered until the transfer to cold leg recirc was complete and the inadequate or degraded core cooling situation still existed. This answer choice was selected during Operator validations.

D. Distractor (EMG C-11) is INCORRECT, but plausible. This procedure has precedence over EMG ES-12, but is subordinate to EMG C-0 and EMG FR-C1.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 74 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153376
User-Defined ID:	LO153376
Reference:	EMERGENCY PROCEDURES
Topic:	#74 2.4.16 (Bank - Low)
RO Importance Rating:	3.5
SRO Importance Rating:	4.4
K/A Number:	2.4.16
Comments:	<p>K/A Statement, Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.</p> <p>Tier 3 Group 4</p> <p>Copy of Bank Question 19593. (100% history)</p> <p>LO1733203, Procedure Usage, Objective 7. Discuss the priority of procedures that deal with abnormal conditions IAW AP 15C-003.</p> <p>Meets the Generic K/A since the questions asks for implementation hierarchy based on entry conditions being met for all four procedures.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

75

ID: LO153219

Points: 1.00

In accordance with AP 15C-003, PROCEDURE USER'S GUIDE FOR ABNORMAL PLANT CONDITIONS, which of the following identifies ALL of the ways a Continuous Action Step may be Identified?

1. Horizontal Bars above and below the step number.
2. Steps indexed with bullets (o).
3. Steps indexed with asterisks (\*)
4. WHEN, THEN logic statements.
5. IF, THEN logic statement.
6. Action Verbs CONTROL, MONITOR, MAINTAIN and TRY.

- A. 1, 3, 6
- B. 1, 4, 6
- C. 2, 3, 5
- D. 2, 4, 5

Answer: B

## Answer Explanation

Systematically, all four answer choices contain (1or2, 3or4 and 5or6) Answer choices sorted numerically. Correct answer at B.

A. Distractor 1 (1,3,6) is INCORRECT, but plausible. (1) and (6) are right, but (3) is wrong. (3) Sub-steps indexed with asterisks may NOT be necessary and when required may be performed in any order. Plausible because this is a symbol used in the EMG Network; wrong because they do NOT annotate direction of a Continuous Action Step. Also wrong because (4) WHEN, THEN logic statements is also one of the ways a Continuous Action step may be identified and it is NOT included in this answer choice.

B. CORRECT (1,4,6) Per AP 15C-003, Section 6.6, Continuous Action steps are identified by (1) horizontal lines above and below the high level step number. They are also created by (4) WHEN, THEN logic statements, and (6) action verbs CONTROL, MONITOR, MAINTAIN, and TRY.

C. Distractor 2 (2,3,5) is INCORRECT, but plausible. All three answer choices are wrong; the opposite of the correct answer.

D. Distractor 3 (2,4,5) is INCORRECT, but plausible. (4) is right, but (2) and (5) are wrong. (2) Subsets indexed with bullets are required to be performed but may be performed in any order. Plausible because they are symbols used in the EMG Network; wrong because they do NOT annotate direction of a Continuous Action Step. (5) IF, THEN logic statements are also used in the EMG Network, but they do NOT annotate direction of a Continuous Action Statement. Also wrong because (1) Horizontal Bars above and below the step number and (6) Action Verbs are also ways a Continuous Action step may be identified and they are NOT included in this answer choice.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 75 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153219
User-Defined ID:	LO153219
Reference:	EMERGENCY PROCEDURES
Topic:	#75 2.4.19 (New - Low)
RO Importance Rating:	3.4
SRO Importance Rating:	4.1
K/A Number:	2.4.19
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of EOP layout, symbols, and icons. (CFR: 41.10 / 45.13)</p> <p>Tier 3 Group 4</p> <p>Low Cog - Fundamental</p> <p>LO1733203, Procedure Usage, Objective 9, Describe how continuous Action Steps are identified in a procedure IAW AP 15C-003.</p> <p>Meets generic K/A since the question asks for how Continuous Action steps are identified in EOP procedures. Horizontal lines (symbol) above and below the procedure step number is one way these steps are identified.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

76

ID: LO153834

Points: 1.00

Given:

- The unit experienced a station blackout and crew responded per EMG C-0, LOSS OF ALL AC POWER.
- Off-Site power was restored, and both AC Emergency busses are re-energized.
- CTMT Pressure is 1.5 psig and steady.
- PZR Level is at 20% and down slow.
- Cold Leg Temperatures are 500°F and down slow.
- PZR Pressure is 855 psig.
- The crew is performing EMG C-0, Step 54. **Select Recovery Procedure:**

Based on these conditions, how should the crew proceed?

- A. Manually Actuate SI and go to EMG E-0, REACTOR TRIP OR SAFETY INJECTION.
- B. Transition to OFN NB-035, LOSS OF OFF-SITE POWER RESTORATION and restore power to non-safety related busses.
- C. Transition to EMG CS-01, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED and continue with station recovery.
- D. Transition to EMG CS-02, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED and manually actuate ECCS components.

Answer: D

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Manually Actuate SI and go to EMG E-0) is INCORRECT, but plausible since conditions exist that would result in the crew manually actuating SIS and transitioning to EMG E-0 if not for the given loss of all AC recovery procedures in effect. EMG C-0 foldout page step 1 directs resetting SI signal to permit manual loading of equipment on AC emergency busses. This action is also accomplished per EMG C-0, Step 46 after power is restored to NB busses. This distractor supports the K/A for testing conditions requiring actuation of ECCS at the SRO Level.

B. Distractor 2 (Transition to OFN NB-035 to restore non-safety related busses) is INCORRECT, but plausible. OFN NB-035 is a recovery procedure and entry conditions are met. Per AP 15C-003, PROCEDURE USER'S GUIDE FOR ABNORMAL PLANT CONDITIONS, Rules of usage, an Operator may be "branched" to perform this procedure as long as those actions don't interfere with continued EMG Actions taken by the rest of the crew. The knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures supports the SRO-Only level of this question. This procedure would be an appropriate transition from EMG ES-02, REACTOR TRIP RESPONSE following just a loss of off-site power. This answer choice is wrong since for the given conditions, the crew is required to transition to EMG CS-02, not OFN NB-035.

C. Distractor 3 (Transition to EMG CS-01) is INCORRECT, but plausible. This choice would be true if not for the low RCS pressure and RCS Subcooling at 28F. The applicant must calculate Subcooling and determine it is <30F to eliminate this distractor.

D. CORRECT (Transition to EMG CS-02) Per EMG C-0, Step 54, the crew must evaluate RCS Subcooling and PZR Level to determine which procedure with which the crew should proceed. The saturation temperature for the given 855 psig (870 psia) is 528F. The RCS Subcooling is only 28F, so the crew should transition to EMG ES-02 and manually actuate ECCS Components per Steps 5 and 6.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 76 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153834
User-Defined ID:	LO153834
Reference:	ECCS
Topic:	(SRO) #76 006 / A2.12 (New - High)
RO Importance Rating:	4.5
SRO Importance Rating:	4.8
K/A Number:	006 A2.12
Comments:	<p>K/A Statement, Emergency Core Cooling System (ECCS), Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Conditions requiring actuation of ECCS. (CFR: 43.5)</p> <p>Tier 2 Group 1</p> <p>High Cog - Analysis of given conditions and selection of a procedure with which to proceed.</p> <p>LO1300600, ECCS, Objective 13, Evaluate ECCS response to a Safety Injection Signal (SIS) actuation and the conditions/setpoints which will actuate an SIS.</p> <p>Meets K/A since the given scenario presents criteria that the applicant must evaluate to determine conditions exist that require actuation of ECCS.</p> <p>SRO Only since the crew is performing EMG C-0 Contingency procedure which alters what the normal response would be based on the special requirements of that procedure. Question cannot be answered by knowing systems knowledge, by knowing immediate operator actions, by knowing entry conditions for AOPs or direct entry to major EOPs, or by knowing the purpose, overall sequence of events or overall mitigative strategy of a procedure. The SRO must assess plant conditions and then select a procedure to mitigate or recover, or with which to proceed. EMG C-0, Step 54 also presents a decision point that involves a transition to an event-specific emergency contingency procedure while meeting the system level K/A for conditions requiring actuation of the ECCS.</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

77

ID: LO153626

Points: 1.00

Given:

- The unit was operating at 100% power when off-site power was lost.
- 'A' EDG tripped on Overspeed and cannot be reset.
- Mechanical Maintenance has been dispatched to investigate.
- The crew has entered EMG ES-04, NATURAL CIRCULATION COOLDOWN.

Based on these conditions, which of the following is the MAXIMUM allowed Cool Down Rate per EMG ES-04?

- A. 50°F/Hr
- B. 53°F/Hr
- C. 70°F/Hr
- D. 100°F/Hr

Answer: C

## Answer Explanation

Answer choices sorted short to sequentially. Correct answer at C.

A. Distractor 1 (50°F/hr) is INCORRECT, but plausible. This choice would be true if during the cooldown a steam void formed in the core and the crew transitioned to EMG ES-05, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITHOUT RVLIS). Wrong because EMG ES-04 does not limit cooldown rate to this value.

B. Distractor 2 (53°F/hr) is INCORRECT, but plausible. This choice would be true if any loops were inactive due to the inability to steam per EMG ES-04, FIGURE 2, C/D RATE AS A FUNCTION OF DECAY HEAT/ACTIVE LOOP  $\Delta T$ , if lowest Active loop  $\Delta T$  was  $>30^{\circ}\text{F}$ . Wrong because no indications of inactive loops were given.

C. CORRECT (70°F/hr) For the given conditions, only ONE CRDM Fan has power available, so the maximum allowed Cooldown Rate is 70°F/hr, per EMG ES-04, step 13. CRDM Fan 'C' (PG19) is lost when off-site power is lost. CRDM Fan 'D' (NG01B) is lost when NB01 is lost due to loss of 'A' EDG. Only 'B' CRDM Fan (NG02B) has power from NB02 and 'B' EDG. Per BD-EMG ES-04, CRDM cooling fans aid significantly in removing heat from the upper head area. For this reason, it is necessary to have as many CRDM fans in operation as possible. If  $<50\%$  of the CRDM fans are running, Cooldown rate is restricted to 70F/hr. For the given LOOP and EDG 'A' Failure, only 33% of CRDM fans are available.

D. Distractor 3 (100°F/hr) is INCORRECT, but plausible. This is the cooldown rate specified per Step 13 if steam release, feed flow capabilities are available for all four S/G and at least two CRDM fans are running. For the given conditions, only one CRDM fan is running, so Cool down rate is restricted to 70°F/hr. This answer choice was selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 77 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153626
User-Defined ID:	LO153626
Reference:	CTMT COOLING
Topic:	(SRO) #77 022 / 2.1.20 (New - High)
RO Importance Rating:	4.6
SRO Importance Rating:	4.6
K/A Number:	022 2.1.20
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Containment Cooling System, Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)</p> <p>Tier 2 Group 1</p> <p>High Cog - Knowledge of CRDM fan power supplies to recognize for given conditions that two are without power. Application of the number of available CRDM fans to determine procedure required restriction in cooldown rate. Procedure knowledge to know when different cooldown rate restrictions exist (per Figure 2)</p> <p>LO1302600, Containment Spray and Cooling System, Objective 9, Describe the function of major Containment Cooling System components and controls.</p> <p>Meets the K/A as CRDM Fans are part of the Containment Cooling System and their operation, or lack of operation affects the rate at which a Natural Circulation Cooldown may be performed. Any other procedure directed operation of the Containment Cooling System would be RO knowledge.</p> <p>SRO Only since the question requires assessment of plant conditions (emergency) and then selection of a section of a procedure (step 13) to mitigate or recover, or with which to proceed. Question cannot be answered solely by knowing systems knowledge, by knowing immediate operator action, by knowing entry conditions, or by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure.</p> <p><u>Revision History:</u> 1- Eliminated the 53°F/hr cooldown limit clarifier from Distractor A, replaced Distractor D, shuffled answer choices to sort sequentially and updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

78

ID: LO153408

Points: 1.00

Given:

- The unit was operating at 100% power when both MFPs tripped.
- The crew manually tripped the Reactor after it failed to trip in auto.

After the crew completed all EMG E-0, REACTOR TRIP OR SAFETY INJECTION Immediate Actions, the following conditions exit:

- MCB Annunciator 035C, PZR SFTY DISCH TEMP HI is LIT.
- Green lights are lit on all three PZR Safety Valves.
- S/G Pressures are all 600 psig and down slow.
- MCB Annunciators 039A and 039B, LOCA SEQ ACTUATED are both LIT
- 'A' and 'B' MDAFW Pumps tripped on overcurrent.
- TDAFW Pump tripped on overspeed.
- RCS Pressure is 1800 psig and slowly lowering.
- Intermediate Range S/U Rate is +0.1 DPM on both channels
- All S/G NR Levels are off scale low.

Based on these conditions, how should the crew proceed?

- A. Transition to EMG ES-03, SI TERMINATION.
- B. Transition to EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT.
- C. Transition to EMG FR-H1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
- D. Transition to EMG FR-S1, RESPONSE TO NUCLEAR PWR GENERATION/ATWTS.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (EMG ES-03) is INCORRECT, but plausible. This choice would be true for an inadvertent SI Actuation per EMG E-0, Step 19. This choice is wrong since the SI actuation was required since S/G pressures were <615 psig, there is no valid heat sink, and there is a positive IR SUR.

B. Distractor 2 (EMG E-1) is INCORRECT, but plausible. This action would be required by EMG E-0, Step 13 for a failed open PZR Safety Valve. For the given conditions, at least one PZR safety valve opened and then reseated. Also wrong since the crew is REQUIRED to transition to EMG FR-H1 at EMG E-0, Step 8.

C. CORRECT (EMG FR-H1) For the given conditions, there is NO Heat sink and the crew will be directed to transition to EMG FR-H1 at EMG E-0, Step 8. This is the highest priority CSF challenge that the crew must address.

