

Given the following conditions:

- The BOP operator reports a degrading vacuum in the main condenser.
- The CRS has entered 40AO-9ZZ07, Loss of Condenser Vacuum.

Subsequently

- The Reactor is tripped due to the degrading vacuum.
- Alarm window 6A16B, SBCS COND INTLK, has annunciated.
- Alarm window 6A16D, COND VAC LO has annunciated.
- Condenser backpressure is 14.0" HgA (all shells).

What actions are required to control the listed secondary parameters?

Steam Generator level can be maintained by (1)

RCS temperature can be maintained by (2)

- A. (1) AFW only (2) ADVs only
- B. (1) AFW or MFW (2) ADVs only
- C. (1) AFW only (2) ADVs or SBCVs
- D. (1) AFW or MFW (2) ADVs or SBCVs

Answer: C

<b>Justification:</b>		
A	Wrong	AFW is correct but SBCVs 7 and 8 are not effected by the interlock since they go to atmosphere
B	Wrong	MFW trips at 13.5 inches
C	<b>Correct</b>	<b>MFW turbine trips at 13.5 inches and Tcold can be controlled by either SBCVs 7 &amp; 8 or ADVs.</b>
D	Wrong	MFW pump turbine trips at 13.5 inches.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO02, Rx Trip / 40AO-9ZZ07, Loss of Condenser Vacuum</p> <p><b>K&amp;A:</b> 4.4 E02 EK1.3: Knowledge of the operational implications of the following concepts as they apply to the (Reactor Trip Recovery): Annunciators and conditions indicating signals, and remedial actions associated with the (Reactor Trip Recovery).</p>		

<b>Question 1 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44120
User-Defined ID:	Q44120
Topic:	Q44120 Describe what components are impacted as backpressure rises.
RO:	3.0
SRO:	3.4
KA#:	4.4 E02 EK1.3
<b>Revision:</b>	<b><i>10/4/2013 rev: 1: In Given Conditions, changed "(highest shell)" to "(all shells)" to match VISION.</i></b>

### **Question 1 Table-Item Links**

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe what components are impacted as backpressure rises.

Given the following conditions:

- PZR pressure is 1345 psia and slowly lowering.
- PZR level is 60% and slowly rising.
- RCS temperature is 562°F and stable.
- SIAS/CIAS/MSIS have been manually actuated on trend.
- RCPs 1A and 2A were stopped as directed by the Standard Post Trip Actions.
- Containment pressure is 2.8 psig and slowly rising.
- Containment temperature is 140°F and slowly rising.
- HPSI train "A" valves have been throttled.
- RDT pressure is 2.8 psig and rising.

The event in progress is a \_(1)\_ and the crew must \_(2)\_ .

- A. (1) RCS cold leg break  
(2) stop the 1B and 2B RCPs and raise HPSI flow
- B. (1) RCS cold leg break  
(2) throttle HPSI train "B" valves to control pressurizer level
- C. (1) Pressurizer steam space leak  
(2) stop the 1B and 2B RCPs and raise HPSI flow
- D. (1) Pressurizer steam space leak  
(2) throttle HPSI train "B" valves to control pressurizer level

Answer: C

<b>Justification:</b>		
<b>A</b>	Wrong	A LOCA is occurring but it is through the Pzr not a cold leg. Stopping the RCPs and raising HPSI flow is correct for the loss of subcooling margin, ~21°F. RCS cold leg break is credible because lowering PZR pressure (1 <sup>st</sup> bullet), manual initiation of SIAS/CIAS/MSIS (4 <sup>th</sup> bullet), increasing CNTMT pressure (6 <sup>th</sup> bullet), and increasing CNTMT temperature (7 <sup>th</sup> bullet) support this diagnosis.
<b>B</b>	Wrong	A LOCA is occurring but it is through the Pzr not a cold leg. May think that throttling HPSI is correct since Pzr level is raising. RCS cold leg break is credible because lowering PZR pressure (1 <sup>st</sup> bullet), manual initiation of SIAS/CIAS/MSIS (4 <sup>th</sup> bullet), increasing CNTMT pressure (6 <sup>th</sup> bullet), and increasing CNTMT temperature (7 <sup>th</sup> bullet) support this diagnosis.
<b>C</b>	Correct	<b>The event in progress is a Pzr Steam space leak as indicated by increasing Pzr and RDT levels with increasing containment temps and pressure. Stopping the RCPs and raising HPSI flow is correct for the loss of subcooling margin, ~21°F.</b>
<b>D</b>	Wrong	The event in progress is a Pzr Steam space leak as indicated by increasing Pzr and RDT levels with increasing containment temps and pressure. May think that throttling HPSI is correct since Pzr level is raising.
<p><b>Proposed reference to be provided to applicant during examination: Steam Tables</b></p>		

