

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

1

ID: S76

Points: 1.00

The plant is operating at rated power with all systems functioning normally when the following indications occur:

- 9D23, DIV I 4160V ESS 64B BKR TRIPPED
- 9D22, DIV I BUS VOLTAGE LOW
- TRIPPED indication on Bus 64B Pos B6
- TRIPPED indication on Bus 64B Pos B8
- EDG11 Not running
- Zero current on ESF Bus 64B X-Y-Z Phase Amperes Meter

(1) What event has occurred, and (2) what action must the SRO direct?

- A. (1) Failure of SST 64  
(2) Perform 20.300.64B, Loss of Bus 64B.
- B. (1) Failure of Bus 64B  
(2) Perform 20.300.64B, Loss of Bus 64B.
- C. (1) Loss of SST 64 with a Failure of EDG 11  
(2) Perform 20.307.01, Emergency Diesel Generator Failure.
- D. (1) Loss of Bus 64B with a Failure of EDG 11  
(2) Perform 20.307.01, Emergency Diesel Generator Failure.

Answer: B

## Answer Explanation

If Bus 64B Pos B6 and B8 are open, this is an indication of a bus fault. The EDG is designed not to start on a bus fault. The correct action is to perform 20.300.64B.

A&C. This is plausible because the zero current and voltage readings would be correct indications of SST 64 failure.

D. This is plausible because the examinee may not understand indications of a bus fault and determine that EDG 11 failed to start.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 1 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	2
Difficulty:	2.50
<hr/>	
System ID:	32666
User-Defined ID:	S76
Cross Reference Number:	NEW
<hr/>	
Topic:	Loss of 4160 Bus
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: <b>Cause of partial or complete loss of A.C. power</b>

## Question 1 Table-Item Links

### Plant Procedures

20.300.64B

### NUREG 1123 KA Catalog Rev. 2

295003 AA2.01 3.4/3.7 Cause of partial or complete loss of A.C. power

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

2

ID: S77

Points: 1.00

Which of the following is (1) the MINIMUM specific gravity that satisfies the Technical Specification requirement for the Division I and Division II batteries and (2) what action is required if those conditions are not met? **(See attached TS 3.8.6)**

- A. (1)  $\geq 1.190$  for each designated pilot cell  
(2) Verify pilot cells electrolyte level is above the top of the plates and not overflowing, and float voltages are  $> 2.07V$  within ONE hour.
- B. (1)  $\geq 1.190$  for each connected cell AND average of all connected cells  $> 1.200$   
(2) Declare the affected battery inoperable IMMEDIATELY.
- C. (1)  $\geq 1.195$  for each designated pilot cell  
(2) Verify pilot cells electrolyte level is above the top of the plates and not overflowing, and float voltages are  $> 2.07V$  within ONE hour.
- D. (1) Average of all designated pilot cells  $\geq 1.190$   
(2) Declare the affected battery inoperable IMMEDIATELY.

Answer: C

## Answer Explanation

TS 3.8.6 requires each designated pilot cell specific gravity to be  $\geq 1.195$ . The correct action to take is to verify electrolyte levels and voltages of pilot cells within Category C values within 1 hour.

- A. The action is wrong because it is the wrong entry condition. Distractor is plausible because it is the right action for the proper entry conditions.
- B. The actions are for if action time not met, temperature not within limits or not within Category C values. Distractor is plausible because you need both conditions to enter the condition.
- D. The action is wrong because it is the wrong entry condition. Distractor is plausible because it is the right action for the proper entry conditions.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

Question 2 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	8
Difficulty:	4.00
System ID:	32626
User-Defined ID:	S77
Cross Reference Number:	NEW
Topic:	ESF Battery Minimum Gravities
Num Field 1:	LOK L
Num Field 2:	10 CFR 55.43(b) 2
Text Field:	ILO 2013 mc
Comments:	<b>KA - Partial or Total Loss of DC Pwr - Ability to recognize system parameters that are entry-level conditions for Technical Specifications.</b>  Provide Tech Spec 3.8.6 including tables to candidates

## Question 2 Table-Item Links

NUREG 1123 KA Catalog Rev. 2

G2.2.42 3.9/4.6 Ability to recognize system parameters that are entry-level conditions for Technical Specifications

295004 Partial or Complete Loss of D.C. Power

## Technical Specifications

3.8.6 Battery Cell Parameters

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

3

ID: S78

Points: 1.00

The main turbine is running with a load of 400 MWe during a plant startup. Reactor power is currently 34% RTP.

- 12:10 Annunciator 4D13, MAIN TURBINE VIB HIGH, alarms.
- 12:11 The BOP operator reports that main turbine bearing #9 is reading 7 mils. Bearings 5, 6, 8 and 10 are reading approximately 4 mils.
- 12:12 The CRS and SM decide to lower turbine load by 50 MWe per 22.000.03, POWER OPERATION 25% TO 100% TO 25%.
- 12:15 Annunciator 4D9, MAIN TURBINE VIB HIGH-HIGH, alarms.
- 12:15 The BOP operator reports that main turbine bearing #9 is reading 11 mils. Bearings 8 and 10 are reading 7 mils.

Which action(s) should be directed based on these indications?

- A. Continue to lower turbine load per 20.000.03, and monitor bearing vibrations.
- B. Scram the reactor and trip the main turbine, and enter 20.000.21, REACTOR SCRAM.
- C. Contact system engineering for additional recommendations and to assist in the mitigation of causes per ARP 4D9.
- D. Fully unload the turbine, and shutdown to hot standby in accordance with 20.000.04, PLANT SHUTDOWN FROM 25% POWER.

Answer: B

## Answer Explanation

Turbine trip setpoint has been exceeded (10 mils with adjacent bearing at or above 6 mils). The operator must trip the turbine to prevent damage.

- A. Plausible because lowering turbine load would be a recommended action if the trip setpoint had not been exceeded.
- C. Plausible because the system engineer could offer knowledge and expertise to mitigate the situation.
- D. Plausible because it would be a conservative action had a turbine trip setpoint not been exceeded.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 3 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
<hr/>	
System ID:	32627
User-Defined ID:	S78
Cross Reference Number:	NEW
<hr/>	
Topic:	MT Vibration
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Ability to determine and/or interpret the following as they apply to MAIN TURBINE GENERATOR TRIP: <b>Turbine vibration</b>

## Question 3 Table-Item Links

### Plant Procedures

20.109.01

23.109

04D009

### NUREG 1123 KA Catalog Rev. 2

295005 AA2.02 2.4/2.7 Turbine vibration

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

4

ID: S79

Points: 1.00

Disregarding the operability of the individual reservoirs, which ONE of the following sets of parameters identifies a configuration for which the Ultimate Heat Sink (UHS) is capable of meeting its DESIGN OBJECTIVE (FUNCTION) if the reservoirs are capable of being cross-connected? (**Provide T.S. 3.7.2**)

	Div 1 Reservoir		Div 2 Reservoir	
	<u>Avg Temp</u>	<u>Level</u>	<u>Avg Temp</u>	<u>Level</u>
A.	81°F	26 ft	76°F	24.5 ft
B.	82°F	27 ft	79°F	23 ft
C.	79°F	26 ft	80°F	22 ft
D.	78°F	24.5 ft	76°F	24.5 ft

Answer: A

## Answer Explanation

Combined Average temp is 78.5°F, combined average level 25.25 feet. The OPERABILITY (TS 3.7.2) of the UHS is based on the OPERABILITY of each RHR reservoir. To be OPERABLE, a RHR reservoir must have sufficient capacity to accept the design heat load from the supported equipment. To accomplish this each reservoir water volume must be greater than 2,990,000 gallons (an indication of 25 feet) and the water temperature must be  $\leq 80^\circ\text{F}$ . In addition, the associated cooling tower and both fans must be OPERABLE.