D. Distractor 3 (EMG FR-S1) is INCORRECT, but plausible. Entry conditions are met to enter EMG FR-S1 on an ORANGE PATH, so this choice would be right if not for the higher priority RED PATH on Heat Sink. This answer choice was selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 78 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153408
User-Defined ID:	LO153408
Reference:	AFW SYSTEM
Topic:	(SRO) #78 061 / 2.4.1 (New - High)
RO Importance Rating:	4.6
SRO Importance Rating:	4.8
K/A Number:	061 2.4.1
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Auxiliary / Emergency Feedwater System, Knowledge of EOP entry conditions and immediate action steps. (CFR: 43.5)</p> <p>Tier 2 Group 1</p> <p>Higher Order - diagnosis of given conditions to determine procedure navigation and priority of those procedure navigation where multiple entry conditions are met.</p> <p>LO1406100, Auxiliary Feedwater System, Objective 11, Describe system and integrated plant responses to transient and equipment failures.</p> <p><u>Overlap Consideration</u> - Question modified after validations to remove action steps to make different from #89 (EMG FR-H1 specific steps)</p> <p>Meeting the spirit of the K/A by testing procedure entry since there are no immediate action steps in a procedure related to AFW System.</p> <p>SRO Only due to assessment of plant conditions and then selection of a procedure to mitigate, recover, or with which to proceed. Question requires knowledge of diagnostic steps and decision points in the EOP that involves transitions to emergency contingency procedures (EMG E-0, Step 8 to EMG FR-H1) and knowledge of administrative procedures (EMG F-0) that specify hierarchy, implementation, and/or coordination of plant emergency procedures (EMG FR H1 RED over EMG FR-S1 ORANGE). Question cannot be answered solely by knowing procedure entry conditions, since priority must be evaluated.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

79

ID: LO153835

Points: 1.00

Given:

- At 0800 the unit tripped due to a Loss of Offsite power and 'A' EDG failed to start.
- At 0810 the SM classified ALERT SA1.1

Based on these conditions, what is the LATEST time the NRC must be notified per AP 26A-001, REPORTABLE EVENTS - EVALUATION AND DOCUMENTATION.

- A. 0900
- B. 0910
- C. 1300
- D. 1310

Answer: B

## Answer Explanation

Answer choices sorted sequentially. Correct answer at B.

A. Distractor 1 (0900) is INCORRECT, but plausible. This time corresponds to one hour after the event occurred. Wrong because per AP 26A-001 and CFR 50.72(1)(1)(i), the NRC must be notified no later than one hour after "The declaration of any of the Emergency Classes specified in the licensee's approved Emergency Plan."

B. CORRECT (0910) This time corresponds to one hour after the SM Declared an ALERT, which meets the requirements for the LATEST time the NRC must be notified. Per AP 26A-001 and CFR 50.72(1)(1)(i), the NRC must be notified no later than one hour after "The declaration of any of the Emergency Classes specified in the licensee's approved Emergency Plan."

C. Distractor 2 (1300) is INCORRECT, but plausible. This time corresponds to four hours after the event occurred, which is plausible since AP 26A-001 and CFR 50.72(b)(2)(i) specifies the NRC must be notified within four hours after "The initiation of any nuclear plant shutdown required by the plant's Technical Specifications." Wrong because the NRC is required to be notified within one hour of an emergency plan classification, or by 0910 at the LATEST.

D. Distractor 3 (1310) is INCORRECT, but plausible. This time corresponds to four hours after the SM Classified the event, which is plausible since AP 26A-001 and CFR 50.72(b)(2)(i) specifies the NRC must be notified within four hours after "The initiation of any nuclear plant shutdown required by the plant's Technical Specifications." Wrong because the NRC is required to be notified within one hour of an emergency plan classification, or by 0910 at the LATEST.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 79 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153835
User-Defined ID:	LO153835
Reference:	AC DIST
Topic:	(SRO) #79 062 / A2.04 (New - High)
RO Importance Rating:	3.1
SRO Importance Rating:	3.4
K/A Number:	062 A2.04
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, AC Electrical Distribution System, Ability to (a) predict the impacts of the following malfunctions or operations on the AC distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect on plant of de-energizing a bus. (CFR 43.1 for this question)</p> <p>Tier 2 Group 1</p> <p>High cog - Requires knowledge of reportability procedures and application of time requirements.</p> <p>LO1734021, SRO ONLY - Reportability and Emergency Plan, Objective 3, Explain the time requirements for classification and notification.</p> <p>Meets the K/A since the given scenario results in a loss of AC Emergency Bus NB01 when both the off-site power source (ESF XFMR XNB01) and emergency power source ('A' EDG) are lost. Any prediction for the impacts due to loss of the bus is RO systems level knowledge and any procedure entry that would result is also expected RO knowledge. This question asks for the expected SRO function of NRC reportability that would result from the Emergency Classification aspect for the loss of bus per AP 26A-001.</p> <p>SRO Only since Reportability satisfies 10CFR 55.43(b)(1) Conditions and limitations in the facility License.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

80

ID: LO153451

Points: 1.00

Given:

- The unit was operating at 100% power.
- 'B' EDG was paralleled with Off-Site power for normal surveillance testing.
- PA0201, 13.8 KV XMFR XNB02 CKT BKR, tripped.
- NB02 remained energized by EDG B.
- MCB Annunciator 00-021B, NB02 BUS UV remained clear.
- The crew entered OFN NB-042, LOSS OF OFFSITE POWER TO NB01 (NB02) WITH EDG PARALLELED.
- The local Operator action to manually Initiate NB02 BUS UV signal was performed.
- MCB Annunciator 00-021B, NB02 BUS UV is LIT.
- NB0211, NB02 EMRG SPLY BKR failed to auto close.

Based on these conditions, 1) what action is the crew REQUIRED to take, and 2) with what procedure should the crew proceed?

- A. 1) Locally stop 'B' EDG.  
2) Go to OFN EF-033, LOSS OF ESSENTIAL SERVICE WATER.
- B. 1) Locally stop 'B' EDG.  
2) Go to OFN NB-030, LOSS OF AC EMERGENCY BUS NB01 (NB02).
- C. 1) Align Service Water to 'B' Train ESW.  
2) Go to OFN EF-033, LOSS OF ESSENTIAL SERVICE WATER.
- D. 1) Align Service Water to 'B' Train ESW.  
2) Go to OFN NB-030, LOSS OF AC EMERGENCY BUS NB01 (NB02).

Answer: B

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (Locally stop B EDG, OFN EF-033) is INCORRECT, but plausible. For the given conditions, the crew is at step B3 of OFN NB-042. When NB02 is NOT energized and there is NO ESW cooling, the RNO directs locally stopping 'B' EDG and going to OFN NB-030. OFN EF-033 is plausible in that B ESW Pump is without power and OFN EF-033 provides direction to align service water to an ESW Train Per Attachment A, but conditions are NOT met to enter OFN EF-033 since the EDG output breaker failed to close, there is no S/D Sequencer actuation. The loss of B ESW pump is a symptom of the loss of power and not an ESW system malfunction. The crew is REQUIRED to transition to OFN NB-030 for the given conditions.

B. CORRECT (Locally Stop B EDG and go to OFN NB-030). For the given conditions, NB02 bus is NOT energized by 'B' EDG since the emergency supply breaker failed to auto close and annunciator 021B is LIT. Since NB02 is NOT energized, 'B' ESW Pump is NOT running, so OFN NB-042 directs locally shutting down 'B' EDG and Transitioning to OFN NB-030.

C. Distractor 2 (Align Service Water to 'B' Tran ESW, OFN EF-033) is INCORRECT, but plausible. Both the action and procedure are plausible, but wrong since 'B' ESW Pump is without power and OFN EF-033 provides direction to align service water to an ESW Train Per Attachment A. But conditions are NOT met to enter OFN EF-033 since the EDG output breaker failed to close, there is no S/D Sequencer actuation. The loss of 'B' ESW pump is a symptom of the loss of power and not an ESW system malfunction. The crew is REQUIRED per OFN NB-042 to locally stop the EDG and transition to OFN NB-030 for the given conditions.

D. Distractor 3 (Align Service Water to B Train ESW, Go to OFN NB-030) is INCORRECT, but plausible. The procedure is right, and but the action is wrong. OFN NB-030 will address the effects of the loss of bus NB02 and restore power and ESW pump operation. This answer choice is wrong because the crew is NOT required to align service water to B Train ESW for the given conditions.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 80 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153451
User-Defined ID:	LO153451
Reference:	EDG ELECT
Topic:	(SRO) #80 064 / A2.03 (New - High)
RO Importance Rating:	3.1
SRO Importance Rating:	3.1
K/A Number:	064 A2.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Emergency Diesel Generator (EDG) System, Ability to (a) predict the impacts of the following malfunctions or operations on the EDG system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Parallel operation of EDGs. (CFR: 43.5)</p> <p>Tier 2 Group 1</p> <p>High Cog - assessment of plant conditions given procedure action, knowledge of power supplies and the implications of the loss on bus NB02 on the running EDG and required procedure transition from memory.</p> <p>LO1406401, Emergency Diesel Generator System (Electrical), Objective 5, Explain the Load Shed / Emergency Load Sequencer System purpose(s), function(s), and timing.</p> <p>Meets the K/A since the EDG is paralleled to the grid for surveillance testing in the given conditions and a subsequent failure and performance of immediate actions resulted in the EDG output breaker failing to close. The question asks for a prediction based on this failure and for which procedure the crew will use to correct, control, or mitigate the consequence of that malfunctions or operations.</p> <p>SRO ONLY since the question requires assessment of plant conditions and selection of a procedure or section of a procedure to mitigate or recover or with which to proceed. The given action for the Dedicated Operator to use OFN NB-042 to Manually Initiate NB02 BUS UV signal is RO knowledge, whereas the required actions and subsequent procedure navigation requires SRO knowledge.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

81

ID: LO153452

Points: 1.00

Given:

- The unit is operating at 100% power.
- Ten hours ago, PZR level channel BB LT-459 failed off-scale LOW.
- All actions that are required to allow for continued operation at full power have been completed.
- PZR level control controlling channels are selected to BB LT-461 over BB LT-460.
- Now PZR level channel BB LT-460 fails off-scale LOW.

Based on these conditions, what Technical Specification REQUIRED ACTION should the crew perform?

- A. Per LCO 3.0.3, immediately trip the reactor and go to EMG E-0, REACTOR TRIP OR SAFETY INJECTION.
- B. Per LCO 3.3.1, COND M, manually trip the Reactor and go to EMG E-0, REACTOR TRIP OR SAFETY INJECTION.
- C. Per LCO 3.0.3, initiate action using OFN MA-038, RAPID PLANT SHUTDOWN within one hour to place the unit in MODE 3 within 7 hours.
- D. Per LCO 3.3.1, COND M, initiate action using OFN MA-038, RAPID PLANT SHUTDOWN to reduce THERMAL POWER to <P-7, Low Power Reactor Trips Block within 6 hours.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (LCO 3.0.3, EMG E-0) is INCORRECT, but plausible. Since no technical specification exists for loss of two PZR Level channels, LCO 3.03 is applicable. LCO 3.0.3 specifies action must be initiated within 1 hour to reduce power and place the unit in MODE 3 within 7 hours. At Wolf Creek, the crew will lower power to 30% and THEN trip the reactor and go to EMG E-0. This choice is only wrong because it specifies the crew must immediately trip the reactor.

B. Distractor 2 (LCO 3.3.1, COND M, EMG E-0) is INCORRECT, but plausible. LCO 3.3.1, COND M is applicable for the loss of a single PZR Level channel and was entered 10 hours ago when BB LI-459 failed. If the given direction of failure had been HIGH, 2/3 coincidence would have been met and the reactor would have auto tripped and the crew would have performed EMG E-0.

C. CORRECT (LCO 3.0.3, OFN MA-038) Since the Reactor Trip on High PZR Level is 2/3 coincidence and one channel is already lost, this failure low will prevent the PZR Level High Reactor trip from functioning and an unspecified conditions exists. For this conditions, LCO 3.0.3 applies and the crew is required to initiate action within 1 hour to place the unit in MODE 3 within 7 hours.

D. Distractor 3 (LCO 3.3.1, COND M, OFN MA-038) is INCORRECT, but plausible. LCO 3.3.1, COND M was entered 10 hours ago when BB LI-459 failed. The action is applicable as REQUIRED ACTION M.2 to reduce THERMAL POWER <P7 in 78 hours instead of placing the failed channel in trip within 72 hours; a difference of 6 hours. Wrong because there are two failed channels and per LCO 3.0.3, the unit should be placed in MODE 3 within 7 hours.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 81 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153452
User-Defined ID:	LO153452
Reference:	PZR LCS
Topic:	(SRO) #81 011 / A2.10 (New - High)
RO Importance Rating:	3.4
SRO Importance Rating:	3.6
K/A Number:	011 A2.10
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Pressurizer Level Control System (PZR LCS), Ability to (a) predict the impacts of the following malfunctions or operations on the PZR LCS; and (b) based on those prediction, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of PZR level instrument - high. (CFR: 43.2 for this question)</p> <p>Tier 2 Group 2</p> <p>High Cog - Application of previously taken procedure action, reactor trip setpoints, and selection of a procedure.</p> <p>LO1301000, Pressurizer Pressure and Level Control, Objective 10, Predict the impact of a given instrument failure, heater failure, or spray valve failure on the Pressurizer Pressure and/or Level Control System.</p> <p>Meets the K/A since failure of two input channels to the PZR LCS is the given condition and the applicant must predict the impacts of the second failure (combined with the results of the actions taken for the first failure) and use a procedure to correct, control, or mitigate the consequences of the combined failures.</p> <p>SRO Only since the question requires assessment of plant conditions (abnormal) and selection of a procedure to mitigate or recover, or with which to proceed based on Technical Specifications requirements for a condition which is unspecified, requiring the crew to respond per LCO 3.0.3.</p> <p><u>Revision History:</u>  1 – Modified question so that BB LT-460 also failed low so that the distractor for LCO 3.0.3 became the correct answer.  Modified answer choices to make 2x2 using technical specification LCO 3.0.3 vs. LCO 3.3.1, COND M and OFN MA-038 vs. EMG E-0. Resorted answer choices to maintain short to long format and updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

82

ID: LO153748

Points: 1.00

Given:

- The unit is in MODE 6 with core off-load in progress.
- You are the Fuel Handling SRO in CTMT.
- A spent fuel assembly has just been removed from the reactor vessel when indications of damaged fuel are observed.

Per OFN KE-018, FUEL HANDLING ACCIDENT, 1) Who directs the performance of the procedure, and 2) where should the damaged fuel assembly be placed?

- A. 1) The Fuel Handling SRO  
2) Return the Spent Fuel Assembly to the Reactor Vessel.
- B. 1) The Fuel Handling SRO  
2) Complete the transfer of the Spent Fuel Assembly to the Upender.
- C. 1) The Control Room Supervisor  
2) Return the Spent Fuel Assembly to the Reactor Vessel.
- D. 1) The Control Room Supervisor  
2) Complete the transfer of the Spent Fuel Assembly to the Upender.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (Fuel Handling SRO, Reactor Vessel) is INCORRECT, but plausible. The notes prior to OFN KE-018, step 1 specifies the CRS is responsible for directing the performance of OFN KE-018. The Fuel Handling SRO is in charge at the scene of the accident and takes the actions of Step 3. Per OFN KE-018, Step 3e, the Fuel Handling SRO is directed to transfer all remaining elements in the Refueling Pool to the Reactor Vessel. The procedure director is wrong, but the location is right.