**Technical Reference:** 40EP-9EO03, LOCA

**K&A:** 4.2 008 AA2.30: Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Inadequate core cooling

<b>Question 2 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44136
User-Defined ID:	Q44136
Topic:	Q44136 determine Inadequate Core Cooling during a Pzr vapor space leak
RO:	4.3
SRO:	4.7
KA#:	4.2 008 AA2.30
<b>Revision</b>	<b>09/27/2013 rev: 1: Added additional Justification for Choices A &amp; B to support credibility of an RCS cold leg break.</b>

### **Question 2 Table-Item Links**

#### Q - 10CFR Sections

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

**Associated objective(s):**

analyze the data to determine the status of the PZR safety valve

Given the following conditions:

- Unit 1 is operating 100% power.
- A 5.0 gpm RCS leak has developed.

When using the ERFDADS Leakrate Program to monitor leakrate, indicated leakrate will be....

- A. less than actual leakrate for at least 7.5 minutes.
- B. less than actual leakrate for at least 15 minutes.
- C. greater than actual leakrate for at least 7.5 minutes.
- D. greater than actual leakrate for at least 15 minutes.

Answer: A

Justification:		
A	Correct	Leakrate will take 7.5 minutes to reach and stabilize at the current leakrate if examinee does not understand the process they may think it works like the algorithm which goes high then comes down to the actual leakrate.
C	Wrong	Leakrate will take 7.5 minutes to reach and stabilize at the current leakrate
B	Wrong	Examinee may choose the 15 minute distracter since is the procedural guidance on how long to let the program run before reporting leakrate.
D	Wrong	
<p><b>Proposed reference to be provided to applicant during examination:</b> NONE</p> <p><b>Technical Reference:</b> 40AO-9ZZ02, Excessive RCS Leakrate / LOIT Lesson Plan</p> <p><b>K&amp;A:</b> 2.1.19: Ability to use plant computers to evaluate system or component status. Small Break LOCA</p>		

<b>Question 3 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	8249
User-Defined ID:	Q15781
LP Number	
Topic:	Q15781 ERFDADS Leakrate Program
RO	3.9
SRO	3.8
KA #	2.1.19
<b>Revision</b>	<b>2/22/13 rev: 0</b>

### **Question 3 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### A / O / P / Q Procedure used by Operations Training

EXCESSIVE RCS LEAKRATE

#### A / O / P / Q - System Designations for Operations Training

ERFDADS

#### Q - Cognitive Level

Memory

#### Q - Question Source

PV Bank Not Modified

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe the use of ERFDADS to Evaluate Reactor Coolant System Leakage.

Interpret the ERFDADS Leakrate data,

Given the following conditions:

- Unit 1 automatically tripped from 100% power.
  - RCS T-cold is 558°F and slowly lowering.
1. Which ONE of the following would be the **first** to satisfy an Entry Condition for 40EP-9EO03, Loss of Coolant Accident?
    - A.
      1. Pressurizer pressure is 1820 psia.
      2. Immediately trip all 4 RCPs if not already secured.
    - B.
      1. Pressurizer pressure is 1847 psia.
      2. Immediately trip all 4 RCPs if not already secured.
    - C.
      1. Pressurizer pressure is 1820 psia.
      2. Check that SIAS is actuated.
    - D.
      1. Pressurizer pressure is 1847 psia.
      2. Check that SIAS is actuated.