Since the UHS relies on the **combined** heat capacity of the two RHR reservoirs to accomplish its design objectives, UHS OPERABILITY must also be based on the two reservoirs having a combined water volume of 5,980,000 gallons and a combined average water temperature of  $\leq 80^\circ\text{F}$ . Furthermore, the two reservoirs must be cross-connected, or capable of being cross-connected.

All distractors are plausible because some of the parameters meet the surveillance requirements. The examinee will have to not only know the requirements, but also understand that BOTH reservoirs are required to meet the design objective. They must also know that they can use an average of the two (required). The correct answer for this question has one parameter per reservoir out of specification. It is only when you average them that you realize they meet the design criteria.

B. is incorrect because average temperature is  $>80^\circ\text{F}$ .

C&D. are incorrect because combined reservoir level average is  $<25$  feet.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 4 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	5
Difficulty:	3.00
<hr/>	
System ID:	32686
User-Defined ID:	S79
Cross Reference Number:	NEW
<hr/>	
Topic:	Ultimate Heat Sink
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Partial or Total Loss of CCW: <b>Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.</b>

## Question 4 Table-Item Links

### NUREG 1123 KA Catalog Rev. 2

G2.2.25 3.2/4.2 Knowledge of bases in Technical Specifications for limiting conditions for operations and safety limits

295018 Partial or Complete Loss of Component Cooling Water

### Technical Specifications

3.7.2 Emergency Equipment Cooling Water (EECW)/Emergency Equipment Service Water (EESW) System and Ultimate Heat Sink (UHS)



# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

5

ID: S80

Points: 1.00

The plant was operating at rated power when a partial loss of drywell cooling condition occurred. 3D81, Primary Containment Pressure High/Low is alarming.

Primary containment pressure is confirmed at 1.52 psig increasing at 0.01 psig every 2 minutes. Drywell temperature is 137°F and rising 0.5°F every 10 minutes.

What action(s) should the CRS direct?

- A. Lower drywell pressure in accordance with EOP 29.100.01, Sheet 2, Primary Containment Control.
- B. Lower drywell temperature in accordance with EOP 29.100.01, Sheet 2, Primary Containment Control.
- C. Lower drywell pressure in accordance with 23.406, Primary Containment Nitrogen and Purge system using RBHVAC.
- D. Lower drywell pressure in accordance with 23.425.01, Primary Containment Procedures using Standby Gas Treatment System.

Answer: C

## Answer Explanation

Drywell temperature and pressures are elevated, but they are not at EOP entry conditions. The correct action is to lower drywell pressure using either SBGTS or RBHVAC in accordance with 23.406 as directed by ARP 3D81.

- A. is plausible because drywell pressure is high, but not high enough to enter the EOPs.
- B. is plausible because drywell temperature is high, but not high enough to enter the EOPs. Also, the high pressure condition was caused by a partial loss of drywell cooling.
- D. is plausible because lowering pressure by venting through SGTS is warranted, however this is the wrong procedure.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

Question 5 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	5
Difficulty:	3.00
System ID:	32966
User-Defined ID:	S80
Cross Reference Number:	NEW
Topic:	High Drywell Pressure
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - High Drywell Pressure: <b>Ability to perform specific system and integrated plant procedures during different modes of plant operation</b>

## Question 5 Table-Item Links

### Plant Procedures

03D081

23.406

### NUREG 1123 KA Catalog Rev. 2

G2.1.23 4.3/4.4 Ability to perform specific system and integrated plant procedures during different modes of plant operation

295024 High Drywell Pressure

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

6

ID: S81

Points: 1.00

The plant has experienced an ATWS. Reactor water level has been intentionally lowered in accordance with 29.100.01 Sheet 1A, RPV Control – ATWS. The following conditions exist:

- Reactor power is 10%.
- One (1) SRV is stuck OPEN.
- RPV level is -28 inches and slowly rising.
- RPV pressure is 944 psig and being maintained by the Main Turbine Bypass Valves.
- Torus temperature is 167°F and rising.
- Torus water level is +10 inches and steady.
- Torus pressure is 4.5 psig and rising slowly.
- SLC is injecting.
- RCIC is injecting at 500 gpm.

Which ONE (1) of the following describes the proper action required and why? (**See attached 29.100.01 Sheet 6 curves.**)

- A. Emergency Depressurize due to being in the unacceptable region of the HCL curve.
- B. Emergency Depressurize due to inability to maintain RPV water level greater than -25 inches.
- C. Reduce RPV pressure to less than 800 psig using Main Turbine Bypass Valves to remain in the acceptable region of the HCL curve.
- D. Reduce RPV pressure to less than 360 psig using Main Turbine Bypass Valves to maintain in the acceptable region of the SRVTPLL.

Answer: C

## Answer Explanation

Torus temperature is rising and only 2°F away from entering the unacceptable region of the HCL curve. FSP-OR2 directs lowering RPV pressure if Torus water temp CANNOT be kept < HCL.

B. is incorrect because RPV Water level is -28 inches and RISING. ED is only required if level cannot be restored and maintained. RCIC, CRD and SLC is raising RPV water level.

A. is incorrect because the plant is currently in the acceptable region of the HCL curve.

D. is incorrect because Torus water level is 3 inches below the SRVTPLL and steady. Reducing pressure to less than 360 psig at this time is not warranted.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 6 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
<hr/>	
System ID:	32706
User-Defined ID:	S81
Cross Reference Number:	NEW
<hr/>	
Topic:	Torus Water Temperature
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Ability to determine and/or interpret the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: <b>Suppression pool water temperature</b>  <b>Provide examinees with 29.100.01 sheet 6 Curves Only.</b>

## Question 6 Table-Item Links

### Plant Procedures

29.200.01 SH 1

29.100.01 SH 6

### NUREG 1123 KA Catalog Rev. 2

295026 EA2.01 4.1\*/4.2\* Suppression pool water temperature

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

7

ID: S82

Points: 1.00

The plant has experienced a reactor scram due to a loss of feedwater. All control rods have inserted. The following plant conditions exist:

- SBFW has been started and is injecting at 1200 gpm.
- HPCI is running and injecting at 5200 gpm.
- RCIC is in Standby.
- Standby Gas Treatment system is running.
- RWCU is in service.
- Reactor water level is 65 inches and rising slowly.

Which ONE (1) of the following describes the proper action that MUST be taken at this time?