B. Distractor 2 (Fuel Handling SRO, Upender) is INCORRECT, but plausible. The CRS is responsible for directing the OFN KE-018. The placement of the spent fuel assembly is also wrong but plausible in that competing the transfer to the upender might be the quickest action to minimize exposure and the damaged fuel assembly will need to be removed from containment eventually. Wrong because OFN KE-018, Step 3e directs returning the spent fuel assembly to the reactor vessel. Both answer choices are wrong, the opposite of the correct answer.

C. CORRECT (CRS, Reactor Vessel) The notes prior to OFN KE-018, step 1 specifies the CRS is responsible for directing the performance of OFN KE-018. The Fuel Handling SRO is in charge at the scene of the accident and takes the actions of Step 3. Per OFN KE-018, Step 3e, the Fuel Handling SRO is directed to transfer all remaining elements in the Refueling Pool to the Reactor Vessel.

D. DISTRACTOR 3 (CRS, Upender) is INCORRECT, but plausible. The person responsible for directing the procedure is right, but the location is wrong. This answer choice was selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 82 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153748
User-Defined ID:	LO153748
Reference:	FHE
Topic:	(SRO) #82 034 / 2.4.6 (New - Low)
RO Importance Rating:	3.7
SRO Importance Rating:	4.7
K/A Number:	034 2.4.6
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Fuel Handling Equipment System (FHES), Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)</p> <p>Tier 2 Group 2</p> <p>Low Cog - Procedure usage</p> <p>LO1732428, OFN KE-018, FUEL HANDLING ACCIDENT, Objective 4, Explain the basis and knowledge requirement for specific procedure steps.</p> <p>Meets K/A since the given event was a fuel handling accident and the question asks about the mitigation strategy of the procedure.</p> <p>SRO Only knowledge per 10CFR 55.43 (7) Fuel handling facilities and procedures.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

83

ID: LO153454

Points: 1.00

The unit was operating at 100% power when a failure caused the turbine to trip. Plant conditions are as follows:

- The crew has transitioned to EMG ES-02, REACTOR TRIP RESPONSE.
- All S/G NR levels are off scale low.
- T<sub>avg</sub> is 549°F and lowering.
- A Red indication exists on AB UV-039 LP Condenser Steam Dump.
- Green indications exist on all other Steam Dump valves.
- AB PK-507, STEAM HDR PRESS CTRL is in AUTO with 0% Output.
- AB US-500Z, STEAM DUMP SEL is in STEAM PRESS position.

Based on these conditions, 1) How will this failure affect plant temperature and 2) what action is the crew REQUIRED to take per EMG ES-02?

- A. 1) Temperature will continue to lower until Operator action is taken.  
2) ALL CLOSE the MSIV's.
- B. 1) Temperature will continue to lower until Operator Action is taken.  
2) Place AB US-500Z, STEAM DUMP SEL in TAVG position.
- C. 1) Temperature will lower until Permissive P-12, LOLO TAVG Actuates.  
2) ALL CLOSE THE MSIVs.
- D. 1) Temperature will lower until Permissive P-12, LOLO TAVG Actuates.  
2) Place AB US-500Z, STEAM DUMP SEL in TAVG position.

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (Continue to lower, ALL CLOSE MSIVs). For the given conditions (Tavg below the P-12 Actuation setpoint), the automatic signal action to close all steam dumps has failed. Per EMG ES-02, Step 1c RNO, the crew has already placed steam dump select switch AB US-500C in the STEAM PRESS position, so since Tavg is continuing to lower, the crew must ALL CLOSE the MSIVs to isolate steam to the steam dumps and stop the uncontrolled cooldown.

B. Distractor 1 (Continue to lower, Tavg Mode) is INCORRECT, but plausible. The first part is right, but the second part is wrong. The steam dump selector switch is normally in the Tavg mode and the crew has already taken EMG ES-02 action to place the switch to the STEAM PRESS mode.

C. Distractor 2 (P-12, ALL CLOSE MSIVs) is INCORRECT, but plausible. The first part is wrong in that the given temperature is already below the P-12 interlock so temperature will continue to lower without Operator Action. The procedure action is right. This answer choice was selected during Operator validations.

D. Distractor 3 (P-12, Tavg Mode) is INCORRECT, but plausible. Both answer choices are wrong; the opposite of the correct answer.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 83 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153454
User-Defined ID:	LO153454
Reference:	SDS
Topic:	(SRO) #83 041 / A2.02 (New - High)
RO Importance Rating:	3.6
SRO Importance Rating:	3.9
K/A Number:	041 A2.02
Comments:	<p>K/A Statement, Steam Dump System (SDS) / Turbine Bypass Control, Ability to (a) predict the impacts of the following malfunctions or operations on the SDS; and (b) based on those predictions use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Steam valve stuck open. (CFR: 41.5 / 43.5 / 45.3 / 45.13)</p> <p>Tier 2 Group 2</p> <p>High Cog - Application of expected plant response, Permissive interlock setpoints and procedure knowledge.</p> <p>LO1504100, Steam Dump System, Objective 5, Describe Steam Dump System and integrated plant response to plant transients and equipment failures.</p> <p>Meets the K/A since the given condition identifies a steam dump valve is open with given RCS temperature &lt;P12 setpoint. The applicant must predict whether or not the open steam dump will close as temperature lowers (P-12 setpoint knowledge) and then select an action as directed by EMG ES-02 to correct, control, or mitigate the consequences of the malfunctions or operations.</p> <p>SRO Only since question requires assessment of plant conditions (abnormal) and selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed. Question cannot be answered solely with system knowledge or by knowing Immediate Operator Actions, Procedure entry conditions, or overall sequence of events or overall mitigative strategy of a procedure.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

84

ID: LO153627

Points: 1.00

Given:

- The unit is operating at 59% power.
- The RO noted a lowering PZR Level combined with a corresponding rise in charging flow.
- The crew enter OFN BB-007, RCS LEAKAGE HIGH and Isolated Letdown.
- Pressurizer level is now 39% and rising with minimum charging to the RCP seals only.
- VCT Level is 50% and lowering slowly.
- Containment sump level and containment pressure are normal.

Based on these conditions, 1) what is the leak location and 2) the NEXT action(s) the crew will take in accordance with OFN BB-007?

- A.     1) There is a leak in the RCS.  
          2) Establish Excess Letdown, per ATTACHMENT A, ESTABLISHING EXCESS LETDOWN.
- B.     1) There is a leak in the RCS.  
          2) Go to OFN MA-038, RAPID PLANT SHUTDOWN and be IN MODE 3 within 6 hours.
- C.     1) There is a leak in the charging line.  
          2) Establish Excess Letdown, per ATTACHMENT A, ESTABLISHING EXCESS LETDOWN.
- D.     1) There is a leak in the charging line.  
          2) Go to OFN MA-038, RAPID PLANT SHUTDOWN and be IN MODE 3 within 6 hours.

Answer:       C

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (RCS Leak, Establish Excess Letdown) is INCORRECT, but plausible since the action to place excess letdown in service is the next OFN BB-007 directed step. Wrong since the given conditions indicated the leak location was on the charging line and is now isolated.

B. Distractor 2 (RCS Leak, go to OFN MA-038) is INCORRECT, but plausible. LCO 3.4.13, RCS OPERATIONAL LEAKAGE is applicable. If the RCS leakage had been from the pressure boundary, or if the leakage was not reduced to within limits within 4 hours per COND A, the REQUIRED ACTION is to be in MODE 3 within 6 hours per COND B. This action would be accomplished per OFN MA-038. Wrong since the given conditions indicated the leak location was on the charging line and is now isolated.

C. CORRECT (Charging Line, Establish Excess Letdown) For the given conditions, the crew has performed OFN BB-007, Steps 1-9 by isolating letdown and minimizing charging flow to the seals only. The NEXT step the crew will take for the given conditions, per Step 10, is to establish Excess Letdown, using ATTACHMENT A.

D. Distractor 3 (Charging Line, OFN MA-038) is INCORRECT, but plausible since the given conditions indicated the leak location was on the charging line, which is now isolated. LCO 3.4.13, RCS OPERATIONAL LEAKAGE is applicable. If the RCS leakage had been from the pressure boundary, or if the leakage was not reduced to within limits within 4 hours per COND A, the REQUIRED ACTION is to be in MODE 3 within 6 hours per COND B. This action would be accomplished per OFN MA-038, if it were required. Wrong since shutdown is NOT required and restoration of PZR Level control by placing excess letdown in service.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 84 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153627
User-Defined ID:	LO153627
Reference:	LOSS OF RX M/U
Topic:	(SRO) #84 APE 022 / AA2.01 (New - High)
RO Importance Rating:	3.2
SRO Importance Rating:	3.8
K/A Number:	APE 022 AA2.01
Comments:	<p>2019 Wolf Creek Exam, K/A Statement, Loss of Reactor Coolant Makeup, Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: Whether charging line leak exists. (CFR: 43.5 / 45.13)</p> <p>Tier 1 Group 1</p> <p>High cog - Analysis and selection of proper procedure guidance for the given conditions.</p> <p>LO1732417, OFN BB-007, RCS LEAKAGE HIGH, Objective 4, Explain the basis and any knowledge requirements for selected procedure steps. (Steps, 4, 8 &amp; 9)</p> <p>Meets the K/A since question provides indication of a leak and conditions after taking a step in the OFN procedure that checks to see if leak was on letdown/charging line. For the given conditions, leakage is isolated.</p> <p>SRO Only since question requires an assessment of plant conditions (abnormal) and selection of a procedure or section of procedure to mitigate or recover, or with which to proceed (Attachment A to place excess letdown in service due to the loss of letdown). Question cannot be answered solely with system knowledge, by knowing Immediate Operator Actions, Procedure entry conditions, overall sequence of events, or overall mitigative strategy of a procedure.</p> <p><u>Revision History:</u> 1 – Changed part 2 of Distractors C and D to make 2x2 question, shuffled answer choices to maintain short to long format and updated answer explanation.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

85

ID: LO153628

Points: 1.00

Given:

- The unit was tripped from 100% power due to a Steam Generator Tube Rupture on 'D' S/G.
- The crew is performing EMG E-3, STEAM GENERATOR TUBE RUPTURE.
- RCS cooldown and initial depressurization are complete.
- The crew is at Step 32, **Check if ECCS Flow should be Terminated**, when the following conditions are noted:
  - RCS subcooling is 45°F
  - Total AFW flow is 200,000 lbm/hr
  - SR SUR is positive.
  - RCS pressure is slowly lowering
  - PZR level is 20% and slowly lowering
  - CTMT Pressure is steady at 1 psig
  - 'D' S/G pressure is 1100 psig and stable.
  - SG NR levels are as follows:
    - \* 'A' S/G 10% and rising
    - \* 'B' S/G 10% and rising
    - \* 'C' S/G 10% and rising
    - \* 'D' S/G 45% and lowering

Based on these conditions, what action(s) is the crew REQUIRED to take?

- A. Stop the ECCS Pumps and continue in EMG E-3.
- B. Transition to EMG FR-S2, RESPONSE TO LOSS OF CORE SHUTDOWN.
- C. Transition to EMG FR-H1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
- D. Transition to EMG C-31, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED.

Answer: D

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (Stop ECCS pumps and Remain in EMG E-3) is INCORRECT, but plausible since this is the correct action if RCS pressure would have been stable or rising. Wrong since the crew is required to transition to EMG C-31 for the lowering RCS pressure trend. This answer choice was selected during Operator validations.

B. Distractor 2 (Transition to EMG FR-S2) is INCORRECT, but plausible since entry conditions are met for this YELLOW Path procedure that the CRS could enter at his/her discretion (per EMG F-0, Figure 1, CSF F-01 SUBCRITICALITY). Wrong because entry to EMG C-31 is the required transition for the given RCS Pressure Drop condition. The mitigating strategy of EMG FR-S2 is the check for instrument malfunctions, verify SR Channels are energized, and to borate until adequate shutdown margin is verified. Given SI actuated for the SGTR and the crew is at the step to evaluate stopping ECCS pumps, there are no actions in EMG FR-S2 that will improve current plant conditions. Based on the boron initiation in progress, the most likely cause of the positive SUR is an instrumentation problem, which is less of a priority when stopping ECCS flow to prevent overfilling the Ruptured S/G, or transitioning to EMG C-31 to address the Loss of Reactor Coolant has a higher priority. This answer choice was selected during Operator validations.

C. Distractor 2 (Transition to EMG FR-H1) is INCORRECT, but plausible since the given flow rate is <270,000 lbm/hr, however a valid heat sink is established by all three INTACT S/Gs NR Level >6%. Entry conditions to EMG FR-H1 would be met (EMG F-0, FIGURE 1 CSF F-03) if given CTMT pressure were >5 psig, in which case the minimum level required for Heat Sink is 29%.

D. Correct (Transition to EMG C-31) Step 32 of EMG E-3 checks if ECCS flow should be Terminated using the following criteria:

- a. Subcooling >30F - YES
  - b. Secondary heat sink - YES
  - c. RCS Pressure STABLE or RISING - NO
  - d. PZR level >6% - YES (but diverse indication of loss of coolant based on given lowering trend)
- The RNO for step 32c. is to Go to EMG C-31, Step 1.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 85 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153628
User-Defined ID:	LO153628
Reference:	SGTR
Topic:	(SRO) #85 EPE 038 / 2.4.21 (New - High)
RO Importance Rating:	4.4
SRO Importance Rating:	4.8
K/A Number:	EPE 038 2.4.21
Comments:	<p>2019 Wolf Creek NRC, K/A Statement: Steam Generator Tube Rupture (SGTR), Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. (CFR: 41.7 / 43.5 / 45.12)</p> <p>Tier 1 Group 1</p> <p>Higher Order Cog - Assessment of Plant Conditions and selection of a procedure or section of a procedure to mitigate or recover, or with which to proceed.</p> <p>LO1732325, EMG E-3, STEAM GENERATOR TUBE RUPTURE, Objective 4, Explain the bases and any knowledge requirements for procedures steps.</p> <p>Meets K/A since the applicant, when given SGTR conditions, must assess the status of Subcriticality and Heat Sink safety functions to eliminate distractors and select the required contingency procedure in response to the given conditions. (Core Cooling, Integrity, Containment and Inventory CSFs are not concerns during performance of EMG E-3)</p> <p>SRO ONLY since the question requires knowledge of diagnostic steps and decision points in EOPs that involve transition to event specific sub-procedures or emergency contingency procedures (EMG C-31). Question cannot be answered by solely knowing systems knowledge, Immediate Operator Actions, Procedure entry conditions, or the purpose, overall sequence of events, or overall mitigative strategy of a procedure (EMG E-3).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

86

ID: LO153667

Points: 1.00

Given:

- The unit just entered MODE 1 during a Reactor Startup.
- 'B' MFP is running.
- The crew is starting up 'A' MFP per SYS AE-121, TURBINE DRIVEN MAIN FEEDWATER PUMP STARTUP.