Answer: C

<b>Justification:</b>		
A	Wrong	Part 2 is wrong the trip 2/ Leave 2 should be used but the requirements to trip 4 RCPS (< 24°F or CS flow) have not been met. Plausible because part 1 is correct and securing 4 RCPs criteria is identified in the LOCA procedure.
B	Wrong	Part 1 is wrong because this is above the automatic SIAS setpoint of 1837 psia. Part 2 is wrong the trip 2/ Leave 2 should be used but the requirements to trip 4 RCPS (< 24°F or CS flow) have not been met. Plausible because part 1 is similar to the actual SIAS setpoint of 1837 psia and securing 4 RCPs criteria is identified in the LOCA procedure.
C	Correct	<p><b>1820 psia is below the SIAS automatic setpoint of 1837 psia for LOCA entry.</b></p> <p>Per 40EP-9EO03:</p> <p><b>1.0 ENTRY CONDITIONS</b></p> <p>1. The Standard Post Trip Actions have been performed. or <b>BOTH</b> of the following conditions exist:</p> <ul style="list-style-type: none"> <li>• A LOCA initiated from Mode 3 or Mode 4</li> <li>• LTOP is <b>NOT</b> in service and</li> </ul> <p>2. Plant conditions indicate that a Loss of Coolant Accident has occurred. <b>ANY</b> or all of the following may be present:</p> <ul style="list-style-type: none"> <li>• Pressurizer level low (for a break in the pressurizer, the level may be high)</li> <li>• SIAS automatically actuated</li> <li>• Rise in containment pressure, temperature, radiation, humidity, and level</li> <li>• High Reactor Drain Tank level, temperature, or pressure</li> </ul>



		The action is consistent with Step 4 of 40EP-9EO03:  <b>IF</b> pressurizer pressure drops to the SIAS setpoint, <b>THEN</b> check that SIAS is actuated.
D	Wrong	Part 1 is wrong because this is above the automatic SIAS setpoint of 1837 psia. Plausible because part 1 is similar to the actual SIAS setpoint of 1837 psia. Also plausible because Part 2 is correct.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO03, LOCA / 40DP-9AP08, LOCA Tech Guide</p> <p><b>K&amp;A:</b> 4.1 009 2.4.1: Knowledge of EOP entry conditions and immediate action steps. Large Break LOCA</p>		

<b>Question 4 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44170
User-Defined ID:	Q44170
Topic:	Q44170 EOP LOCA Entry condition
RO:	4.6
SRO:	4.8
KA #:	4.1 009 2.4.1
<b>Revision:</b>	<b>10/08/2013 rev: 2</b> <b>Replaces Q7641</b> <b>10/09/2013 Rev 3: revised question to simplify which Entry Condition to evaluate. Included "the first" in the stem to avoid subset issues.</b>

## **Question 4 Table-Item Links**

### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

### Q - Cognitive Level

Comprehension / Anal

### Q - Question Source

New

### O - RO Tier Group Designations

Tier 1 Group 1

### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

analyze whether or not entry into the LOCA EOP is appropriate

Given the following conditions:

- Unit 1 was manually tripped from 100% power
- All 4 RCPs were secured due to a loss of Nuclear Cooling Water.

Assuming no additional Operator actions, which one of the following represents the operational implications of this condition?

- A. Low Tave will require manual control of SBCS due to Quick Open block being generated
- B. High Tave will require manual control of the SBCS due to overcooling if left in automatic control
- C. Low Tave will require manual Feedwater control due to the low Refill demand while in Reactor Trip Override
- D. High Tave will require manual Feedwater control due to the high Refill demand while in Reactor Trip Override

Answer: D

<b>Justification:</b>		
A	Wrong	Group X QO block would be generated if Tave is < 573.5 degrees. Quick Open is blocked on low Tave. Both parts are wrong.
B	Wrong	Tave will go high but SBCS operates on Tcold which will be maintained on program
C	Wrong	Low temp would cause low refill demand but in this case Tave goes high
D	<b>Correct</b>	<b>With a constant Tcold, That will elevate when Natl Circ is being established higher than normal Tave will cause RTO to feed excessively requiring Oper to take manual control of Downcomers.</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ16, RRS Malfunctions / LOIT Lesson Plan</p> <p><b>K&amp;A:</b> 4.2 015/017 AK1.01: Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): Natural circulation in a nuclear reactor power plant</p>		

<b>Question 5 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	10334
User-Defined ID:	Q10334
LP Number:	L10435
Topic:	Q10334 Effects of Nat'l Circ on FWCS/SBCS
RO	4.4
SRO	4.6
KA#	4.2 015/017 AK1.01
<b>Revision</b>	<b>2/22/13 rev: 0</b>

### **Question 5 Table-Item Links**

#### Q - 10CFR Sections

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2007

RO Exam 2013

#### **Associated objective(s):**

Effects of RCP shutdown on T-ave

Given the following conditions:

Initial Conditions:

- Unit 1 is in Mode 5.
- RCS level is 103 feet 6 inches.
- RCS temperature is 140°F.
- LPSI pump B is providing Shutdown Cooling flow at 4500 gpm.