- A. Isolate RWCU, secure SBFW, and restore level to the normal band using HPCI.
- B. Start RCIC manually, and secure HPCI to control the reactor water level ascent to the normal band.
- C. Secure HPCI, and restore reactor water level using SBFW and CRD to prevent adding heat to the suppression pool.
- D. Isolate RWCU, and start RCIC manually. Continue to monitor reactor water level until the normal operating band is reached.

Answer: D

## Answer Explanation

ODE-4 Enclosure A page 2 directs taking manual actions when automatic actions fail. This question tests the ability of the SRO to analyze plant conditions and make decisions based on available plant procedures. In this case the SRO must first recognize PCIS failure and failure of RCIC to initiate. They must then direct action in accordance with the ODE. Isolating RWCU is the ONLY action that MUST be taken. The other actions are valid but they are water use strategies.

### Plausible Distractors:

- B. is incorrect because there is no direction to secure HPCI per procedures. 29.100.01, sheet one allows use of table one systems. The operator would dial back HPCI to 0 gpm instead of securing the turbine. There is no mention of isolate RWCU, which is a required action. This is plausible because it discusses a water use strategy.
- C. is incorrect because there is no mention of RWCU or RCIC. These are plausible because they discuss strategy for control of the plant.
- A. is incorrect because there is no mention of RCIC. These are plausible because they discuss strategy for control of the plant.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 7 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
<hr/>	
System ID:	32806
User-Defined ID:	S82
Cross Reference Number:	NEW
<hr/>	
Topic:	Auto/Manual actions
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Reactor Low Water Level: <b>Knowledge of abnormal condition procedures.</b>

## Question 7 Table-Item Links

### Plant Procedures

23.427

ODE-04 Organizational Improvement

### NUREG 1123 KA Catalog Rev. 2

G2.4.11 4.0/4.2 Knowledge of abnormal condition procedures

295031 Reactor Low Water Level

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

8

ID: S83

Points: 1.00

The plant is operating at rated power when SRV E fails open. Attempts to close SRV E in accordance with 20.000.25, Failed Safety Relief Valve, have failed. The P603 operator places the mode switch in shutdown on direction from the CRS, and some control rods fail to insert.

The following conditions currently exist:

- Reactor power is 30%.
- Torus temperature is 109°F and rising at 2°F/min.

Which **ONE** (1) of the following describes the proper action to be taken **AND** the basis for that action? (See attached 29.100.01 Sheet 6 curves.)

- A. Place RHR in Torus Cooling to prevent exceeding Pressure Suppression Pressure (PSP).
- B. Inject SLC to ensure Hot Shutdown Boron Weight is injected before Suppression Pool temperature exceeds the Heat Capacity Limit (HCL).
- C. Manually open additional SRVs to ensure RPV pressure remains within the Heat Capacity Limit (HCL).
- D. Emergency Depressurize to ensure the Suppression Pool can accommodate the energy stored in the Reactor Vessel.

Answer: B

## Answer Explanation

B. The plant is about to exceed 110°F, which is the BIIT limit for the situation. The CRS must direct injection of SLC to ensure Hot Shutdown Boron Weight is injected before Suppression Pool temperature exceeds the Heat Capacity Temperature Limit.

Plausible Distractors:

- A. is incorrect because torus cooling does not prevent exceeding the PSP curve. The PSP is a function of suppression pool water level, not temperature. This is plausible because RHR should be placed in Torus Cooling in accordance with 20.000.25.
- C. is incorrect because opening additional SRVs would add heat to the torus and the BIIT is the limiting curve at the moment. The conditions are not anywhere near the HCL. This is plausible because you are allowed to open SRVs manually maintain RPV pressure below the HCL.
- D. is incorrect because the conditions do not warrant an ED during an ATWS. There would have to be a level control problem. It is plausible based on the basis statement of 'To ensure the suppression pool can accommodate the energy stored in the Reactor Vessel'.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 8 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
<hr/>	
System ID:	32826
User-Defined ID:	S83
Cross Reference Number:	NEW
<hr/>	
Topic:	High Torus Temperature Actions
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 2
Text Field:	ILO 2013 mc
Comments:	KA - High Suppression Pool Temp: <b>Knowledge of the specific bases for EOPs.</b>  <b>Provide the examinee with 29.100.01 Sheet 6 (curves only) for this question.</b>

## Question 8 Table-Item Links

### Plant Procedures

BWROG EPG App B

### NUREG 1123 KA Catalog Rev. 2

G2.4.18 3.3/4.0 Knowledge of the specific bases for EOPs

295013 High Suppression Pool Water Temperature



# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

9

ID: S84

Points: 1.00

A reactor scram has occurred. An RPIS failure has prevented the P603 Operator from verifying all control rods have inserted.

- APRMs are reading downscale.
- The IRMs have been inserted and are reading between Range 4 and 5 and lowering.
- RPV Pressure is 950 psig and being maintained by Main Turbine Bypass Valves.
- SLC has not been injected.

(1) Is the reactor shutdown under all conditions, and (2) what actions should be taken in accordance with plant procedures?

- A. (1) NO  
(2) Perform FSQ 1-8..
- B. (1) NO  
(2) Perform 20.000.21, REACTOR SCRAM.
- C. (1) YES  
(2) Exit 29.100.01A, RPV CONTROL - ATWS, and perform 29.100.01 Sheet 1, RPV CONTROL
- D. (1) YES  
(2) Exit Rx Power leg of 29.100.01A, RPV CONTROL - ATWS, and perform 20.000.21, REACTOR SCRAM.

Answer: B

## Answer Explanation

Per EPGs, positive confirmation that the reactor will remain shutdown under all conditions without boron is best obtained by determining that no control rod is withdrawn beyond the Maximum Subcritical Banked Withdrawal Position. RPIS has failed therefore this is not possible. The reactor is below Range 7 on the IRMs and trending down indicating the reactor is shutdown. FSQ override one (1) states that if the reactor is shutdown, exit to the SCRAM AOP.

A. is incorrect because the CRS should exit the ATWS EOP. This answer is plausible because the examinee may determine the correct action is to continue on and inject Boron because the reactor will not remain shutdown under all conditions

C. is incorrect because Per EPGs, positive confirmation that the reactor will remain shutdown under all conditions without boron is best obtained by determining that no control rod is withdrawn beyond the Maximum Subcritical Banked Withdrawal Position. RPIS has failed therefore this is not possible. The examinee may determine the power indications mean the reactor will remain shutdown under all conditions.

D. is incorrect because is incorrect because Per EPGs, positive confirmation that the reactor will remain shutdown under all conditions without boron is best obtained by determining that no control rod is withdrawn beyond the Maximum Subcritical Banked Withdrawal Position. RPIS has failed therefore this is not possible. The examinee may determine the power indications mean the reactor will remain shutdown under all conditions. The answer is plausible because the examinee may determine that exiting the ATWS EOP and entering the normal RPV Control EOP is the correct course of action.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 9 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
<hr/>	
System ID:	32726
User-Defined ID:	S84
Cross Reference Number:	NEW
<hr/>	
Topic:	Failure to SCRAM - RPIS failure
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Ability to determine and/or interpret the following as they apply to INCOMPLETE SCRAM: <b>Reactor power</b>

## **Question 9 Table-Item Links**

### Plant Procedures

29.100.01 SH 6

29.100.01 SH 1A

BWROG EPG App B

### NUREG 1123 KA Catalog Rev. 2

295015 AA2.01 4.1\*/4.3\* Reactor power

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

10

ID: S85

Points: 1.00

The plant is in Mode 1 at rated power when 16D5, REAC/AUX BUILDING BSMT/SUBBSMT HIGH RADN, alarms. The operator sent to RR H11-P849 confirms Channel 11, RBSB HPCI Room, alarm light is ON and indicates 780 mr/hr.