To maintain OPERABILITY per LCO \_\_\_\_\_ 1) \_\_\_\_\_, the crew is required to \_\_\_\_\_ 2) \_\_\_\_\_.

- A. 1) 3.3.1, Reactor Trip System (RTS) Instrumentation  
2) Place 'A' MFP low control oil pressure switches in the tripped condition.
- B. 1) 3.3.1, Reactor Trip System (RTS) Instrumentation  
2) Ensure FC HS-25, AFP START BLOC TRN A switch is in the BLOCK position.
- C. 1) 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation  
2) Place 'A' MFP low control oil pressure switches in the tripped condition.
- D. 1) 3.3.2, Engineered Safety Feature Actuation System (ESFAS) Instrumentation  
2) Ensure FC HS-25, AFP START BLOC TRN A switch is in the BLOCK position.

Answer: C

## Answer Explanation

Answer choices sorted sequentially. Correct answer at C.

A. Distractor 1 (LCO 3.3.1, Trip Channels) is INCORRECT, but plausible. The MFP trip status is an input to AFAS-M ESFAS Actuation signal, not a reactor trip. Plausible because a loss of MFP will result in lowering levels and a reactor trip on Low S/G Level. RTS permissives (P4) results in a FWIS; which is also an ESFAS actuation signal. The action to place the Low Lube Oil pressure channels in tripped condition is right.

B. Distractor 2 (LCO 3.3.1, FC HS-25 BLOC) is INCORRECT, but plausible. The LCO is wrong as MFP trip status is an input to AFAS-M ESFAS Actuation signal, not a reactor trip. The action to place FC HS-25 in BLOCK position is wrong because this action does NOT ensure OPERABILITY but is plausible since this action is directed by SYS AE-121, Step 6.1.10 when the unit is in MODE 2 or below to prevent a spurious Auxiliary Feedwater System actuation. Wrong because the unit is IN MODE 1 and the low lube oil pressure switches will already be tripped per step 6.1.6 by the time the procedure directs this option.

C. CORRECT (LCO 3.3.2, Trip Channels) Per SYS AE-121, NOTES prior to step 6.1.5, to ensure compliance with LCO 3.3.2, the crew should place 'A' MFP low control oil pressure switches in the tripped condition (Step 6.1.5.2) to comply with LCO 3.3.2, COND J prior to resetting 'A' MFP in step 6.1.6.

D. Distractor 3 (LCO 3.3.2, FC HS-25 to BLOCK) is INCORRECT, but plausible. The applicable LCO is right, but the action required to maintain OPERABILITY is wrong.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 86 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153667
User-Defined ID:	LO153667
Reference:	LOSS OF MFW
Topic:	(SRO) #86 APE 054 2.2.37 (New - High)
RO Importance Rating:	3.6
SRO Importance Rating:	4.6
K/A Number:	APE 054 2.2.37
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of Main Feedwater, Ability to determine operability and/or availability of safety related equipment. (CFR: 43.5)</p> <p>Tier 1 Group 1</p> <p>LO1505900, Main Feedwater, Objective 13, Determine the limiting conditions for operations for the Main Feedwater System.</p> <p><u>Applicable Wolf Creek OE.</u> CR 00023008, Trip of all MFP Pumps Instrumentation CR 2008-000149, Plant Startup with only one MFP</p> <p>Meets K/A since LCO 3.3.2, COND J applies to the AFW Pump start on trip of both MFPs. Wolf Creek procedures must be adhered to, to ensure proper ESFAS (AFAS-M) actuation for Decay Heat Removal in the event of a loss of operating MFPs.</p> <p>SRO Only since question cannot be answered solely by knowing &lt;1 hour TS Actions, cannot be answered by knowing information listed above the line and cannot be answered by knowing the TS Safety limits. Question involves application of required actions in accordance with rules of application requirements, specifically directed by Wolf Creek procedures.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

87

ID: LO153839

Points: 1.00

Given:

- The unit was operating at 100% power.
- MCB Annunciators 025A, NN01 INST BUS UV actuated.
- The crew stabilized the plant using OFN NN-021, LOSS OF VITAL 120 VAC INSTRUMENT BUS.
- The CRS is Referring to Applicable Technical Specifications.

Based on these conditions, which of the following Technical Specification conditions will the CRS enter when considering the loss of power to the S/G Pressure and S/G Level instruments for each S/G and why?

1. LCO 3.3.1, RTS Instrumentation, Cond E (Function 14 for S/G Level Reactor Trip)
  2. LCO 3.3.2, ESFAS Instrumentation, Cond D (Function 1e for S/G Pressure SIS Actuation)
  3. LCO 3.3.2, ESFAS Instrumentation, Cond D (Function 4e for S/G Pressure MSLIS Actuation)
  4. LCO 3.3.2, ESFAS Instrumentation, Cond I (Function 5c for S/G Level P-14, Turbine Trip/FWIS)
  5. LCO 3.3.2, ESFAS Instrumentation, Cond D (Function 6d for S/G Level AFAS Actuation)
  6. LCO 3.8.7, Inverters - Operating, Cond A (Loss of Inverter)
  7. LCO 3.8.9, Distribution Systems - Operating, Cond C (Loss of Bus NN01)
- A. CRS will enter 1-7 since the Required Actions for this particular support systems directs entry to the supported system LCOs.
- B. CRS will enter 1-7 per LCO 3.0.2, since upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions must be met.
- C. CRS will enter ONLY 6 and 7 per LCO 3.0.6, since the supported systems are INOPERABLE solely due to the INOPERABILITY of the support system.
- D. CRS will enter ONLY 6 and 7 since OFN NN-021 directs performance of ALL the supported system Required Actions without having to enter the supported system LCOs.

Answer: C

**Answer Explanation**



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (All 7 LCOs since support system directs entry to supported systems) is INCORRECT, but plausible. LCO 3.0.6 includes this provision as an exception. LCO 3.8.9, COND A provides an example of this exception as LCO 3.7.8 (supported system) is entered as a result of an INOPERABILITY of NG05E, or NG06 (support system). Wrong because no such exception applies per LCO 3.8.8 for a loss of NN power supply for the supported loss of instrument.

B. Distractor 2 (All 7 LCOs since LCO 3.0.2 applies) is INCORRECT, but plausible. LCO 3.0.5 and LCO 3.0.6 are exceptions to this rule. For the given scenario, the CRS will NOT enter LCOs for the supported systems due to the loss of the support system.

C. CORRECT (Enter 6 and 7 ONLY per LCO 3.0.6). The supported instruments are ONLY INOPERABLE due to the loss of the support system. Per LCO 3.0.6, as an exception to LCO 3.0.2, the applicable LCOs for the supported instruments are NOT required to be entered. For the given conditions, LCO 3.8.9 COND C has a 2 hour Required Action to restore power to bus NN01 or be in MODE 3 in 6 hours and MODE 6 in 36 hours. These required actions are more limiting than what is required by LCO 3.3.1 and LCO 3.3.2.

D. Distractor 3 (Enter 6 and 7 ONLY since OFN NN-021 directs Required Actions of supported systems) is INCORRECT, but plausible. OFN NN-021, Step A10 directs the crew to verify Protection and Control Interlocks are in their correct states per Tech Spec LCOs for the supported systems Required Actions (LCO 3.3.1, COND S to verify P-6 while in MODE 2 for loss of IRNI and to verify P-10 while in MODES 1 or 2 for loss of PRNI, and LCO 3.3.2, COND L to verify P-11 while in MODES 1-3 for loss of a PZR Pressure Instrument). The LCO entry part is right, but the reason is wrong since the Required Action Per LCO 3.3.1, COND E and LCO 3.3.2, COND D and COND I is to place affected channel in Trip within 72 hours, which is NOT directed by OFN NN-021. ALL supported systems Required Actions are NOT directed by OFN NN-021, but the 1 hour tech specs are since the support system has a 2 hour required action time.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 87 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153839
User-Defined ID:	LO153839
Reference:	LOSS OF VITAL AC
Topic:	(SRO) #87 APE 057 / AA2.05 (New - High)
RO Importance Rating:	3.5
SRO Importance Rating:	3.8
K/A Number:	APE 057 AA2.05
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of Vital AC Electrical Instrument Bus, Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: S/G pressure and level meters. (CFR: 43.5 / 45.13)</p> <p>Tier 1 Group 1</p> <p>High Cog - Analysis</p> <p>LO1732431, OFN NN-021, LOSS OF VITAL 120 VAC INSTRUMENT BUS, Objective 4, Explain the basis and knowledge requirement for specific procedure steps. (A9. Refer to applicable Technical Specifications)</p> <p>Meets K/A since loss of bus NN01 was the given malfunction and the question asked about the technical specification implication of the loss of S/G pressure and S/G Level meters.</p> <p>SRO ONLY since the question cannot be answered by knowing &lt;1 hour TS/TRM Actions, cannot be answered by knowing information listed above the line, cannot be answered by knowing TS Safety limits and requires the application of generic LCO requirements (LCO 3.0.2 and LCO 3.0.6).</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

88

ID: LO153837

Points: 1.00

Given:

- The unit was operating at 100% power.
- A seismic event occurred and all associated MCB Annunciators for the earthquake actuated.
- The unit was tripped due to a rupture of the Instrument Air header per OFN KA-019, LOSS OF INSTRUMENT AIR.
- During the Reactor Trip Response, uncontrolled S/G Level was observed, and the crew transitioned to EMG E-3, STEAM GENERATOR TUBE RUPTURE.
- Both PORVs are UNAVAILABLE.

Based on these conditions, to what procedure will the crew transition from EMG E-3?

- A. EMG ES-31, POST SGTR COOLDOWN USING BACKFILL
- B. EMG ES-33, POST-SGTR COOLDOWN USING STEAM DUMP
- C. EMG C-33, SGTR WITHOUT PRESSURIZER PRESSURE CONTROL
- D. EMG C-31, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED

Answer: C

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (EMG ES-31) is INCORRECT, but plausible. EMG ES-31 is a specific Post-SGTR recovery procedure to which the crew may transition from EMG E-3, Step 65. Wrong because for the given loss of instrument air and PORVs, the crew has no method of depressurizing the RCS and will transition to EMG C-33 from Attachment D, Step D1 when they are unable to restore Instrument Air to align Aux Spray during ECCS Actuation. EMG ES-31 is the preferred method for SGTR recovery since it minimizes radiological releases and facilitates processing of contaminated primary coolant.

B. Distractor 2 (EMG ES-33) is INCORRECT, but plausible. EMG ES-33 is a specific Post-SGTR recovery procedure to which the crew may transition from EMG E-3, Step 65. Wrong because for the given loss of instrument air and PORVs, the crew has no method of depressurizing the RCS and will transition to EMG C-33 from Attachment D, Step D1 when they are unable to restore Instrument Air to align Aux Spray during ECCS Actuation. EMG ES-33 is the fastest means of depressurizing the RCS, which would be important if the feedwater supply was limited. However, this method requires steam release from the ruptured S/G and results in higher radioactive release.

C. CORRECT (EMG C-33). During the performance of EMG E-3, Normal Spray is NOT available due to the loss of instrument air. For the given unavailability of the PORV action to depressurize the RCS, the crew is directed to depressurize RCS using Aux Spray using ATTACHMENT D, ALIGNING AUXILIARY SPRAY DURING ECCS ACTUATION. Due to the loss of instrument air, the crew is directed to transition to EMG C-33 per Step D1.

D. Distractor 3 (EMG C-31) is INCORRECT, but plausible. There are multiple transition paths to EMG C-31 from EMG E-3 (Foldout page direction for RCS Subcooling <30F, PZR Level <6%, Inability to isolate the ruptured S/G, or Ruptured S/G Pressure <380 psig). For the given conditions, loss of instrument air and loss of both PORVS, a loss of RCS pressure control exists, and the crew will transition to EMG C-33.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 88 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153837
User-Defined ID:	LO153837
Reference:	LOSS OF INST AIR
Topic:	(SRO) #88 APE 065 / 2.2.44 (New - High)
RO Importance Rating:	4.2
SRO Importance Rating:	4.4
K/A Number:	APE 065 2.2.44
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of Instrument Air, Ability to interpret control room indications to verify the status and operation of a system and understand how Operator actions and directives affect plant and system conditions. (CFR: 41.5 / 43.5 / 45.12)</p> <p>Tier 1 Group 1</p> <p>High Cog - Application of system knowledge to understand how complete loss of Instrument Air affects ability to perform EMG actions.</p> <p>Meets the K/A since the given scenario provided a complete loss of the instrument Air System due to a piping rupture. The question tests the implication of this loss of instrument air on the ability to perform EMG E-3 Actions at the SRO level of understanding.</p> <p>SRO ONLY since the question cannot be answered by solely knowing system knowledge, by knowing Immediate Operator actions, by knowing entry conditions for AOPs or direct entry into major EOPs, or by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure. The SRO must assess emergency plant conditions and then select a section of the EMG E-3 procedure with which to proceed based on the given loss of instrument air specified by the applicable K/A. One distractor tests knowledge of a decision point in the EOP that involves transitioned to the event-specific EMG C-33 emergency contingency procedure, which is only unnecessary due to availability of a PORV based on given conditions.</p> <p><u>Revision History:</u>  1 - Added to exam as a Replacement Question.  2 - Rewrote question to specify PORVs were unavailable to make one of the distractors the correct answer and changed the other three answer choices to possible procedure transitions.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

89

ID: LO153635

Points: 1.00

Given:

- Reactor Trip and Safety Injection have occurred.
- After entering EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT, the secondary heat sink was lost.
- The crew transitioned to EMG FR-H1, RESPONSE TO LOSS OF SECONDARY HEAT SINK when the following conditions were noted:
  - \* RCS pressure is at 1600 psig.
  - \* Containment Pressure is at 3 psig.
  - \* S/G pressures are at 1040 psig in all four SGs.
  - \* 'A' and 'D' S/G Wide Range levels are 11% and slowly trending down.
  - \* 'B' and 'C' S/G Wide Range levels are 10% and slowly trending down.