Current Conditions:

- RCS level has slowly dropped to 102 feet 8 inches.
- LPSI pump B amps are oscillating.
- Shutdown Cooling flow is oscillating.

Which ONE of the following actions is directed by the Lower Mode Functional Recovery Procedure?

- A. Run LPSI and CS pumps in parallel to lower RCS temperature.
- B. Reduce LPSI pump B flow to minimize vortexing at the pump suction.
- C. Shift SDC to CS pump B due to its lower suction pressure requirements.
- D. Place LPSI pump A in service and vent the B SDC train to remove entrapped gases.

Answer: B

<b>Justification:</b>		
A	Wrong	This may help lower temperature eventually but would further lower LPSI pump suction pressure
B	<b>Correct</b>	<b>Reducing flow would increase LPSI pump suction pressure and reduce vortexing and is directed by HR-2</b>
C	Wrong	CS pump B has higher pressure and temperature requirements when placed on SDC. Examinee may confuse this with lower suction pressure requirements
D	Wrong	This may be done eventually but with lowering level it is not directed to swap train until the reason for the lowering level is determined
<p><b>Proposed reference to be provided to applicant during examination:</b> NONE</p> <p><b>Technical Reference:</b> 40EP-9EO11, LMFRP / 40AL-9RK2B, B02 Alarm Response</p> <p><b>K&amp;A:</b> 4.2 025 AA1.03: Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: LPI pumps</p>		

<b>Question 6 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	22463
User-Defined ID:	Q22463
Topic:	Q22463 Knowledge of LMFRP initial steps for loss of SDC
RO:	3.3
SRO:	3.4
KA #	4.2 025 AA1.03
<b>Revision</b>	<b>2/25/13 rev: 0</b>

### **Question 6 Table-Item Links**

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2008

RO Exam 2013

#### **Associated objective(s):**

outline the major steps used to control Core and RCS heat removal in HR (LMFRP)

Given the following conditions:

- Unit 1 had been operating at 100% power.
- A manual reactor trip was initiated due to lowering pressurizer level and pressure.
- Standard Post Trip Actions are being performed.
- No manual operator actions have been taken.
- All 8 RCP "LO NCW FLOW" alarm windows on B04 have actuated.

Which ONE of the following conditions would have caused these alarms?

- A. 8.5 psig in containment.
- B. 1837 psia in the pressurizer.
- C. Refueling Water Tank level has lowered to 9.4%.
- D. High alarm on RU-6 (Nuclear Cooling Water radiation monitor).

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<b>NCW valves isolate on CSAS signal 8.5 psig in containment</b>
B	Wrong	1837 psia initiates a SIAS/CIAS – starting SI pumps and closing Containment Isolation valves
C	Wrong	9.4 % initiates RAS which stops LPSI pumps and closes SI miniflow valves
D	Wrong	This alarm is associated with RCS leakage into the NCW system via RCP Cooling. Examinee could believe that this RU has auto actions as some others like RU-29/30 (CREFAS), RU-31/145 (FBEVAS) and RU-141 (thru filter mode).
<p><b>Proposed reference to be provided to applicant during examination:</b> NONE</p> <p><b>Technical Reference:</b> 40EP-9EO03, LOCA</p> <p><b>K&amp;A:</b> 4.2 026 AK3.02: Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS</p>		

<b>Question 7 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44036
User-Defined ID:	Q44036
Comments	
Topic:	Q44036 automatic features associated with the NC Containment Isolation Valves.
RO	3.6
SRO	3.9
KA #	4.2 026 AK3.02
<b>Revision</b>	<b>2/26/13 rev: 0</b>

### **Question 7 Table-Item Links**

#### Q - 10CFR Sections

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe the automatic features associated with the NC Containment Isolation Valves.