Based on this report, the SRO should immediately \_\_\_\_\_.

- A. direct the Mode Switch placed in Shutdown, and enter 20.000.02, "Abnormal Release of Radioactive Material"
- B. commence a normal reactor shutdown, and enter 20.000.02, "Abnormal Release of Radioactive Material"
- C. direct the Mode Switch placed in Shutdown, and enter 29.100.01 SH 5, "Secondary Containment and Rad Release"
- D. enter 20.000.02, "Abnormal Release of Radioactive Material," and enter 29.100.01 SH 5, "Secondary Containment and Rad Release"

Answer: D

## Answer Explanation

Once the reading is determined to be valid, the SRO should immediately enter the AOP and EOP. There is no verification of a primary system discharging into secondary containment, and the reading is below Max Safe (5R/hr), therefore a shutdown is not required at this time (either by GOP or mode switch).

A. is plausible because this action would be required per EOPs if two or more areas exceed Max Safe and a primary system was discharging into secondary containment. The examinee may justify a primary system discharging into secondary containment based on the high rad reading in the HPCI room.

B. The EOPs require this action if any one parameter exceeds its max safe value in two or more areas. This is plausible because the EOPs do require a shutdown based on high rad levels.

C. is plausible because this action would be required per EOPs if two or more areas exceed Max Safe and a primary system was discharging into secondary containment. The examinee may justify a primary system discharging into secondary containment based on the high rad reading in the HPCI room. The examinee may determine that entry into the AOP is not required because the plant meets EOP entry requirements.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

Question 10 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	32827
User-Defined ID:	S85
Cross Reference Number:	NEW
Topic:	Secondary Containment Hi Rad
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 4/5
Text Field:	ILO 2013 mc
Comments:	KA - Secondary Containment Ventilation High Radiation: <b>Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.</b>

## Question 10 Table-Item Links

### Plant Procedures

16D05

20.000.02

29.100.01 SH 5

### NUREG 1123 KA Catalog Rev. 2

G2.1.7 4.4/4.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation

295034 Secondary Containment Ventilation High Radiation

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

11

ID: S86

Points: 1.00

Which ONE of the following places the plant in a one hour Technical Specification action AND describes the correct bases for that Technical Specification?

- A. Plant in Mode 3 with A and C SRMs inoperable; to prevent and mitigate prompt reactivity excursions during refueling and low power operation.
- B. Plant is in Mode 2 with SRMs A and B inoperable and IRMs on range 2; to prevent and mitigate prompt reactivity excursions during refueling and low power operation.
- C. Plant in Mode 3 with A and C SRMs inoperable; to prevent violation of a Safety Limit and a fuel design limit that may result from a single control rod withdrawal error event.
- D. Plant is in Mode 2 with SRMs A and B inoperable and IRMs on range 2; to prevent violation of a Safety Limit and a fuel design limit that may result from a single control rod withdrawal error event.

Answer: B

Answer Explanation
Per TS 3.3.1.2, three channels of SRMs are required. Only two are operable. This is the correct bases from the TS bases document.
A. is plausible because there is a mode 3 requirement, but only 2 SRMs are required. This is the correct bases.
C. is plausible because there is a mode 3 requirement, but only 2 SRMs are required. This is the bases statement for control rod block instrumentation.
D. is plausible because this is the bases statement for control rod block instrumentation.

Question 11 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
System ID:	31827
User-Defined ID:	S86
Cross Reference Number:	NEW
Topic:	SRM TS Actions
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 2
Text Field:	ILO 2013 mc
Comments:	KA - Source Range Monitor - <b>Knowledge of less than or equal to one hour Technical Specification action statements for systems</b>

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

## **Question 11 Table-Item Links**

### NUREG 1123 KA Catalog Rev. 2

G2.2.39 3.9/4.5 Knowledge of less than one hour technical specification action statements for systems

215004 SRM System

### Technical Specifications

3.3.1.2 Source Range Monitor (SRM) Instrumentation

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

12

ID: S87

Points: 1.00

The plant has experienced a small break LOCA. The reactor is currently shut down. Reactor pressure is 944 psig and being controlled by the main turbine bypass valves. Reactor water level is 194 inches and being maintained by RCIC injecting at 250 gpm.

A foreign object becomes lodged in the oil pathway to the actuator for E51-F044, RCIC Turbine Governor Control Valve. How does the plant respond, and what action must be taken (if any)?

- A. Reactor water level decreases to Level 3. Start and inject with SBFW.
- B. Reactor water level increases to >214 inches, and RCIC shuts down. Verify E5150-F045 closed.
- C. Reactor water level decreases to Level 2, and HPCI automatically starts. Throttle HPCI to maintain level in band.
- D. Reactor water level increases to >214 inches. RCIC must be tripped manually to prevent filling the RPV solid.

Answer: B

## Answer Explanation

With control oil pressure available, the Turbine Control Valve (F044) can be throttled back from its normally full open position. This in turn controls the amount of steam delivered to the RCIC Turbine which controls turbine speed. A loss of control oil will result in the F044 going full OPEN. The SRO would have to enter 20.000.23, HIGH RPV WATER LEVEL. Action C, with RPV water level >214 inches, is to verify HPCI tripped, E5150-F045 closed and N2103-F001 closed.

A. is incorrect because level does not lower. Plausible because the action is required by EOP sheet 1, IAW table 1 sources.

C. is incorrect because level does not lower. HPCI will not start. Plausible because HPCI is a table 1 source on EOP sheet 1. The statement says to maintain level which would be to throttle injecting sources to maintain level in band.

D. is incorrect because E5150-F045 is the valve that closes on L8. The trip throttle valve does not trip to allow RCIC to 'restart' at L2 to control level. This is a plausible distractor because E5150-F044 trips on other signals.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 12 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
<hr/>	
System ID:	31828
User-Defined ID:	S87
Cross Reference Number:	NEW
<hr/>	
Topic:	RCIC Actions
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Ability to (a) predict the impacts of the following on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: <b>Loss of lube oil</b>

## Question 12 Table-Item Links

### Plant Procedures

23.206

29.100.01 SH 1

20.000.23

### NUREG 1123 KA Catalog Rev. 2

217000 A2.07 3.1/3.1 Loss of lube oil



# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

13

ID: S88

Points: 1.00

System Operating Procedure 23.201, Safety Relief Valves and Automatic Depressurization System, includes a precaution that states:

"If Suppression Pool average water temperature is  $\geq 95^{\circ}\text{F}$ , comply with Technical Specifications 3.6.2.1, Suppression Pool Average Temperature."

What is the basis for this limitation on Suppression Pool average temperature per Technical Specifications?