Based on these conditions, which of the following action(s) is the crew REQUIRED to take per EMG FR-H1?

- A. Return to EMG E-1 at the previous step in effect.
- B. Trip all RCPs and initiate RCS Bleed and Feed in accordance with EMG FR-H1.
- C. Establish Flow from Non-Safety Related AFW Pump per SYS AP-122, NON-SAFETY AUX FEED PUMP OPERATION.
- D. Perform ATTACHMENT A, JUMPERING OF MAIN FEEDWATER ISOLATION SIGNAL to establish conditions to use a Condensate Pump to feed all four S/Gs.

Answer: B

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (RTPSE - EMG E-1) is INCORRECT, but plausible. For the given concurrent LOCA in progress, this choice would be right if given RCS pressure was <1040 psig as directed by EMG FR-H1, Step 1. Per the basis for Step 1, If the LOCA was large enough for RCS pressure to be lower than S/G pressure, the S/Gs would no longer function as a heat sink and the core decay heat removal would be accomplished by ECCS break flow and performance of EMG FR-H1 would NOT be required.

B. CORRECT (Trip RCPs and initiate Bleed and Feed per EMG FR-H1). For the given WR S/G Levels <12% in all 4 S/Gs, Step 2 RNO directs stopping RCPs, Placing Steam Dumps in STEAM PRESS position, turning off all PZR Heaters and going to Step 30 to initiate the RCS Bleed and Feed section of the procedure.

C. Distractor 2 (Non-Safety AFW Pump) is INCORRECT, but plausible. This action is directed by EMG FR-H1, Step 8 and would be correct if not for the given WR S/G Levels at <12%. Wrong because for the given conditions, the crew should remove RCS Heat Input and skip Steps 3-29 to perform RCS Bleed and Feed per step 30. This answer choice was selected during Operator validations.

D. Distractor 3 (Perform ATTACHMENT A to feed using Cond Pump) is INCORRECT, but plausible. This is part of the next set of actions taken if restoration of flow from the Non-Safety AFW pump is unsuccessful at restoring the secondary heat sink, per Step 10. Wrong because for the given conditions, the crew should remove RCS Heat Input and skip Steps 3-29 to perform RCS Bleed and Feed per Step 30.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 89 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153635
User-Defined ID:	LO153635
Reference:	LOSS OF SECONDARY HEAT SINK
Topic:	(SRO) #89 WE05 / EA2.2 (New - High)
RO Importance Rating:	3.7
SRO Importance Rating:	4.3
K/A Number:	E05 EA2.2
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Loss of Secondary Heat Sink, Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments. (CFR: 43.5 / 45.13)</p> <p>Tier 1 Group 1</p> <p>High Cog - Analysis of given plant conditions, application of CTMT Adverse conditions, procedure direction</p> <p>LO1732346, EMG FR-H1, LOSS OF HEAT SINK, Objective 3, Explain the Basis and any knowledge requirements for EMG FR-H1 Procedure Steps.</p> <p><u>Overlap Consideration</u> Question modified after validations to make different from #78. (#78 tests entry conditions based on loss of pumps, this question states heat sink lost and asks what action the crew will take based on given conditions).</p> <p>Meets the K/A since the question provides a loss of secondary heat sink scenario and asks for the proper procedure guidance the crew must take based on given conditions to operate within the limitations of the facilities license and amendments.</p> <p>SRO Only since the question requires assessment of Emergency Plant Conditions and selection of a procedure or section of a procedure (Bleed and Feed Steps) to mitigate or recover or with which to proceed. Must also display knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps to dismiss a distractor. Question cannot be answered solely by knowing systems knowledge, Immediate Operator actions, Procedure Entry Conditions, or by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure.</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

90

ID: LO153636

Points: 1.00

Given:

- Unit power was stable at 90%.
- Control Bank 'D' rods were at 160 steps with Rod Control in AUTO.
- Control Bank 'D' rods begin to step **OUT** at minimum rod speed.
- Rod Control System automatic rod blocks fail to stop rod motion.
- Any associated Turbine Runbacks also fail to actuate.

Based on these conditions, and without any Operator action, which of the following Reactor Trips is designed to provide protection for this event per Technical Specification Bases?

- A. Pressurizer Pressure - High
- B. Power Range Neutron Flux - Low
- C. Power Range Neutron Flux - High
- D. Power Range Neutron Flux - High Positive Rate

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (PZR Pressure High) is INCORRECT, but plausible since the given Continuous Rod Withdrawal event will cause RCS pressure to rise. Per LCO 3.3.1 Basis, The Pressurizer Pressure - High trip function ensures that protection is provided against overpressurization the RCS. This trip Function operates in conjunction with the PZR PORV and Safety valves to prevent RCS overpressure conditions. Wrong because this trip is not specifically designed to show protection for a continuous rod withdrawal event. The rise in pressure is input to OTΔT Reactor Trip, which is also designed to show protection for a continuous rod withdrawal event.

B. Distractor 2 (Power Range Neutron flux - Low) is INCORRECT, but plausible. This answer choice would have been true if given Reactor power was lower. In MODE 1 below P10 (10% power) and in MODE 2, this trip is in service to provide protection against a continuous rod withdrawal by tripping the reactor at 25%. Wrong because this trip is blocked for the given conditions.

C. CORRECT (Power Range Neutron flux high) Per LCO 3.3.1 Basis, the Power Range Neutron Flux-High, OTΔT, and OPΔT (coincident with steam line break) Reactor Trips all provide protection against a continuous rod withdrawal event while operating above P10 (10% power) with the PR Neutron Flux - Low reactor trip blocked.

D. Distractor 3 (PR Positive Rate Trip) is INCORRECT, but plausible. Per LCO 3.3.1 Basis, The Power Range Neutron Flux - High Positive Rate Trip Function ensures that protection is provided against rapid rises in neutron flux that are characteristic of an RCS drive rod housing rupture and the accompanying ejection of the RCCA. This function also provides protection for the rod withdrawal at power event, but for the given event (Only bank D rods at 8 steps per minute), the reactor will NOT trip due to high positive rate. This answer choice was selected during Operator validations.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 90 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153636
User-Defined ID:	LO153636
Reference:	CONT ROD WITHDRAWAL
Topic:	(SRO) #90 APE 001 / AA2.03 (New - Low)
RO Importance Rating:	4.5
SRO Importance Rating:	4.8
K/A Number:	APE 001 AA2.03
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Continuous Rod Withdrawal, Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal, Proper actions to be taken if automatic safety functions have not taken place. (CFR: 43.5 / 45.13)</p> <p>Tier 1 Group 2</p> <p>Low Cog - Fundamental Knowledge Design Basis for Reactor Trips</p> <p>LO1732421, OFN SF-011, REALIGNMENT OF DROPPED, MISALIGNED ROD(S), AND ROD CONTROL MALFUNCTIONS, Objective 4, Explain the bases and any knowledge requirements for selected procedure steps (Step 4).</p> <p><u>Overlap Considerations</u> - OTΔT/OPΔT reactor trips tested on #10</p> <p>Meets the K/A since the given event was a Continuous Rod Withdrawal and automatic actions associated with rod stops and Turbine Runbacks failed. The "proper action" to Manually Trip the Reactor is RO knowledge.</p> <p>SRO Only since the question requires knowledge of Reactor Trip System Technical Specification Basis and USAR Accident Analysis to select the reactor trip that is designed to show protection for the given failure. Question cannot be answered solely by knowing systems knowledge, by knowing immediate Operator Actions, by knowing procedure entry conditions, or by knowing the purpose, overall sequence of events, or overall mitigative strategy of the procedure.</p> <p><u>Revision History:</u> 1 – Changed given Pressurize Pressure Trip distractor to "High" and updated answer explanation. 2 - Added "Per Technical Specification Bases" to the end of the question.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

91

ID: LO153838

Points: 1.00

Given:

- During a down power transient, the RO identified two Bank D control rods, one from each group, were stuck and misaligned from their respective step counters by more than 12 steps.
- The crew tripped the Reactor and transitioned to EMG E-0, REACTOR TRIP OR SAFETY INJECTION.
- While monitoring Critical Safety Functions using EMG F-0, CRITICAL SAFETY FUNCTION STATUS TREES (CSFST) per EMG E-0, Step 4, the following conditions are noted.
  - Two Control Rod Bottom lights NOT LIT
  - Power Range NIs at 2% and lowering
  - Intermediate Range SUR is +.1 on both channels
  - All S/G NR Levels are off scale low.
  - SI is NOT Actuated and is NOT required.

Based on these conditions, to what procedure is the crew REQUIRED to transition?

- A. EMG ES-02, REACTOR TRIP RESPONSE
- B. EMG FR-S2, RESPONSE TO LOSS OF CORE SHUTDOWN
- C. EMG FR-H5, RESPONSE TO STEAM GENERATOR LOW LEVEL
- D. EMG FR-S1, RESPONSE TO NUCLEAR POWER GENERATION / ATWS

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (EMG ES-02) is INCORRECT, but plausible. This choice is directed by EMG E-0, Step 4 and would be the right procedure transition if not for the positive IR SUR. EMG ES-02 will also eventually check for rods not fully inserted and direct performance of Emergency Boration per OFN BG-009. This choice is wrong because for the given conditions, an Orange Path CSF challenge exists on the CRITICALITY CSFST and the crew is REQUIRED to transition to EMG FR-S1.

B. Distractor 2 (EMG FR-S2) is INCORRECT, but plausible. Entry conditions for this procedure would be met if IR SUR were negative and but less negative than 0-.2 dpm with SRNIs not yet energized. If these conditions were met, this yellow patch procedure could be entered at CRS discretion, but would NOT be a REQUIRED procedure transition. EMG FR-S1 is applicable for both RED and ORANGE path, so an applicant may also confuse EMG FR-S2 as an ORANGE path condition and selected this choice.

C. Distractor 3 (EMG FR-H5) is INCORRECT, but plausible. Entry conditions for this procedure are met with all S/G NR Levels <6%. This YELLOW path procedure could be entered at CRS discretion, but it is NOT REQUIRED.

D. CORRECT (EMG FR-S1). Given Positive SUR on IRNI's an ORANGE path challenge exists on the SUBCRITICALITY CSFST and the crew is REQUIRED to enter EMG FR-S2 per EMG F-0. EMG FR-S1 will initiate an emergency boration per step 6 after verifying the reactor and turbines are tripped. Main Generator and Exciter breakers are open, AFW is actuated and SI is not actuated.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 91 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153838
User-Defined ID:	LO153838
Reference:	INOPERABLE STUCK CONTROL ROD
Topic:	(SRO) #91 APE 005 / 2.4.21 (New - High)
RO Importance Rating:	4.0
SRO Importance Rating:	4.6
K/A Number:	APE 005 2.4.21
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, INOPERABLE/Stuck Control Rod, Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. (CFR: 43.5)</p> <p>Tier 1 / Group 2</p> <p>High Cog - Assessment of plant conditions and selection of highest priority procedure.</p> <p>LO1732421, OFN SF-011, REALIGNMENT OF DROPPED, MISALIGNED ROD(S), AND ROD CONTROL MALFUNCTIONS, Objective 4, Explain the bases and any knowledge requirements for selected procedure steps. (Step 6).</p> <p>Meets the K/A since the given scenario presented two stuck control rods that become misaligned by the respective group step counter by 12 steps, requiring the crew to trip the reactor and go to EMG E-0. With the control rods stuck out resulting in a positive IR SUR, the Subcriticality CSF is challenged and the crew should enter the REQUIRED functional restoration procedure to immediately address that challenge.</p> <p>SRO Only since the question cannot be answered by knowing systems knowledge, by knowing immediate operator actions or by knowing entry conditions for AOPs or plant parameters that required direct entry into major EOPs. The question cannot be answered by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure. Question requires assessment of emergency plant conditions and selection of a procedure to mitigate or recover, or with which to proceed. Since entry conditions are met to enter more than one procedure, the selection of an answer choice requires knowledge of hierarchy implementation. EMG E-0 step 4 also represents a decision point in the EOP that involves transition to event-specific emergency functional restoration procedure per EMG F-0.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

92

ID: LO153638

Points: 1.00

The crew reduced power to support maintenance which resulted in the following chemistry parameters trend changes:

- RCS Gross Activity - RISING
- RCS Dose Equivalent Iodine - 131 - STEADY
- RCS Cesium-137 - STEADY
- SJ RE-001, Letdown Monitor Indication - RISING
- The crew entered OFN BB-006, HIGH REACTOR COOLANT ACTIVITY.

Based on these conditions, 1) what is a potential cause for the high activity and 2) what action is directed per OFN BB-006?

- A.     1) RCS Crud Burst  
          2) Maximize Cleanup Flow, as directed by Chemistry.
- B.     1) Fuel Rod Cladding Failure  
          2) Request Reactor Engineering determine percentage of failed fuel.
- C.     1) Fuel Rod Cladding Failure  
          2) Commence a slow downpower per GEN 00-004, POWER OPERATIONS to be in MODE 3 within 6 hours.
- D.     1) RCS Crud Burst  
          2) Place the Cation bed demineralizer in-service, using SYS BG-202, OPERATION OF THE CVCS CATION BED DEMIN.

Answer:        A

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (Crud Burst, Maximize Cleanup) RCS gross activity rising with Iodine-131 and Cesium-137 stable indicate a potential crud burst. Step 9 of OFN BB-006 addresses a crud burst as one of the causes of high RCS activity and OFN BB-006, Step 2 specifies the crew should maximize cleanup flow as directed by Chemistry.

B. Distractor 1 (Failed Fuel, Request Reactor Engineering assess) is INCORRECT, but plausible. Failed fuel would cause letdown monitor and gross activity to rise, but it would also cause Dose Equivalent Iodine and CS-137 to rise as well. A note prior to step 6 in OFN BB-006 states a rise in I-131 or CS-137 concentration may indicate a failed fuel element. OFN BB-006, Step 9 RNO directs consulting with Reactor Engineering if crud burst was the NOT cause of high activity and failed fuel was suspected. Rising I-131 and CS-137 would have been evident in samples if failed fuel was suspected, so this choice is wrong.

C. Distractor 2 (Failed Fuel, downpower to MODE 3) is INCORRECT, but plausible. Failed fuel would cause letdown monitor and gross activity to rise, but it would also cause Dose Equivalent Iodine and CS-137 activities to rise as well. A note prior to OFN BB-006, Step 6 states a rise in I-131 or CS-137 concentration may indicate a failed fuel element. The action to be in MODE 3 in 6 hours is required if Dose Equivalent I-131 specific activity is >60 uCi/gm. Given that DE I-131 indications are steady, and that LCO 3.4.16 is applicable if DE I-131 values exceed 1 uCi/gm, then this action is NOT yet required, even if there were indications of failed fuel.