Given the following initial conditions:

- Unit 1 is operating at 100% power.
- Pressurizer pressure is 2250 psia and stable.
- Pressure Master Controller, RCN-PIC-100, output is currently 16%

Subsequently:

- Pressure Master Controller, RCN-PIC-100, slowly fails to 100% output.

Main spray valves, RC-100E and RC-100F will respond by going from full...

- A. closed at 33% output to full open at 50% output.
- B. open at 33% output to full closed at 50% output.
- C. closed at 50% output to full open at 100% output.
- D. open at 50% output to full closed at 100% output.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<b>PPCS operates from 33 to 50% output for spray control -- closed to open</b>
B	Wrong	This controller is reverse acting such that more output lowers RCS pressure. Because it controls both the spray and heater output, it is plausible that with a greater output spray valves could be going closed
C	Wrong	Controller range is 0 – 50% output but the controller output uses the entire range of 0 – 100% making C and D plausible.
D	Wrong	
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> Operator Information Manual / LOIT Lesson Plan</p> <p><b>K&amp;A:</b> 4.2 027 AK2.03: Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Controllers and positioners</p>		

<b>Question 8 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44156
User-Defined ID:	Q44156
Topic:	Q44156 PPCS controller failure
RO:	2.6
SRO:	2.8
KA#:	4.2 027 AK2.03
<b>Revision:</b>	<b>10/01/2013 rev: 1 Replaces Q5820. This is the 1<sup>st</sup> submittal of this question.</b>

### **Question 8 Table-Item Links**

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe the Control Room controls associated with the Pressurizer Pressure Master Controller including it's indications.

Given the following conditions:

- Unit 1 is operating at 100% power.
- RCP 1A has tripped.
- All 4 PPS channels SG-1 "LO FLOW" have actuated.
- Leg 1-3 phase current lights are extinguished.
- Leg 2-4 phase current lights are illuminated.

Which ONE of the following is correct regarding the status of the Reactor Trip Switchgear (RTSG) breakers and actions to trip the reactor?

- A. At least one RTSG breaker has opened and only NGN-L10 must be tripped to de-energize the CEDMCS bus.
- B. At least one RTSG breaker has opened and both NGN-L03 and L10 must be tripped to de-energize the CEDMCS bus.
- C. At least two RTSG breakers have opened and only NGN-L10 must be tripped to de-energize the CEDMCS bus.
- D. At least two RTSG breakers have opened and both NGN-L03 and L10 must be tripped to de-energize the CEDMCS bus.

Answer: B

<b>Justification:</b>		
A	Wrong	One RTSG breaker is correct but if the examinee applies electric bus logic they may believe that L03 supplies the A/C train and L10 supplies the B/D train.
B	<b>Correct</b>	<b>This light would be out with either the B or D RTSG being tripped and both L03 and L10 must be tripped to de-energize the CEDMCS bus.</b>
C	Wrong	Due to the setup of the RTSG breakers one phase current light out only ensures that one RTSG breaker has opened in the extinguished loop. The examinee may associate the phase light with both breakers being tripped.
D	Wrong	
<p><b>Proposed reference to be provided to applicant during examination:</b> NONE</p> <p><b>Technical Reference:</b> Operator Information Manual, pg 46</p> <p><b>K&amp;A:</b> 4.1 029 EA1.12: Ability to operate and monitor the following as they apply to a ATWS: M/G set power supply and reactor trip breakers</p>		

<b>Question 9 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	44037
User-Defined ID:	Q44037
Cross Reference Number:	
Topic:	Q44037 Ability to operate RTSG breakers and MG pwr supplies during ATWS conditions
RO	4.1
SRO	4.0
KA #	4.1 029 EA1.12

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

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Given a reactor trip describe the EOP expectation concerning the operation of the input breakers for L03 and L10

Following a reactor trip Unit 1 has the following conditions:

- Pressurizer pressure is 1600 psia and increasing.
- PZR level is 28% and increasing.
- Containment pressure is 0.3 psig and stable.
- SG #1 pressure is 1090 psia and stable.
- SG #2 pressure is 1100 psia and stable.
- SG #1 level is 70% WR and rising.
- SG #2 level is 60% WR and stable.
- RCS T-cold is 560°F and slowly lowering.
- Containment temperature is 90°F and stable.
- HPSI flow is 150 gpm to each loop.
- SIAS/CIAS have initiated.