- A. To ensure adequate cooling of the core upon ECCS initiation.
- B. To ensure adequate net positive suction head for RHR pumps.
- C. To ensure peak primary containment pressures and temperatures do not exceed maximum allowable values post DBA.
- D. To ensure peak primary containment pressures and temperatures do not exceed maximum allowable values during an ATWS event.

Answer: C

## Answer Explanation

Per TS Bases: A limitation on the suppression pool average temperature is required to provide assurance that the containment conditions assumed for the safety analyses are met. This limitation subsequently ensures that peak primary containment pressures and temperatures do not exceed maximum allowable values during a postulated DBA or any transient resulting in heatup of the suppression pool.

A.is incorrect because the temperature of the torus cannot be high enough to be ineffective in maintaining the core 'cool'. It is plausible because the examinee may confuse the bulk temperature of the torus with the ability to provide adequate core cooling.

B.is incorrect because this is based on the RHR NPSH limit curve. This is plausible because it is partly determined by torus temperature

D. is incorrect because although this event will add a lot of heat to the suppression pool, it is not the DBA that the limit is based on per TS. It is plausible because it is one of the main reasons for having SRVs.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 13 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
<hr/>	
System ID:	32746
User-Defined ID:	S88
Cross Reference Number:	NEW
<hr/>	
Topic:	SRV P and L
Num Field 1:	LOK L
Num Field 2:	10 CFR 55.43(b) 2
Text Field:	ILO 2013 mc
Comments:	KA - ADS: <b>Ability to Explain and Apply System Limits and Precautions</b>

## Question 13 Table-Item Links

### Plant Procedures

TECH SPECS

23.201

BWROG EPGs Volume 1

### NUREG 1123 KA Catalog Rev. 2

G2.1.32 3.8/4.0 Ability to explain and apply system limits and precautions

218000 ADS

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

14

ID: S89

Points: 1.00

The reactor is operating at rated power when 1D61, SRV OPEN, alarms. Plant indications are as follows:

- Drywell pressure is 0.5 psig and steady.
- Torus temperature is 80°F and steady.
- Generator MW is 1143MWe and steady.

The operator dispatched to the Relay Room reports SRV tailpipe temperature indications are normal except for SRV "C", which is reading 230°F and steady.

(1) What is the status of SRV "C", and (2) what action(s) should be taken?

- A. (1) Open  
(2) Commence a rapid power reduction in accordance with 23.623, REACTOR MANUAL CONTROL SYSTEM.
- B. (1) Leaking  
(2) Evaluate plant shutdown to repair SRV in accordance with 22.000.03, POWER OPERATION 25% TO 100% TO 25%.
- C. (1) Open  
(2) Place the Mode Switch in SHUTDOWN, and perform 20.000.21, REACTOR SCRAM.
- D. (1) Leaking  
(2) Commence a rapid power reduction in accordance with 23.623, REACTOR MANUAL CONTROL SYSTEM.

Answer: B

## Answer Explanation

SRV tailpipe temperature of 230°F and steady indicates a very slowly rising temperature. Also, the temperature should read ~370°F for a stuck open SRV. ARP 1D61 has a note that says GE recommends lowering pressure to 200 psig to reseat the valve. A plant shutdown would have to occur for this to happen.

Plausible Distractors:

- A. is incorrect because SRV tailpipe temperature of 230°F and steady indicates a very slowly rising temperature. Also, the temperature should read ~370°F for a stuck open SRV. This is plausible because the SRV OPEN alarm is in. The examinee will have to determine the difference between a leaking SRV and a Stuck open SRV.
- C. is incorrect because SRV tailpipe temperature of 230°F and steady indicates a very slowly rising temperature. Also, the temperature should read ~370°F for a stuck open SRV. This is plausible because the SRV OPEN alarm is in. The examinee will have to determine the difference between a leaking SRV and a Stuck open SRV. The override statement in the AOP has the operator place the mode switch in SHUTDOWN if Torus temperature reaches 110°F, which makes this distractor plausible.
- D. is incorrect because this action is taken per the AOP if the SRV cannot be closed. The SRV is not OPEN; therefore this is the wrong action to take. It is plausible because the examinee may determine that a leaking SRV is the same as an OPEN SRV.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 14 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
<hr/>	
System ID:	32766
User-Defined ID:	S89
Cross Reference Number:	NEW
<hr/>	
Topic:	Leaking SRV
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.41(b )5
Text Field:	ILO 2013 mc
Comments:	KA - Ability to (a) predict the impacts of the following on the RELIEF/SAFETY VALVES; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: <b>Leaky SRV</b>

## Question 14 Table-Item Links

### Plant Procedures

01D61

20.000.25

### NUREG 1123 KA Catalog Rev. 2

239002 A2.02 3.1/3.2 Leaky SRV

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

15

ID: S90

Points: 1.00

The plant is operating at full power with Division 2 SGTS OUT OF SERVICE for maintenance. The following indications occur:

- 3D85, PRIMARY CONTAINMENT HIGH PRESS CHANNEL TRIP, alarms
- P50-R801, DIV 1 NIAS Header Pressure Recorder is reading 40 PSIG and degrading rapidly

Which ONE of the following describes the affect of these conditions, if any, and the Emergency Operating Procedure Leg required to mitigate the condition, if any?

- A. NO CHANGE IN DIFFERENTIAL PRESSURE between the Reactor Building and the environs, NO EOP usage is required.
- B. DECREASING DIFFERENTIAL PRESSURE between the Reactor Building and the environs, which would FIRST result in an Entry Condition for the Radiation Release Control EOP Leg.
- C. INCREASING DIFFERENTIAL PRESSURE between the Reactor Building and the environs, which would FIRST result in an Entry Condition for the Secondary Containment Control EOP Leg.
- D. DECREASING DIFFERENTIAL PRESSURE between the Reactor Building and the environs, which would First result in an Entry Condition for the Secondary Containment Control EOP Leg.

Answer: D

## Answer Explanation

High Drywell Pressure channel trip will cause RB HVAC to trip and isolate. Loss of DIV 1 NIAS will result in SGTS valve/dampers failing closed. With no SGTS Train in service, DECREASING D/P will be noted. The first EOP entry condition reached will be the Reactor Building D/P at 0 inches WC, which requires entry into the Secondary Containment EOP Leg.

A. is plausible, would be true if RB HVAC remained operating

B. is plausible, a high drywell pressure and unmonitored ground level release may eventually cause Rad release entry condition.

C. is plausible, would be true if SGTS operated at full capacity. RB HVAC trip would cause DP to lower until SGTS started.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 15 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
<hr/>	
System ID:	31846
User-Defined ID:	S90
Cross Reference Number:	315-0020-C011-001
<hr/>	
Topic:	LOCA - NIAS
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013
Comments:	KA - Ability to (a) predict the impacts of the following on the STANDBY GAS TREATMENT SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: <b>Plant air system failure</b>

## Question 15 Table-Item Links

### Plant Procedures

03D085

23.404

29.100.01 SH 5

### NUREG 1123 KA Catalog Rev. 2

261000 A2.09 2.4\*/2.6\* Plant air system failure

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

16

ID: S91

Points: 1.00

The plant is operating with the following steady state conditions:

- Reactor Power.....99%
- North RRMG speed.....72.94%
- South RRMG speed.....87.92%
- Loop A Jet Pump Flow.....44.2 Mlbm/hr
- Loop B Jet PumpFlow.....50.9 Mlbm/hr
- Total core flow.....95.1 Mlbm/hr

Based on these conditions, \_\_\_(1)\_\_\_ scoop tube(s) will be locked and the CRS will \_\_\_(2)\_\_\_.