D. Distractor 3 (Crud Burst, Place Cation bed in Service) is INCORRECT, but plausible. The cause is right, but the action is wrong. The action is directed by OFN BB-006, Step 6, if RCS Cesium concentration is High. Since the given Cesium Concentration is Steady, Step 6 RNO directs the crew to step 8 without placing the Cation Bed In Service.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 92 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153638
User-Defined ID:	LO153638
Reference:	HIGH RCS ACTIVITY
Topic:	(SRO) #92 APE 076 / AA2.02 (New - High)
RO Importance Rating:	2.8
SRO Importance Rating:	3.4
K/A Number:	APE 076 AA2.02
Comments:	<p>2019 Wolf Creek NRC, K/A Statement: High Reactor Coolant Activity. Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: Corrective actions required for high fission product activity in RCS. (CFR 43.5 / 34.13)</p> <p>Tier 1 Group 2</p> <p>High Cog - Knowledge of the causes of high fission product activity and the required procedure action.</p> <p>LO1732416, OFN BB-006, HIGH REACTOR COOLANT ACTIVITY, Objective 4, Explain the basis and knowledge requirement for specific procedure steps.</p> <p>Meets the K/A since the given condition is high RCS activity. The question asks for what may have caused the high activity and what action is directed by OFN BB-006. High Fission product activity is evaluated but not the cause given steady CS-137 and I-131 chemistry values.</p> <p>SRO Only since the question requires assessment of plant conditions (abnormal) and then selection of a section of a procedure to mitigate or recover, or with which to proceed. Question cannot be answered solely by knowing systems knowledge, by knowing immediate Operator actions, by knowing procedure entry conditions, or by knowing the purpose, overall sequence of events, or overall mitigative strategy of the procedure.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

93

ID: LO153639

Points: 1.00

Given:

- A LOCA to Containment has occurred.
- The crew is performing EMG E-1, LOSS OF REACTOR OR SECONDARY COOLANT, Step 13.  
**Check if RHR Pumps Should Be Stopped:** when the following conditions are noted.
- Both RHR Pumps are running.
- RCS Pressure is steady at 1600 psig.
- RWST Level is at 86% and down slow.

Based on these conditions, which of the following describes how the RHR pumps will be operated and why?

- A. Stop both RHR Pumps to prevent pump damage.
- B. Stop both RHR Pumps to minimize loss of RWST inventory.
- C. Leave both RHR Pumps running since a transition to EMG ES-12, TRANSFER TO COLD LEG RECIRCULATION will occur within the next 2.5 hours.
- D. Leave both RHR Pumps running since a transition to EMG ES-11, POST LOCA COOLDOWN AND DEPRESSURIZATION will occur within the next 2.5 hours.

Answer: A

**Answer Explanation**



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at A.

A. CORRECT (Stop both RHR Pumps to prevent pump damage). For the given conditions, Steady RCS Pressure >325 psig and unlikely to lower to <325 psig within 2.5 hours, EMG E-1, Step 13 directs stopping the RHR pumps and monitoring RCS pressure. This step contains a continuous action step to restart the RHR pumps if pressure lowers to <325 psig to provide injection to the RCS. The basis for this action per BD-EMG E-1, Step 13 is to stop the RHR pumps if RCS pressure is above their shutoff head to prevent damage to the pumps. The RHR pump recirculates on a small volume circuit so there is concern for pump and motor overheating. Stopping the pump at this step protects the pump from damage and allows for future pump operability, for example to place the RHR system in S/D cooling mode per SYS EJ-120, STARTUP OF A RESIDUAL HEAT REMOVAL TRAIN as directed by EMG ES-11 to complete the cooldown to MODE 5.

B. Distractor 1 (Stop both pumps to minimize loss of RWST inventory) is INCORRECT, but plausible. The action to stop both RHR pumps is correct, but the reason is wrong. Plausible because other procedures, such as EMG C-11, LOSS OF EMERGENCY RECIRCULATION contain actions that are designed to preserve RWST inventory. For a LOCA inside CTMT, the RWST inventory is NOT lost, it is just relocated to the containment sump.

C. Distractor 2 (Leave both running since transitioning to EMG ES-12 within 2.5 hours) is INCORRECT, but plausible. EMG E-1, Step 13 directs the crew to evaluate change in RCS Pressure trend to determine whether or not RCS pressure will lower to <325 psig within the next 2.5 hours. This choice would be true for a Large Break LOCA with a rapidly lowering RCS Pressure and RWST levels. Wrong because for the given conditions with RCS Pressure steady at 1600 psig. A Small break LOCA is in progress and the crew will NOT transition to EMG ES-12.

D. Distractor 3 (Leave both running since transitioning to EMG ES-11 within 2.5 hours) is INCORRECT, but plausible. EMG E-1, Step 13 directs the crew to evaluate change in RCS Pressure trend to determine whether or not RCS pressure will lower to <325 psig within the next 2.5 hours. The crew will be transitioning to EMG ES-11 for the given small break LOCA within the next few minutes, but for the given conditions, RCS Pressure steady at 1600 psig (at SI Pump shutoff head) the ECCS flow and break flow are matched and pressure is unlikely to lower. The crew is procedurally directed to stop both RHR pumps to prevent pump damage for the given conditions.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 93 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	153639
User-Defined ID:	LO153639
Reference:	LOCA CD & DEPRESS
Topic:	(SRO) #93 WE03 / 2.1.23 (New - High)
RO Importance Rating:	4.3
SRO Importance Rating:	4.4
K/A Number:	WE03 2.1.23
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, LOCA Cooldown and Depressurization, Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6)</p> <p>Tier 1 Group 2</p> <p>High Cog - Analysis of plant conditions to select a procedure and determine how the RHR system is operated to change plant modes.</p> <p>LO1732321, EMG ES-11, POST LOCA COOLDOWN AND DEPRESSURIZATION, Objective 3, Explain the bases and any knowledge requirement for procedure steps. (Steps 13 and 20)</p> <p>Meets the K/A since the given conditions will result in the crew performing EMG ES-11, POST LOCA COOLDOWN AND DEPRESSURIZATION and the question specifies how the RHR system is operated.</p> <p>SRO Only since the question cannot be answered by knowing systems knowledge, by knowing Immediate Operator actions, by knowing entry conditions for AOPs or plant parameters that require direct entry into major EOPs, or by knowing the purpose, overall sequence of events or overall mitigative strategy of a procedure. The question does require assessment of emergency plant conditions and the selection of a section of EMG E-1 procedure to mitigate or recover, or with which to proceed. This question tests a complex understanding of EOP guidance and why the specified action is taken.</p> <p><u>Revision History:</u> 1- Modified question to ask how the RHR pumps were to be operated and why. Changed all four answer choices. Sorted the new answer choices in short to long format and updated answer explanations.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

94

ID: LO153405

Points: 1.00

Given:

- The reactor just tripped.
- The Work Control SRO is NOT STA Qualified.
- The CRS is STA Qualified.
- The SM is STA Qualified.

In accordance with AP 21-001, CONDUCT OF OPERATIONS, which of the following is required for SRO turnover?

- A. No relief is required since the SM is STA Qualified and can fulfil the STA required functions.
- B. The CRS and Work Control SRO shall turn over with each other as soon as the crew exits the EMG Network.
- C. The CRS and Work Control SRO shall turn over with each other as soon as the crew transitions to EMG ES-02, REACTOR TRIP RESPONSE.
- D. The CRS and Work Control SRO shall turnover with each other as soon as the Immediate Action read through of EMG E-0, REACTOR TRIP OR SAFETY INJECTION is completed.

Answer: D

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (No relief since SM is STA Qualified) is INCORRECT, but plausible. The SM and STA each have specific Oversight responsibilities for a Reactor Trip as described in AP 15C-003, Appendix E, that would preclude the SM from fulfilling the STA role. Per AP 21-001, Section 6.6.5.1, the non-STA qualified SRO will conduct turnover with the STA qualified CRS following the read through of the Immediate Actions. The Key SM Function during this event is to monitor for Fold Out Page Criteria, Classify, and evaluate for transitions to other procedures while maintaining overall responsibility and oversight of crew response.

B. Distractor 2 (After exiting the EMG Network) is INCORRECT, but plausible. Per AP 21-001 section 6.6.5, With a Transient in progress, no operations personnel shall be relieved of duty until the transient (e.g., reactor trip) is in a state that allows a smooth and efficient turnover to be completed. This paragraph is applicable to shift turnover between crews and is clarified by Section 6.6.5.1, which directs the non-STA qualified SRO to conduct turnover with the STA qualified CRS following the read through of the Immediate Actions.

C. Distractor 3 (Entry to EMG ES-02) is INCORRECT, but plausible. Per AP 21-001 section 6.6.5, With a Transient in progress, no operations personnel shall be relieved of duty until the transient (e.g., reactor trip) is in a state that allows a smooth and efficient turnover to be completed. This paragraph may be interpreted as transition from EMG E-0 as this is the point where plant conditions are stable, there is time to conduct a status brief and return to normal operation rules of usage. This paragraph is clarified by Section 6.6.5.1, which directs the non STA qualified SRO to conduct turnover with the STA qualified CRS following the read through of the Immediate Actions.

D. CORRECT (After read through of Immediate Actions) Per AP 21-001, Section 6.6.5.1, the non STA qualified SRO will conduct turnover with the STA qualified CRS following the read through of the Immediate Actions. The STA has defined roles for a Reactor Trip per AP 15C-003, Appendix E that must be performed by a qualified STA. Priorities of the STA during a Reactor Trip is to Ensure all required equipment started if a sequencer actuates, monitor CSFT's, Review EALs, and Evaluate Applicable Technical Specifications.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 94 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153405
User-Defined ID:	LO153405
Reference:	CONDUCT OF OPS
Topic:	(SRO) #94 2.1.3 (New - Low)
RO Importance Rating:	3.7
SRO Importance Rating:	3.9
K/A Number:	2.1.3
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of shift or short-term relief turnover practices. (CFR: 43.1 for this question)</p> <p>Tier 3 Group 1</p> <p>Low Cog - Procedure guidance</p> <p>LO1733258, AP 21-001, CONDUCT OF OPERATIONS, Objective 1, Discuss the purpose/scope and selected knowledge requirements of procedure AP 21-001, CONDUCT OF OPERATIONS. (Section 6.6 Shift Relief and Turnover)</p> <p>Meets the K/A since the question asks for the required short-term relief turnover practice when the plant trips and the Work Control SRO is NOT qualified STA. Wolf Creek has 6 SRO who are NOT STA qualified. Four of the SRO applicants taking this exam will NOT be STA qualified upon receiving SRO licenses.</p> <p>SRO Only since the question tests SRO responsibilities and SRO qualifications during a Reactor Trip response,</p> <p><u>Revision History:</u> 1 – Specified in the stem that both the CRS and SM are STA qualified. Modified all four answer choices with consistent wording regarding at what point the CRS and Work Control SRO will turnover. Improved distractor A by specify the SM could fulfil the STA role since qualified to eliminate 'none of the above' answer choice.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

95

ID: LO153651

Points: 1.00

As the Work Control SRO assigned to participate in Change Package Planning, which of the following is your responsibility in accordance with AP 05-001, CHANGE PACKAGE PLANNING AND IMPLEMENTATION?

- A. Identify all affected drawings to be updated.
- B. Coordinate preparation of work orders implementing the change package.
- C. Identify essential reading if the change package directly affects control room operations.
- D. Coordinate with IPS to ensure modifications are scheduled and implemented in accordance with procedure AP 22C-005, IPS DAILY SCHEDULING.

Answer: C

## Answer Explanation

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (Identify all affected drawings to be updated) is INCORRECT, but plausible. Per AP 05-001, paragraph 5.3.1, the Implementation Coordinator (IC) is responsible for the initiation of essential drawing releases.

B. Distractor 2 (Coordinate preparation of work orders) is INCORRECT, but plausible. Per AP 05-001, paragraph 5.3.5, Coordinating preparation of work orders is the responsibility of the Implementation Coordinator (IC). Responsible because Operations personnel will be involved in the work control process, but NOT as the responsible coordinator per AP 05-001.

C. CORRECT (Identify Essential Reading) Per AP 05-001, 6.3.12 and 5.6, Operations department is responsible to identify "Essential Reading" for all change packages that directly affect control room indications by indicating this in pre-implementation planning. IF "Essential Reading" is necessary, then Operations shall place the applicable sections of the change package in Operations Essential Reading.

D. Distractor 3 (Coordinate with IPS) is INCORRECT, but plausible. Per AP 05-001, Section 5.3.6, this action is the responsibility of the Implementation Coordinator (IC). Plausible because Operations personnel participate in the IPS process, but not specifically for the inclusion of the change package.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 95 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153651
User-Defined ID:	LO153651
Reference:	CONDUCT OF OPS
Topic:	(SRO) #95 2.1.15 (New - Low)
RO Importance Rating:	N/A
SRO Importance Rating:	3.2
K/A Number:	2.2.5
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of administrative requirements for temporary management directives, such as standing orders, night orders, Operations memos, etc. (CFR: 43.3 for this question)</p> <p>Tier 3 Group 1</p> <p>Low Cog - Fundamental</p> <p>LO1733206, Engineering Work Control, Objective 4, Discuss the major steps of procedure AP 05-001, emphasizing operations involvement in Back-Out FCRs and Essential Reading.</p> <p>Meets K/A since Essential Reading is how temporary management directives are communicated</p> <p>SRO Only per CFR 55.43(b)(3) Facility licensee procedures required to obtain authority for design and operating changes in the facility. The question asks for the specific SRO responsibility as part of the design change process.</p> <p><u>Revision History</u></p> <ol style="list-style-type: none"><li>1. Added to exam as a replacement question.</li><li>2. None.</li><li>3. Modified Answer Choice C for formatting consistency.</li></ol>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

96

ID: LO153655

Points: 1.00

Given:

- A Safety Related Surveillance Test (STS) on equipment in a Locked High radiation area requires the installation of temporary gages.
- After the test began, the test performer discovered a deficiency that will require the suspension of the test for 2 days for corrective maintenance unrelated to the surveillance test.

In accordance with AP 29B-003, SURVEILLANCE TESTING, what is required to leave the gages installed until the test can be completed?