The CRS has come to the step in the Emergency Operating Procedure regarding throttling HPSI flow and finds the following:

**CAUTION**

Throttling HPSI injection valves will cause erosion damage to downstream piping

The correct mitigating EOP for these conditions is \_(1)\_ and throttling HPSI injection valves to lower HPSI flow \_(2)\_.

- A. (1) LOCA (2) is permitted but should be avoided.
- B. (1) SGTR (2) is permitted but should be avoided.
- C. (1) LOCA (2) is only permitted by fully closing the HPSI valves.
- D. (1) SGTR (2) is only permitted by fully closing the HPSI valves.

Answer: B

<b>Justification:</b>		
A	Wrong	NO change in Cntmt parameters = not a LOCA
B	<b>Correct</b>	<b>Full closed is preferred but throttling is permitted based on plant conditions</b>
C	Wrong	NO change in Cntmt parameters = not a LOCA
D	Wrong	The tech guide states that throttling is permitted based on plant conditions
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40DP- 9AP09, SGTR Tech Guide / 40EP-9EO04, SGTR</p> <p><b>K&amp;A:</b> 038 2.4.20: Knowledge of the operational implications of EOP warnings, cautions, and notes. Steam Generator Tube Rupture</p>		

<b>Question 10 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44121
User-Defined ID:	Q44121
Topic:	Q44121 use of cautions and notes in the EOPs. (HPSI Injection)
RO:	3.8
SRO:	4.3
KA#:	038 2.4.20
<b>Revision:</b>	<b>7/19/2013 rev: 0</b>

### **Question 10 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

describe the SGTR EOP mitigation strategy

Given the following conditions:

- Unit 1 tripped from 100% power.
- SIAS/CIAS and AFAS-1 have automatically initiated.
- Steam Generator #1 pressure is 745 psia and lowering.
- Steam Generator #1 level is 8% WR and lowering.
- Steam Generator #2 pressure is 760 psia and lowering.
- Steam Generator #2 level is 30% WR and lowering.
- Auxiliary feedwater flow is 1800 gpm to steam generator #1.
- Auxiliary feedwater flow is 0 gpm to steam generator #2.

Which ONE of the following is the correct condition and proper Operator actions?

- A. MSIS has failed. Initiate a manual MSIS immediately.
- B. AFAS-2 has failed. Initiate a manual AFAS-2 immediately.
- C. MSIS has failed. Obtain CRS permission, then immediately initiate an MSIS.
- D. AFAS-2 has failed. Obtain CRS permission, then immediately initiate an AFAS-2.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<b>MSIS setpoint of 955 psia has been exceeded the operator is required to initiate ESFAS actions that have failed. Initiation of failed automatic emergency systems is a license requirement for Reactor Operators.</b>
B	Wrong	AFAS setpoint of 25% WR has not been exceeded
C	Wrong	MSIS setpoint of 955 psia has been exceeded the operator is required to initiate ESFAS actions that have failed not wait for CRS permission.
D	Wrong	AFAS setpoint of 25% WR has not been exceeded
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO05, ESD / Tech Specs</p> <p><b>K&amp;A:</b> 4.4 E05 EA2.2: Ability to determine and interpret the following as they apply to the (Excess Steam Demand): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.</p>		

<b>Question 11 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44039
User-Defined ID:	Q44039
Topic:	Q44039 Adherence to procedures and license requirement during an ESD event
Num Field 1:	3.4
Num Field 2:	4.2
Text Field:	4.4 E05 EA2.2
<b>Revision</b>	<b>9/27/13 rev: 1: Added "Initiation of failed automatic emergency systems is a license requirement for Reactor Operators." To Justification for Choice A to better tie the question to the K/A.</b>

### Question 11 Table-Item Links

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

describe the mitigating strategy outlined in the ESD EOP



Given the following conditions:

- Unit 1 has tripped from 100% power.
- An inadvertent "A" train SIAS occurred following the trip.
- The CRS has diagnosed a LOAF (Loss of all Feed).
- The CRS directs you to start AFN-P01, Start-Up Aux Feedpump.
- AFN-P01 suction valves CTN-HV-1 and 4 are both open.
- You have gone to "START" one time using its handswitch (AFN-HS-11).