- A. (1) both  
(2) enter 20.138.03, UNCONTROLLED RECIRC FLOW CHANGE, and trip the South RRMG
- B. (1) neither  
(2) enter 20.138.03, UNCONTROLLED RECIRC FLOW CHANGE, and trip the South RRMG
- C. (1) both  
(2) enter LCO for Recirc loops operating, and declare 'A' loop flow inoperable within 2 hours
- D. (1) neither  
(2) enter LCO for Recirc loops operating, and declare 'A' loop flow inoperable within 2 hours

Answer: D

## Answer Explanation

No condition exists to cause a scoop tube to lock. The correct answer is to enter the LCO based on meeting the entry criteria of recirculation jet pump recirculation loop flow mismatch  $\geq 5\%$  core flow difference with core flow  $\geq 70\%$  of rated core flow.

A. is incorrect because No condition exists to cause a scoop tube to lock. The scoop tube will lock if speed is  $>10\%$  from DEMAND. There is no scoop tube lock between loops. The uncontrolled recirc flow AOP directs tripping the affected MG is speed increased  $>10\%$  with an uncontrolled recirc flow change.

B. is incorrect because the uncontrolled recirc flow AOP directs tripping the affected MG is speed increased  $>10\%$  with an uncontrolled recirc flow change. There is no indication of this occurring.

C. is incorrect because No condition exists to cause a scoop tube to lock.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

Question 16 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	32586
User-Defined ID:	S91
Cross Reference Number:	NEW
Topic:	Recirc Flow Control
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Ability to (a) predict the impacts of the following on the RECIRCULATION FLOW CONTROL SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: <b>Recirculation pump speed mismatch between loops</b>

## Question 16 Table-Item Links

### Plant Procedures

20.138.01

23.138.01

### NUREG 1123 KA Catalog Rev. 2

202002 A2.04 3/3.2 Recirculation pump speed mismatch between loops: Plant-Specific

### Technical Specifications

3.4.1 Recirculation Loops Operating



# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

17

ID: S92

Points: 1.00

The plant is operating at 75% power with the North and South Condenser pumps running. The Center Condenser pump has been removed from service.

Later the following conditions exist:

- Normal and Emergency Hotwell supply pumps are running
- The normal and emergency condenser makeup level control valves are 100% open
- North condenser hotwell level is indicating 6 inches on IPCS and slowly lowering
- South condenser hotwell level is indicating 0 inches on IPCS and slowly lowering

Based on these indications:

- (1) What is the operating condition of the condenser pumps? **AND**
- (2) What action shall the CRS direct?
  - A. (1) North running and South tripped  
(2) Perform a rapid/emergency power reduction in accordance with 23.623, Reactor manual control system
  - B. (1) Both running  
(2) Perform a rapid/emergency power reduction in accordance with 23.623, Reactor manual control system
  - C. (1) Both tripped.  
(2) Place the mode switch in shutdown in accordance with 20.107.01, Loss of Feedwater or Feedwater Control
  - D. (1) North trips followed by south trip after a time delay.  
(2) Place the mode switch in shutdown in accordance with 20.107.01, Loss of Feedwater or Feedwater Control

Answer: C

## Answer Explanation

The low hotwell level trip requires the north and south hotwell instruments to be at or below 16 inches for the pump trip. The correct action is to place the mode switch in shutdown because the lowering level in the hotwell indicates that adequate pumping capacity is not available which satisfies the immediate action in the AOP.

A. is plausible because the examinee may believe that the pump trips on low condenser level is hotwell specific, and may believe the pumps trip at 0 inches in the associated hotwell.

B. is plausible because the examinee may know that both the north and south hotwell low level instruments are required for a pump trip but believe that the pumps trip at 0 inches in the hotwell. Performing a rapid power reduction would minimize the water demand and possibly recover hotwell level

D. is plausible because the examinee may believe pump trips are staggered and employ a time delay similar to HFPs.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 17 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
<hr/>	
System ID:	32986
User-Defined ID:	S92
Cross Reference Number:	NEW
<hr/>	
Topic:	Hotwell Level
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Ability to (a) predict the impacts of the following on the REACTOR CONDENSATE SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: <b>Low hotwell level</b>

## Question 17 Table-Item Links

### Plant Procedures

20.107.01

05D055

### NUREG 1123 KA Catalog Rev. 2

256000 A2.06 3.2/3.2 Low hotwell level

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

18

ID: S93

Points: 1.00

The following are current plant conditions:

- Reactor Power.....100%
- RPV Level .....186 inches (slowly lowering)
- North and South RFPT speed.....>5000 RPM
- All Condenser Pump current indicators.....Yellow and flashing
- 5D107, CONDENSATE SUPPLY HDR PRESSURE HIGH/LOW.....alarming
- 3D164, FEEDWATER CONTROL DCS TROUBLE.....alarming
- 3D156, REACTOR WATER LEVEL LOW.....alarming
- North and South Heater Drains Pumps.....in service
- Temperatures in the Reactor and Turbine Buildings.....normal

Based on these conditions, (1) what event has occurred, and (2) what operator action should be taken?

- A. (1) Both RFP minimum flow valves failed OPEN.  
(2) Isolate RFP minimum flow valves with their motor operated isolation valves.
- B. (1) RPV Startup LCV failed OPEN.  
(2) Place the RPV Startup LCV controller in manual, and set to 0% demand.
- C. (1) North Heater Drains Pump discharge valve drifted CLOSED.  
(2) Enter 20.107.01, LOSS OF FEEDWATER OR FEEDWATER CONTROL.
- D. (1) North Heater Drain Pump recirc line valve failed OPEN.  
(2) Manually initiate a Reactor Recirc runback.

Answer: A

## Answer Explanation

The conditions are indicative of RFP min flow valves failing open. MOP04 tells operators to take manual control to maintain control bands. The operators must isolate the min flow valves to prevent a Rx Scram on Low RPV level.

Per MOP04 2.3.3 Auto/Manual Control:

1. Automatic control is the preferred method, if available.
2. Manual control is required when any of the following apply:
  - a. Automatic control is unavailable.
  - b. Manual control is required to maintain control band

B. is incorrect because there would be very little to no flow through the highly restrictive flow path with the large bore FW injection valves open.

C. is incorrect because this condition would result in a small power transient due to loss of FW heating but one HDP is capable of maintaining flow to the RFPs.