- A. Issue Temporary Modification Order and hang associated tags.
- B. Issue an On-The-Spot Procedure Change modifying the test duration.
- C. Generate a Condition Report ONLY to document the as left conditions.
- D. Document Shift Manager permission to leave installed on STS Routing Sheet for up to 10 days.

Answer: A

## Answer Explanation

Answer choices sorted short to long. Correct answer at A.

- A. CORRECT (Issue TMO and hang associated tags) Per AP 29B-003, Step 6.8.6.
  - 2. If the test is suspended, this shall be identified in Section 5 of the STRS.
    - a. IF a test which authorized the installation of a Temporary Modification has been suspended for greater than 24 hours or is to be terminated, THEN the modification must be removed, or a Temporary Modification Order and associated tags issued.
- B. Distracter 2 (OTSC on the procedure modifying the test duration) is INCORRECT, but plausible since an OTSC could be written to permit the gauges be installed until completion of the test, however the governing procedure requires an evaluation and temporary modification for this condition.
- C. Distracter 2 (Generate a Condition Report ONLY) is INCORRECT, but plausible since this is an appropriate action if no provision were contained in the AP governing document. An associated Condition report will probably already be written, so this action alone does not allow for temporary equipment to be installed past 24 hours.
- D. Distracter 3 (SM can authorize for 10 days) is INCORRECT, but plausible since the SM is the person with overall responsibility. Wrong because AP 29B-003 requires a TMO and tags to be issued without a just documenting SM extension comment on STRS. This answer choice was selected during Operator validations.



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 96 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	153655
User-Defined ID:	LO153655
Reference:	EQUIPMENT CONTROL
Topic:	(SRO) #96 2.2.12 (Bank - Low)
RO Importance Rating:	3.7
SRO Importance Rating:	4.1
K/A Number:	2.2.12
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of surveillance procedures. (CFR: 41.10 / 45.13)</p> <p>Tier 3 Group 2</p> <p>Copy of bank question LO17833 (91% history - 41/45)</p> <p>LO1733214, Plant Operability Processes, Objective 4, Discuss application of the definitions, responsibilities and procedural requirements associated with AP 29B-003, SURVEILLANCE TESTING.</p> <p>Meets K/A because the question tests generic knowledge of surveillance procedures that would allow for test equipment to remain installed while the test was suspended.</p> <p>SRO Only because the applicant must demonstrate understanding of Surveillance Requirements, and Temp Mod Requirement while considering ALARA for work in HRA. Adherence to conditions and limitations in the facility license meets 10CFR55.43(1) criteria.</p> <p><u>Revision History:</u> 1 – Corrected misspelling in the stem</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

97

ID: LO153747

Points: 1.00

You are the Control Room Supervisor. Per AP 21-001, CONDUCT OF OPERATIONS, in which of the following circumstances would you direct the use of the staged RCA Fast Entry Dosimetry for an Operator who is not already signed onto an RWP?

- A. During OFN EG-004, CCW SYSTEM MALFUNCTIONS, switch CCW service loop to the opposite train.
- B. During EMG C-0, LOSS OF ALL AC POWER, to open all of the equipment doors listed in the Attachments.
- C. During OFN RP-017, CONTROL ROOM EVACUATION, to proceed to the Aux Shutdown Panel via CAS.
- D. During EMG E-3, STEAM GENERATOR TUBE RUPTURE, to locally isolate a failed open ARV on a Ruptured S/G.

Answer: D

<b>Answer Explanation</b>
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# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (OFN EG-004, Swap CCW Service Loop) is INCORRECT, but plausible. Per AI 21-016, Attachment B (Page 3 of 31), accomplishing this task is a Time Sensitive Action that must be completed within 15 minutes from the time the Service Loop is lost. The consequence of not meeting the time limit is "Late core damage with RCS at high pressure is postulated to occur." Plausible because CCW System components are located in the Aux Building, but all required actions to meet the time sensitive action are completed within the control room.

B. Distractor 2 (EMG C-0, Open Doors) is INCORRECT, but plausible. Per AP 21-001, Paragraph 6.15, the use of RCA Fast Entry should be used to support time critical or time sensitive actions as directed by the on-duty SRO during the performance of ALR, OFN, or EMG emergency procedures. Per AI 21-016, ATTACHMENT A, (page 22 of 23), the action to open all listed doors listed in EMG C-0 is a Time Critical Action that must be completed within 16 minutes from the time the local Operator is dispatched. (TCA\_SBO\_L1: Open logic cabinet doors for instrumentation cooling following a loss of all AC power (Local Actions). TCA Source WCAP-12231, Station Blackout Coping Assessment and Wolf Creek Letter NO 89-0072. The consequence of this event if TCA not met is the equipment will heat above 120F and possibly fail. This answer choice is wrong because RCA entry is NOT required to perform ATTACHMENT A - Aux Feed Corridor, or ATTACHMENT B - Control Room Door and Cabinet Alignment. Applicant must demonstrate knowledge of the actions accomplished per EMG C-0 Attachments to know there is NO RCA entry required.

C. Distractor 3 (OFN RP-017, Man ASP) is INCORRECT, but plausible. Per OFN RP-017, Step 5, the SRO is directed to obtain dosimetry from the Emergency Locker in the Control Room and proceed to the ASP via CAS. This choice is wrong because RCA Fast Entry guidelines and dosimetry are not used for this OFN procedure directed RCA entry via the CAS and does NOT meet requirements of AP 21-001.

D. CORRECT (EMG E-3, Isolate ARV) Per AP 21-001, Paragraph 6.15, the use of RCA Fast Entry should be used to support time critical or time sensitive actions as directed by the on-duty SRO during the performance of ALR, OFN, or EMG emergency procedures. Per AI 21-016, ATTACHMENT A, (page 14 of 23), the action to locally isolate ARV on a ruptured S/G is a Time Critical Action that must be completed within 21.53 minutes from initiation of the initial Demand. (TCA\_SGTRARV\_L1: Respond to a SGTR Event with a failed open ARV (Local Actions)). TCA Source: Assumption F of calculation AN 06-019. The consequence of this event if TCA not met is higher release of radioactive materials to the environment.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 97 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153747
User-Defined ID:	LO153747
Reference:	RADIATION CONTROL
Topic:	(SRO) #97 2.3.7 (New - Low)
RO Importance Rating:	3.5
SRO Importance Rating:	3.6
K/A Number:	2.3.7
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Ability to comply with radiation work permit requirements during normal or abnormal conditions. (CFR: 41.12 / 45.10)</p> <p>Tier 3 Group 3</p> <p>Low Cog - procedure knowledge</p> <p>LO1733204, Radiation Protection I, Objective 2, Discuss the requirements of procedure AP 25B-300, RWP PROGRAM pertaining to the ability to reduce radiation exposure.</p> <p><u>Overlap Consideration</u> - 2019 JPM requires emergency dose calculation per EPP 06-013.</p> <p>Meets the K/A in that the question tests use of staged RCA Fast Entry for someone not signed into an RWP. Use of RWP is radworker knowledge, but RCA Fast entry may only be directed by the on-duty SRO for certain conditions. This question tests which condition would require implementing AP 21-001 Conduct of Operations guidance for radiological controls for performance of time critical actions.</p> <p>SRO Only per CFR 55.43(4) - Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions. The use of RCA Fast Entry may only be directed by the on-duty SRO per AP 21-001.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

98

ID: LO153753

Points: 1.00

Given:

- An event occurred which requires an Emergency Classification declaration.
- The SM is attempting to determine Containment Radiation levels to evaluate any LOSS or POTENTIAL LOSS of Fission Product Barriers.
- Both CTMT High Range Area Rad Monitors GT RE-59 and GT RE-60 are Out of Service.

Per AP 06-004, EQUIPMENT IMPORTANT TO EMERGENCY RESPONSE, how are Containment Radiation Levels obtained to confirm either a LOSS or POTENTIAL LOSS of any Fission Product Barriers?

- A. Use installed SD RE-25, Aux Building Area Radiation Monitor.
- B. Use installed SD RE-37, Fuel Building Area Radiation Monitor.
- C. Use portable device to measure radiation levels outside of the Equipment Hatch.
- D. Use portable device to measure radiation levels outside of the Personnel Access Hatch.

Answer: D

## Answer Explanation

Answer choices sorted short to long. Correct answer at D.

A. Distractor 1 (SD RE-025) is INCORRECT, but plausible. Installed CTMT Area Radiation Monitors SDRE-040, -041, and -042 are used to detect Reactor Coolant System (RCS) Barrier Loss. SE RE-025 is plausible because it is located on the 2047 level of the Aux Building where AP 06-004 directs performing surveys to detect Fuel Clad (FC) Barrier LOSS or Containment (CTMT) Barrier - POTENTIAL LOSS. Wrong because SE RE-025 is NOT used per AP 06-004 to evaluate loss of Fission Product Barriers.

B. Distractor 2 (SD RE-037) is INCORRECT, but plausible. Installed CTMT Area Radiation Monitors SDRE-040, -041, and -042 are used to detect Reactor Coolant System (RCS) Barrier Loss. SE RE-037 is plausible because it is located on the 2047 level of the Fuel Building, which is adjacent to Containment. Wrong because SE RE-037 is NOT used per AP 06-004 to evaluate loss of Fission Product Barriers.

C. Distractor 3 (Portable device to measure rad levels outside Equipment Hatch) is INCORRECT, but plausible since AP 06-004 specifies use of a Portable Device to measure radiation levels outside of the Personnel Hatch. The Equipment Hatch may also be easier for a field survey team technician to access from outside the RCA using the stairs. Wrong because the specified Threshold does not account for the additional shielding provided by the missile shield on the equipment hatch and AP 06-004 specifies surveys are to be taken at the access to the Personnel Hatch for evaluating fission product barrier status.

D. CORRECT (Portable device to measure rad levels outside personnel hatch) AP 06-004, Attachment C, Paragraph C.4 (Page 6 of 14) contains Table F-1, Fission Product Barrier Threshold Matrix, as the designated compensatory measure to evaluate fission product barrier status after the loss of both GT RE-59 and GT RE-60. A Radiation Level of >1 R/hr as measured outside of the 2047' Elevation Personnel Access Hatch would confirm a LOSS of the Fuel Clad (FC) Barrier. A Radiation level of >15R measured from the same spot would indicate a POTENTIAL LOSS of the Containment (CMT) Barrier.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 98 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153753
User-Defined ID:	LO153753
Reference:	RADIATION CONTROL
Topic:	(SRO) #98 2.3.15 (New - Low)
RO Importance Rating:	2.9
SRO Importance Rating:	3.1
K/A Number:	2.3.15
Comments:	<p>2019 Wolf Creek NRC, K/A Statement, Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (CFR: 41.12 / 43.4 / 45.9)</p> <p>Tier 3 Group 3</p> <p>Low Cog - Procedure Direction</p> <p>LO1733215, Emergency Classifications and Protective Action Recommendations (PAR), Objective 1, Discuss how to classify an even in accordance with procedure EPP 06-005, EMERGENCY CLASSIFICATION. To properly classify using APF 06-002-02, EAL TECHNICAL BASES, and APF 06-002-03, EAL CLASSIFICATION MATRIX, the applicant must understand how critical parameters are obtained if the listed indication on the Fission Product Barrier Loss / Potential Loss Matrix is unavailable. AP 06-004 provides guidance for how to obtain Containment Radiation levels given a loss of both GT RE-59 and GT RE-60, which is an existing condition at Wolf Creek.</p> <p>Meets K/A since the question specifies a loss of a radiation monitoring system that is used for Emergency Classification purposes and uses installed area radiation monitors or temporary portable survey instruments as answer choices when asking for the procedure-directed compensatory measures for the loss of the radiation monitoring capability.</p> <p>SRO ONLY per 10CFR 55.43 (1) Conditions and limitations in the facility license and 55.43(4) Radiation Hazards that may arise during normal and abnormal situation, including maintenance activities and various contamination conditions.</p>

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

99

ID: LO153685

Points: 1.00

In which of the following situations will the crew remain in a "Lower Priority" procedure?

- A. ONLY after declaring 10CFR50.54(x) to document the Procedure Priority Deviation.
- B. When a note or caution within the Lower Priority Procedure specifies precedence over the Higher Priority Functional Restoration Procedure.
- C. ONLY when the procedure of higher priority cannot be performed as written and the SM authorizes a variance to remain in a lower priority procedure.
- D. While performing a Red Path CSFST procedure, a higher priority Red Path is diagnosed. The crew should remain in the current procedure until complete and THEN transition ONLY if the Red Path condition still exists.

Answer: B

## Answer Explanation

Answer choices sorted short to long. Correct answer at B.

A. Distractor 1 (Only after declaring 10CFR 50.54(x)) is INCORRECT, but plausible. Per AP 15C-003, 10 CFR 50.54(x) is a consideration when a procedure variance involves a departure from a license condition or technical specification. This process is NOT required to perform a lower priority procedure.

B. CORRECT (note or caution specifies precedence). Per BD-EMG F-0, Note prior to step 1, Notes and cautions within EMG procedures which prohibit the use of functional restoration procedures shall take precedence over the requirements of this procedure. (Examples, EMG C-0, EMG C-21 throttling Aux Feed, EMG ES-12)

C. Distractor 2 (SM authorizes a Variance) is INCORRECT, but plausible. Per AP 15C-003, A procedure variance is when action is taken during an event not covered by an approved procedure in order to minimize personnel injury or damage to the facility or to protect public health and safety. The procedure variance shall only be taken when the procedure as written is not effective for the actual plant conditions. The CRS authorizes the variance, not the SM. This choice is wrong, because there are specific instances where "lower priority" procedures are performed and taking variance is NOT required.