Which ONE of the following is correct, AFN-P01 is ...

- A. running and feeding both Steam Generators.
- B. running but not feeding either Steam Generator.
- C. not running, AFN-P01 can be started by going to "STOP" then "START".
- D. not running, AFN-P01 can be started by going to "START" one more time.

Answer: C

<b>Justification:</b>		
A	Wrong	This would be the option normally; this pump has no auto start feature so going to start is plausible answer. Will not start due to the SIAS actuation blocking the starting circuit.
B	Wrong	
C	<b>Correct</b>	<b>Going to stop will pick up the SIAS OR then going to start again will start the pump.</b>
D	Wrong	This would be the correct action for resetting an 86 lockout condition so the examinee may choose this option.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> LOIT lesson plan / 01-E-AFB-002. AFN-P01 electrical print</p> <p><b>K&amp;A:</b> 4.4 E06 EK2.1: Knowledge of the interrelations between the (Loss of Feedwater) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.</p>		

<b>Question 12 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	8390
User-Defined ID:	Q21227
Topic:	Q21227 (2013) EOP LOAF Restore feedwater using AFN-P0I after SIAS
RO	3.3
SRO	3.7
KA#	4.4 E06 EK2.1
<b>Revision</b>	<b>9/27/13 rev: 1: In new Choice D, replaced "will start" by "can be started" to better balance Choices C &amp; D. Swapped Choices C &amp; D (and Justifications) to sequence shortest-longest. This changed the answer from D to C.</b>

### Question 12 Table-Item Links

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2005

RO Exam 2013

#### **Associated objective(s):**

determine from where feed can be established

Analyze plant conditions to determine if feed can be established using AFN-P01 during a LOAF.

Given the following conditions:

- Unit 1 tripped from 100% power due to a loss of offsite power.
  - DG "A" is under clearance for planned maintenance.
  - The RO reports that Essential Spray Pond Pump "B" has both a white and blue light illuminated on the SESS panel.
1. What is the appropriate EOP to enter?
  2. What is the required action and reason for that action?
    - A.
      1. 40EP-9EO07, LOOP/LOFC
      2. Place all the charging pump handswitches in Pull to Lock to prevent an uncontrolled restoration of RCP seal injection.
    - B.
      1. 40EP-9EO07, LOOP/LOFC
      2. Isolate Seal Injection to prevent a rapid cooldown of the RCP seals.
    - C.
      1. 40EP-9EO08, Blackout
      2. Place all the charging pump handswitches in Pull to Lock to prevent an uncontrolled restoration of RCP seal injection.
    - D.
      1. 40EP-9EO08, Blackout
      2. Isolate Seal Injection to prevent a rapid cooldown of the RCP seals.

Answer: C

<b>Justification:</b>		
A	Wrong	Candidate is given the Loss of Offsite power, if they do not recognize that the SESS panel is telling them that DG 'B' must be secured they may stay in LOOP/LOFC procedure. LOOP is a credible choice.
B	Wrong	
C	Correct	<b>Candidate must determine that the Blackout procedure must be entered due the loss of Spray Pond flow to DG "B". Charging pumps are placed in PTL to prevent the uncontrolled restoration of RCP seals as stated in the BO tech guide.</b>
D	Wrong	Blackout is correct but the reason given is a correct action and condition from the LOOP procedure making this a credible distracter.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO07, LOOP/LOFC and 40DP-9AP12 Tech Guide / 40EP-9EO08, Blackout and 40DP9AP13 Tech Guide</p> <p><b>K&amp;A:</b> 4.1 055 EK3.02: Knowledge of the reasons for the following responses as the apply to the Station Blackout: Actions contained in EOP for loss of offsite and onsite power</p>		

<b>Question 13 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	4.00
System ID:	44168
User-Defined ID:	Q44168
Topic:	Q 44168 Actions taken in the Blackout procedure
RO:	4.3
SRO:	4.6
KA #:	4.1 055 EK3.02
<b>Revision:</b>	<b>10/03/2013 rev: 0</b> <b>Replaces Q44040</b>

### **Question 13 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

state the reason that all Charging Pumps are placed in PTL

Referring to the provided picture of Board 1, which ONE of the following describes the status of the electric plant? (No operator actions have been taken)

- A. Normal full power lineup.
- B. DG "B" is in test run paralleled with offsite power.
- C. DG "B" is in emergency run providing power to PBB-S04.
- D. DG "B" is running due to only an AFAS, SIAS or CSAS actuation.