D. is incorrect because this would have a negligible effect on RPV Water level.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 18 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
<hr/>	
System ID:	32606
User-Defined ID:	S93
Cross Reference Number:	NEW
<hr/>	
Topic:	RFP Min Flow Failure
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	<b>KA - Reactor Feedwater: 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</b>

## Question 18 Table-Item Links

### Plant Procedures

20.107.01

23.107

MOP04

### NUREG 1123 KA Catalog Rev. 2

G2.2.44 4 .2/4.4 Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions

259001 Reactor Feedwater System

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

19

ID: S94

Points: 1.00

The plant is running at rated power with all systems functioning normally. The Reactor Building Rounds Operator and CRDH System Engineer are briefing the CRS on an upcoming surveillance in the Control Room. The Shift Manager and STA are attending a meeting in the Plant Manager's office, and the CRNSO has left the Control Room to use the bathroom facilities.

Both RR MG Sets then trip. Before the P603 operator can place the Mode Switch in Shutdown, he collapses and is incapacitated.

What action must the CRS perform?

- A. Direct the Reactor Building Rounds Operator to perform 20.000.21, Reactor Scram.
- B. Wait for the CRNSO to return from the bathroom facilities, and direct him to place the Mode Switch in Shutdown.
- C. Direct the System Engineer to place the Mode Switch in Shutdown.
- D. Place the Mode Switch in Shutdown.

Answer: D

Answer Explanation	
MOP13, section 3.1.4.5, gives the CRS authority to manipulate controls in an emergency or when Control Room personnel are incapacitated. The CRNSO shall be kept informed of the actions taken. In non-emergency situations, the CRS shall confer with the CRNSO before taking such actions.	
A. This action is plausible because the operator is qualified at the site, but not licensed.	
B. This is plausible since the CRNSO is the other licensed RO in the Control Room.	
C. This is plausible because of the unusual circumstances and the perception that the CRS can order plant personnel to take action in the Control Room.	

Question 19 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	31926
User-Defined ID:	S94
Cross Reference Number:	NEW
Topic:	Conservative Actions
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	KA - Reactor water level response: <b>Knowledge of conservative decision making practices</b>

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

## **Question 19 Table-Item Links**

### Plant Procedures

20.138.01

MOP03 - Conduct Of Operations

### NUREG 1123 KA Catalog Rev. 2

G2.1.39 3.6/4.3 Knowledge of conservative decision making practices

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

20

ID: S95

Points: 1.00

After a **ONE WEEK VACATION**, a Nuclear Station Operator is scheduled to work the following schedule:

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
OFF	12 hrs	12 hrs	12 hrs	12 hrs	8 hrs	OFF

Per MGA 17, Working Hour Limits, which **ONE** of the following is the **MAXIMUM ADDITIONAL** hours this person can be scheduled to work **WITHOUT** exceeding any administrative limits?

- A. 4 hours on Tuesday
- B. 8 hours on Thursday
- C. 10 hours on Saturday
- D. 12 hours on Sunday

Answer: D

Answer Explanation
12 hours on Sunday, does NOT exceed 26 hours in a 48 hour period or 72 hours in a 7 day period.
A is plausible, but exceeds 26 hours in a 48 hour period.
B is plausible, but exceeds 26 hours in a 48 hour period.
C is plausible, it exceeds NO limit, is NOT the maximum.

Question 20 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	31167
User-Defined ID:	S95
Cross Reference Number:	802-4101-0015-008
Topic:	Work Hour Limits
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 2
Text Field:	ILO 2013
Comments:	KA - Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

## **Question 20 Table-Item Links**

### Plant Procedures

MGA17 - Working Hour Limits

### NUREG 1123 KA Catalog Rev. 2

G2.1.5 2.9/3.9 Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.



# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

21

ID: S96

Points: 1.00

The plant is operating at 50% power. What is (1) the **MAXIMUM** amount of **TOTAL** Reactor Coolant System Leakage allowed for continued plant operation, and (2) what action is required if this limit is exceeded?

- A. (1) 25 gpm  
(2) Verify source of leakage is not service sensitive type 304 or 316 austenitic stainless steel in 4 hours.
- B. (1) 5 gpm  
(2) Reduce leakage to within limits in 4 hours.
- C. (1) 25 gpm  
(2) Reduce leakage to within limits in 4 hours.
- D. (1) 5 gpm  
(2) Be in Mode 3 in 12 hours.

Answer: C

Answer Explanation
TS LCO 3.4.4.c limits TOTAL RCS Leakage to 25 gpm. If total leakage is not within the limit, TS requires leakage to be reduced within limits in 4 hours.
A is plausible - 25 gpm is the TOTAL RCS Leakage in 24 hours. The action is not proper for this limit.
B is plausible - 5 gpm is the Maximum UNIDENTIFIED Leakage. This action is proper for this limit.
D is plausible - 5 gpm is the Maximum UNIDENTIFIED Leakage. This action is proper for the time limit exceeded for TS 3.4.4 Condition A & B or if pressure boundary leakage exists.

Question 21 Info	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	31066
User-Defined ID:	S96
Cross Reference Number:	804-0012-A000-001
Topic:	Maximum Total Reactor Coolant System Leakage
Num Field 1:	LOK L
Num Field 2:	10 CFR 55.43(b) 6
Text Field:	ILO 2013
Comments:	KA - <b>Knowledge of conditions and limitations in the facility license</b>

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

## **Question 21 Table-Item Links**

NUREG 1123 KA Catalog Rev. 2

G2.2.38 3.6/4.5 Knowledge of conditions and limitations in the facility license

Technical Specifications

3.4.4 RCS Operational LEAKAGE

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

22

ID: S97

Points: 1.00

The plant is running at rated power with the HPCI system inoperable.

While performing 24.137.01, OPERABILITY OF 480V SWING BUS 72CF AUTOMATIC THROWOVER SCHEME, the throwover failed to occur when the Auto Throwover Permissive Test switch at Bus 72C, Position 1A was taken to CLOSE. The SRO has entered Tech Spec 3.0.3.

Maintenance personnel have submitted Form MMA26001, TROUBLESHOOTING DATASHEET, for approval with the following information:

- The Risk Category for the condition is considered 'HIGH'
- The troubleshooting boundary is Bus 72C, Position 1A cubicle plain
- A flashlight must break the cubicle plane to perform an adequate visual inspection based on orientation

Based on the information given, what is the LOWEST level of approval required? (**See attached MMA26, Enc. C.**)

- A. Control Room NSO
- B. Control Room Supervisor
- C. Maintenance Manager
- D. Troubleshooting Team Lead

Answer: B

## Answer Explanation

MMA26 Enclosure C designates this activity to be 'Category C' based on it being 'High Risk' and the Rigor Matrix. The Rigor Matrix allows Category C based on Visual Inspection **with** barrier intrusion. Category C can be approved by an SRO.

A. The Control Room NSO CAN NOT approve the Troubleshooting data sheet. They are only required to be RO licensed.

C. The Maintenance Manager CAN approve the Troubleshooting data sheet, but they are not the LOWEST level. MM approval is required for Categories A/B.

D. The Troubleshooting Team Lead does not have approval authority.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 22 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
<hr/>	
System ID:	32646
User-Defined ID:	S97
Cross Reference Number:	NEW
<hr/>	
Topic:	Troubleshooting - TS issue
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013 mc
Comments:	<b>KA - Knowledge of the process for managing troubleshooting activities</b>  <b>NOTE:</b> MMA26 Enclosure C, Page 3 of 5 must be provided to examinees.