D. Distractor 3 (Higher Priority Red Path while in Red Path) is INCORRECT, but plausible. Per AP 15C-003, section 6.12.7, Once an FRP is entered due to a Red or Orange Path condition, that FRP shall be performed to completion. A specific exception to this rule is if an higher priority Red Path procedure is diagnosed, in which case the current FRP is suspended and the crew should transition to the higher priority FRP. Also plausible since AP 15C-003, Section 6.12.8 specifies that if a LOWER priority FRP condition arises, performance of that lower path FRP is NOT required if the condition clears prior to the crew being ready to transition to that procedure.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 99 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	153685
User-Defined ID:	LO153685
Reference:	EMERGENCY PROCEDURES
Topic:	(SRO) #99 2.4.22 (New - Low)
RO Importance Rating:	3.6
SRO Importance Rating:	4.4
K/A Number:	2.4.22
Comments:	<p>2019 Wolf Creek NRC. K/A Statement: Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations. (CFR: 43.5)</p> <p>Tier 3 Group 4</p> <p>Low Order - knowledge of abnormal and emergency procedure rules of usage, and basis for selection of procedure hierarchy.</p> <p>LO1733203, Procedure Usage, Objective 7. Discuss the priority of procedures that deal with abnormal conditions IAW AP 15C-003.</p> <p>Meets the Generic K/A as the question asks when (and why) a lower priority procedure would be performed over a higher priority procedure. The exceptions to normal rules of usage are procedurally based on the given event in progress.</p> <p>SRO Only as the question requires knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures. SROs are responsible for procedure variations and deviations (10CFR 50.54(x)).</p>



# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

100

ID: LO88860

Points: 1.00

Given:

- The crew is responding to a LOCA using EMG FR-C1, RESPONSE TO INADEQUATE CORE COOLING.
- The SM declared a GENERAL EMERGENCY (FG 1.1) due to LOSS of Fuel Clad and Reactor Coolant System Barriers and a POTENTIAL LOSS of the CTMT Barrier since the EMG FR-C1 procedure actions in progress were NOT effective in restoring the CSFST Core Cooling RED PATH condition within 15 minutes.
- Containment pressure is steady at 12 psig.
- A dose projection is NOT yet available.

Based on these conditions, what is the MINIMUM Protective Action Recommendation (PAR)?

Evacuate....

**(REFERENCE PROVIDED)**

- A. JRR, CCL, and CTR
- B. JRR, CCL, CTR, and ALL subzones within 2-5 miles
- C. JRR, CCL, CTR, and subzones 2-5 miles downwind
- D. JRR, CCL, CTR and subzones 2-10 miles downwind

Answer: C

## Answer Explanation

Reference Provided is EPP 06-006, ATTACHMENT A

Answer choices sorted short to long. Correct answer at C.

A. Distractor 1 (JRR, CCL, and CTR) is INCORRECT, but plausible. This is the EPP-06-006 flowpath result if the applicant answers "No" to Actual or projected severe core damage. Wrong since the given entry to EMG FR-C1 on RED path constitutes projected severe core damage.

B. Distractor 2 (JRR, CCL, CTR, and all subzones within 2-5 miles) is INCORRECT, but plausible. This is the right distance to be evacuated per EPP-06-006, but ONLY the downwind sectors require evacuation.

C. CORRECT (JRR, CCL, CTR, and subzones 2-5 miles downwind). For the given conditions, only two of the three fission product barriers are actually lost. The Containment Barrier is potentially lost for emergency classification purposes but is still intact based on given pressure and trend.

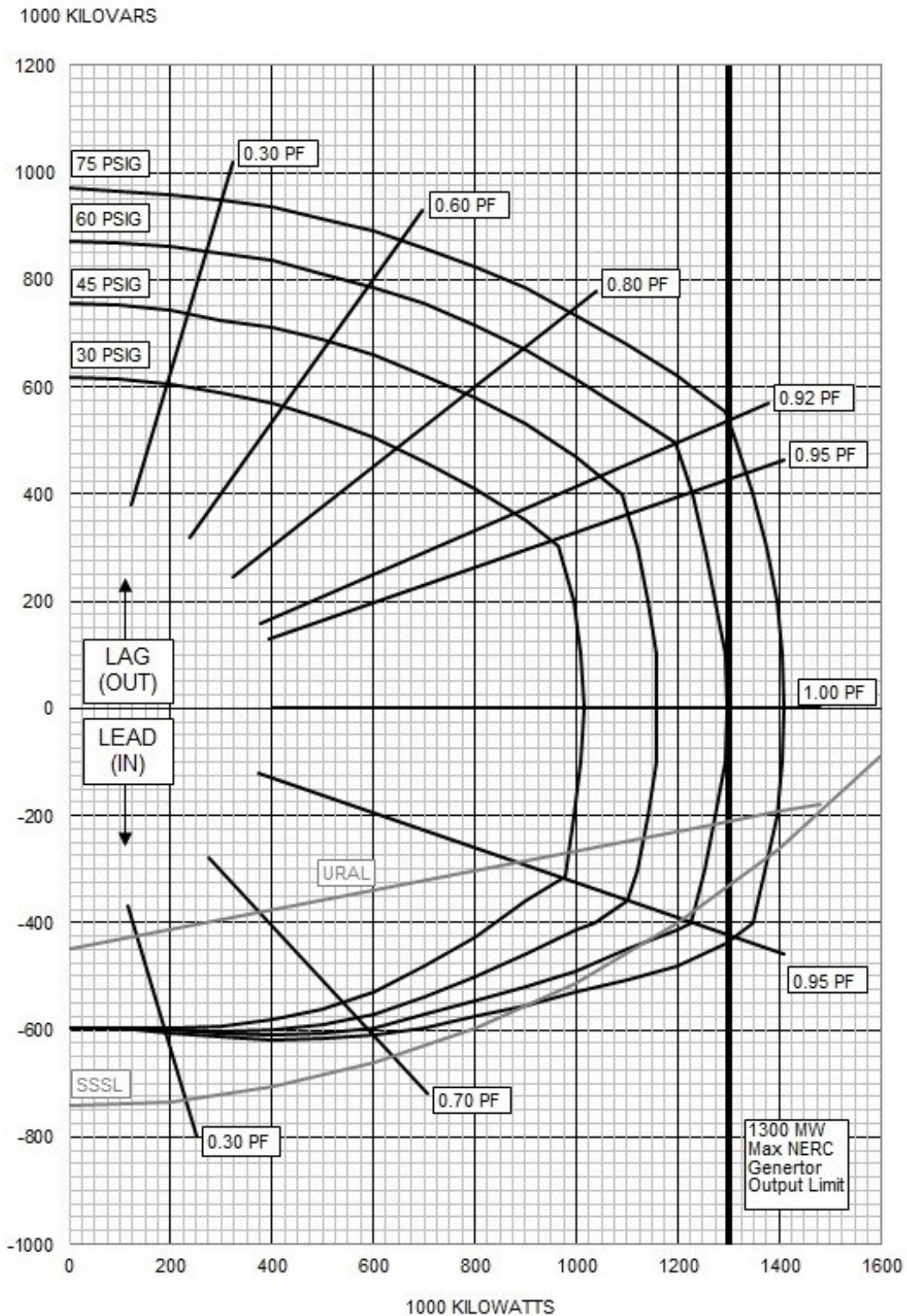
D. Distractor 3 (JRR, CCL, CTR and subzones 2-10 miles downwind) is INCORRECT, but plausible. This is the EPP 06-006 flowpath result if the applicant answers "Yes" to Actual or Imminent breach of three fission product barriers. Wrong since CTMT is still intact for the given pressure and trend even though considered "Potentially Lost" for classification purposes.

# EXAMINATION ANSWER KEY

2019 Wolf Creek ILO NRC, Rev 3

Question 100 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	No
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	88860
User-Defined ID:	LO88860
Reference:	EMERGENCY PROCEDURES / PLAN
Topic:	(SRO) #100 2.4.44 (Reference) (Bank - High)
RO Importance Rating:	N/A
SRO Importance Rating:	4.4
K/A Number:	2.4.44
Comments:	<p>2019 Wolf Creek NRC Exam, K/A Statement, Knowledge of Emergency Plan Protective Action Recommendations. (CFR: 41.10 / 41.12 / 43.5 / 45.11)</p> <p>Tier 3 Group 4</p> <p>High Cog - Analysis of given conditions to determine fission product barrier status and use of reference flow chart.</p> <p>Edited Bank Question (100% History)</p> <p>Reference provided is EPP 06-006, Attachment A.</p> <p>LO1733215, Emergency Classifications and Protective Action Recommendations (PAR), Objective 2, Determine protective action recommendations IAW EPP-06-006, PROTECTIVE ACTION RECOMMENDATIONS.</p> <p>Meets K/A since the question provides a scenario where a General Emergency exists combined with indications of fuel clad barrier loss (RED PATH EMG FR-C1) and asks for a protective action recommendation with no dose projections available yet.</p> <p>SRO Only per 10CFR 55.43(1) Conditions and limitations in the facility license when exercising the Emergency Plan and making protective action recommendations.</p> <p><u>Revision History:</u> 1- Modified stem information to present how the GE was declared, actual loss of 2 barriers and potential loss of 3rd barrier due to being in EMG FR-C1 for &gt;15 minutes without clearing the CSFST RED path condition on Core Cooling. Changed status of containment barrier from "intact" to specify a pressure and trend so that the applicant has to determine the CTMT barrier is still intact and therefore the minimum PAR is 2-5 miles downwind.</p>

FIGURE 1  
GENERATOR PERFORMANCE CURVE



Reference Provided for Question #36

**ATTACHMENT A**  
(Page 1 of 1)

**PROTECTIVE ACTION RECOMMENDATION CHART**

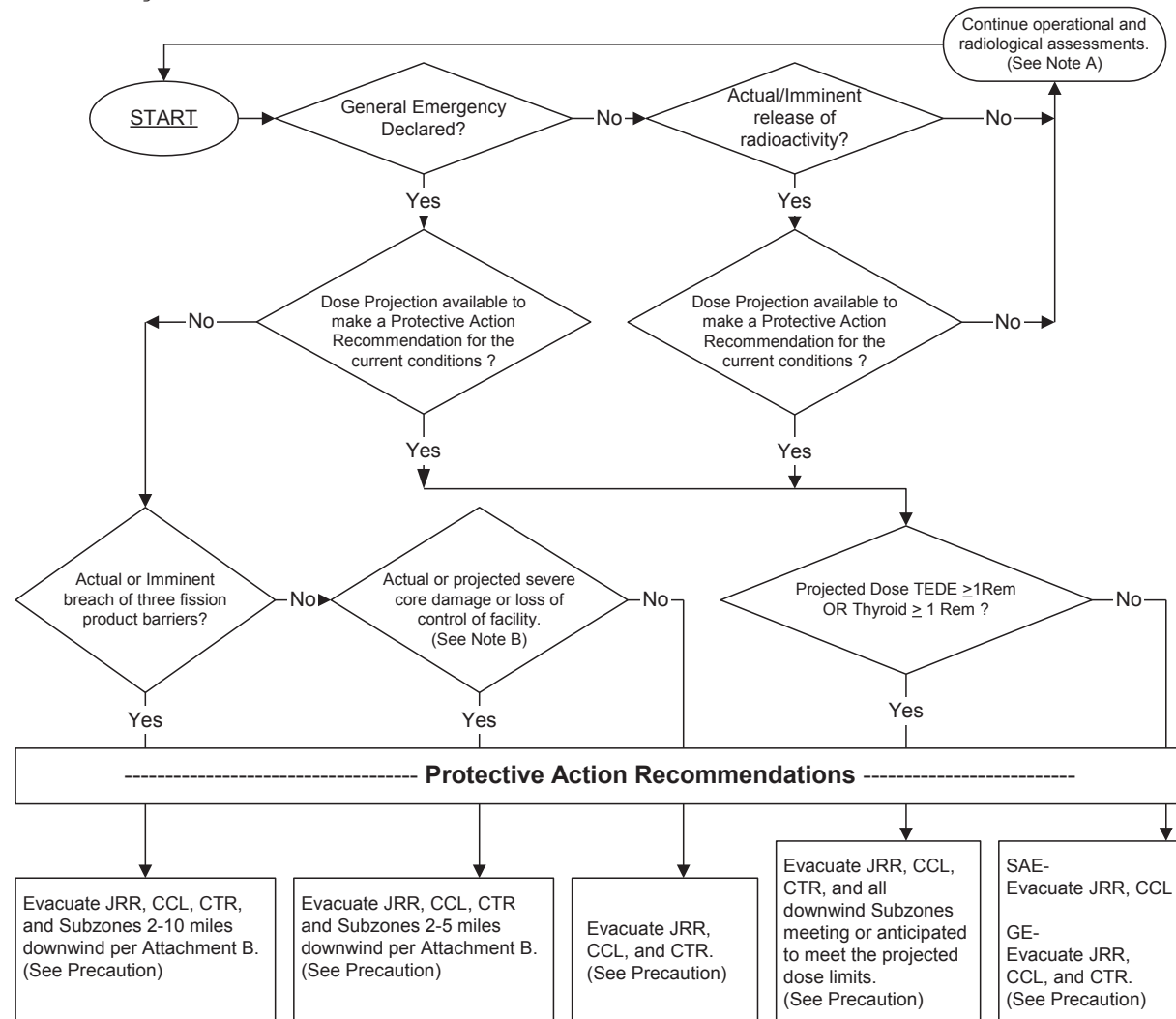
1. These protective actions recommendations are for planning purposes only. Practical decisions must take existing conditions into consideration. Conditions to consider are actual threat to the public based on plant conditions, weather, evacuation routes, evacuation times etc. Discussions, taking these conditions into account, with the appropriate State, County, NRC, and FEMA officials may yield recommendations different than those specified by this flow chart.
2. Protective action recommendations should include all subzones meeting or anticipated to meet the projected dose limits.

**PRECAUTIONS**

Sheltering of the public should be considered as an alternative to evacuation if the dose received during evacuation might be greater than the dose received remaining indoors or the expected risk from radiation is offset by safety risks involved in carrying out the protective action.

**NOTES**

- A. John Redmond Reservoir (JRR) and Coffey County Lake (CCL) are recommended for evacuation as a precautionary measure upon declaration of a Site Area Emergency.
- B. Projected severe core damage is indicated by core cooling orange path, or core cooling red path, or heat sink red path. Actual severe core damage is indicated by GTRE59 or 60 reading >600 R/Hr.



-END-

Reference Provided for Question #100

## Wolf Creek NRC Written Exam Question Clarification

### Guidance from NUREG 1021, Rev 11, Appendix E

7. If you have any questions concerning the intent or the initial conditions of a question, do *not* hesitate to ask them before answering the question. Note that questions asked during the examination are taken into consideration during the grading process and when reviewing requests for informal NRC staff reviews (appeals). Ask questions of the NRC examiner or the designated facility instructor *only*. A dictionary is available if you need it.

When answering a question, do *not* make assumptions regarding conditions that are not specified in the question unless they occur as a consequence of other conditions that are stated in the question. For example, you should not assume that any alarm has activated unless the question so states or the alarm is expected to activate as a result of the conditions that are stated in the question. Similarly, you should assume that no operator actions have been taken, unless the stem of the question or the answer choices specifically state otherwise. Finally, answer all questions based on actual plant operation, procedures, and references. If you believe that the answer would be different based on simulator operation or training references, you should answer the question based on the *actual plant*.

Originator: \_\_\_\_\_

Question Number: \_\_\_\_\_

Clarification Question: \_\_\_\_\_  
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Resolution: \_\_\_\_\_  
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