## Question 22 Table-Item Links

### Plant Procedures

TECH SPECS

MMA26 - Troubleshooting

### NUREG 1123 KA Catalog Rev. 2

G2.2.20 2.6/3.8 Knowledge of the process for managing troubleshooting activities

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

23

ID: S98

Points: 1.00

Following a transient in which RPV level dropped below the top of active fuel (TAF), plant conditions are as follows:

- RPV level is being controlled at 197 inches.
- **ALL** Control Rods are inserted.
- Containment Venting is being performed to maintain Torus Pressure below the Primary Containment Pressure Limit.
- Containment High Range Radiation Monitors indicate 3000 R/hr, 20 minutes after the scram.

In accordance with EP-101, which **ONE** of the following Emergency Action Levels is appropriate based solely on Fission Product Barrier Degradation? (**See attached EP-101, Enc. B.**)

- A. Unusual Event FU1 - Any Loss **OR** Any Potential Loss of Primary Containment.
- B. Alert FA1 - Any Loss **OR** Any Potential Loss of **EITHER** Fuel Clad **OR** Reactor Coolant System.
- C. Site Area Emergency FS1 - Loss **OR** Potential Loss of Any Two Barriers.
- D. General Emergency FG1 - Loss of Any Two Barriers **AND** Potential Loss of Third Barrier

Answer: D

## Answer Explanation

CHRRMS is an indication of Fuel Clad breach, and Venting due to approaching PCPL is RCS and CT Barrier breach. This question is conceptual on FP Barriers.

A is plausible if candidate cannot associate venting irrespective of release rates with CT failure.  
B is plausible if candidate cannot associate CHRRM indication with fuel failure **OR** Containment Pressure with RCS failure **OR** associate venting irrespective of release rates with CT failure.  
C is plausible if candidate cannot associate CHRRM indication with fuel failure and Containment Pressure with RCS failure.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 23 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	5
Difficulty:	3.00
<hr/>	
System ID:	31046
User-Defined ID:	S98
Cross Reference Number:	832-0001-0004-004
<hr/>	
Topic:	EAL for Fission Product Barrier Degradation
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 4
Text Field:	ILO 2013
Comments:	<b>KA - Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.</b>  Provide EP-101 Enc. B

## Question 23 Table-Item Links

### Plant Procedures

EP-101

### NUREG 1123 KA Catalog Rev. 2

G2.3.14 3.4/3.8 Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

24

ID: S99

Points: 1.00

You are the Shift Manager with the plant operating at rated conditions. An accident occurs on the Refuel Floor resulting in the following conditions:

- An **ALERT** has been declared due to damage to irradiated fuel and the loss of water level in the fuel pool.
- The TSC is being staffed, however command and control has **NOT** been transferred from the Main Control Room.
- A worker has been injured during the accident, has been verified to be located on the refuel bridge, and has a high probability of survival if promptly treated for the injuries.
- You have been requested to authorize an exposure of 22 Rem TEDE for two workers who have volunteered to rescue the injured person.
- Rad Protection management personnel have reviewed the situation and recommend rescuing the injured worker.
- The emergency workers have been properly briefed, have acknowledged that they have volunteered and understand the associated risks, and are waiting in the Reactor Building for authorization to rescue the injured person.

Which of the following statements is correct regarding your authorization of the request in compliance with EP-201-03, Variances from Routine Radiological Practice and Procedures During an Emergency?

- A. You **can** authorize the request because command and control has not been transferred to the TSC.
- B. You **can** authorize the request **ONLY** after obtaining approval from the Plant Manager because command and control has not been transferred to the TSC and Plant Manager concurrence is required.
- C. You **cannot** authorize the request because approval can only be granted by the Radiation Protection Advisor and may not be delegated.
- D. You **cannot** authorize the request because the emergency workers will exceed the maximum allowable Emergency Exposure limit of 10 Rem TEDE.

Answer: A

## Answer Explanation

This condition meets all of the requirements of EP-201-03 step 6.2.1.4.

B is plausible, but Plant Manager approval is not required and would only delay the authorization.

C is plausible, but RPA approval is not required in this instance, Emergency Director authorization is sufficient.

D is plausible, but 10 Rem TEDE is allowed to (per EP-201-03) to mitigate an accident or protect valuable property.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 24 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
<hr/>	
System ID:	31026
User-Defined ID:	S99
Cross Reference Number:	838-0001-0002-004
<hr/>	
Topic:	Authorize exposure to rescue injured worker
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 4
Text Field:	ILO 2013
Comments:	<b>KA - Knowledge of radiation exposure limits under normal or emergency conditions.</b>

## **Question 24 Table-Item Links**

### Plant Procedures

EP-201-03

### NUREG 1123 KA Catalog Rev. 2

G2.3.4 3.2/3.7 Knowledge of radiation exposure limits under normal and emergency conditions



# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

25

ID: S100

Points: 1.00

The following conditions exist one (1) hour after a Loss of Coolant Accident:

- Drywell pressure.....56 psig (rising)
- Torus pressure.....55 psig (rising)
- Drywell oxygen.....5% (rising)
- Drywell hydrogen.....5% (rising)
- CHRRM reading.....9.1 E4
- RPV level.....12 inches (stable)
- RPV pressure.....100 psig (decreasing slowly through an unisolable leak)

After the initial recommendation, which of the following Protective Action Recommendations should be made? (Assume **NO** dangerous travel conditions or short, controlled release.) (**See attached EP-545, Enc. A, and EP-547, Enc. A & B.**)

- A. Evacuate All Areas.
- B. Evacuate Area 1, **and** evacuate downwind affected areas to 5 miles.
- C. Evacuate Areas 1, 2, and 3, **and** evacuate downwind affected areas to 10 miles.
- D. Evacuate Area 1, **and** evacuate downwind affected areas to 5 miles, **and** evacuate remainder of 10 mile EPZ when initial evacuation is complete.

Answer: D

## Answer Explanation

Current CHRRM reading indicates >100% Gap Activity (per EP-547, Enc. B.) Using EP-545, Enc. A, correct PAR is Evacuate Area 1, **and** evacuate downwind affected areas to 5 miles, **and** evacuate remainder of 10 mile EPZ when initial evacuation is complete. A, B, & C are plausible, but incorrect since they assume <100% gap activity.

# EXAMINATION ANSWER KEY

2013 ILO NRC - SRO

<b>Question 25 Info</b>	
Question Type:	Multiple Choice
Status:	Active
Always select on test?	Yes
Authorized for practice?	No
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
<hr/>	
System ID:	31007
User-Defined ID:	S100
Cross Reference Number:	832-0001-0016-002
<hr/>	
Topic:	Provide Protective Action Recommendations
Num Field 1:	LOK H
Num Field 2:	10 CFR 55.43(b) 5
Text Field:	ILO 2013
Comments:	<b>KA - Knowledge of emergency plan protective action recommendations.</b>  <b>Provide the following references to examinee:</b> <b>EP-545, Enc. A</b> <b>EP-547, Enc. A &amp; B</b>

## Question 25 Table-Item Links

### Plant Procedures

EP-545

EP-547

### NUREG 1123 KA Catalog Rev. 2

G2.4.44 2.4/4.4 Knowledge of emergency plan protective action recommendations