Answer: C

<b>Justification:</b>		
A	Wrong	The breaker from NBN-X04 is open this is the normal power supply to PBB-S04.
B	Wrong	DG is tied to PBB-S04 but it is not connected to offsite power.
C	<b>Correct</b>	<b>With offsite power disconnected, DG "B" is in emergency run to energize PBB-S04</b>
D	Wrong	AFAS/SIAS/CSAS start the DG but do not energize the PBB-S04
<p><b>Proposed reference to be provided:</b> Picture of B01</p> <p><b>Technical Reference:</b> page 4 of Operator Information Manual</p> <p><b>K&amp;A:</b> 4.2 056 AA2.46: Ability to determine and interpret the following as they apply to the Loss of Offsite Power: That the ED/Gs have started automatically and that the bus tie breakers are closed</p>		

<b>Question 14 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	44041
User-Defined ID:	Q44041
Topic:	Q44041 Verify DGs have started and energized class 4160kV buses
RO	4.2
SRO	4.4
KA#	4.2 056 AA2.46
<b>Revision</b>	<b>4/02/13 rev: 0</b>

## **Question 14 Table-Item Links**

### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

### Q - Cognitive Level

Comprehension / Anal

### Q - Question Source

New

### O - RO Tier Group Designations

Tier 1 Group 1

### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

analyze whether the Maintenance of Vital Auxiliaries Safety Function is met and what contingency actions are required if it is not

Given the following conditions:

- Unit 1 was tripped from 100% power due to a degrading vacuum.
- All 8 ADV permissives have been energized.
- The operator has opened SGA-HV-184 and SGB-HV-185 to control SG pressure.

Subsequently with NO operator action:

- ADV SGA-HV-184 has gone closed.
- ADV SGB-HV-185 remains open.
- All 8 ADV permissive lights remain illuminated.

Which ONE of the following instrument bus failures would result in this configuration?

- A. PNA-D25 has de-energized.
- B. PNB-D26 has de-energized.
- C. PKC-M43 has de-energized.
- D. PKD-M44 has de-energized.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<b>ADVs 179 and 184 fail closed on a loss of PNA-D25</b>
B	Wrong	ADVs 178 and 185 fail closed on a loss of PNA-D26
C	Wrong	ADVs 179 and 184 would fail closed on a loss of PKC-M43 but since the permissive lights are still on this was not the failure.
D	Wrong	ADVs 178 and 185 would fail closed on a loss of PKD-M44 but since the permissive lights are still on this was not the failure.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ13, Loss of Class Instrument or Control Power</p> <p><b>K&amp;A:</b> 4.2 057 AA2.17: Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: System and component status, using local or remote controls</p>		

<b>Question 15 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44043
User-Defined ID:	Q44043
Topic:	Q44043 describe the availability of ADVs during a loss of class instrument power
RO	3.1
SRO	3.4
KA#	4.2 057 AA2.17
<b>Revision</b>	<b>10/02/13 rev:1: Justification for Distractor D, changed PKC-M43 to PKD-M44.</b>

### **Question 15 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

Modified PV Bank

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

describe the availability of ADVs during a loss of class instrument power



Given the following conditions:

- Unit 1 is operating at 100% power.
- A fault occurs on PKA-M41 and the Class DC bus is de-energized.

With no operator action, which ONE of the following describes the expected condition of the "A" train Instrument Inverter, PNA-N11 and Instrument Bus, PNA-D25?

The AC output breaker on PNA-N11 is \_(1)\_ and PNA-D25 is \_(2)\_?

- A. (1) open (2) energized
- B. (1) closed (2) energized
- C. (1) open (2) de-energized
- D. (1) closed (2) de-energized

Answer: D

<b>Justification:</b>		
A	Wrong	PNA-D25 would be energized in Units 2 and 3 but not U-1
B	Wrong	
C	Wrong	<b>PNA-D25 will be de-energized due to NO auto transfer capability in U-1 but the AC output breaker opens on high amp output not on a DC low voltage supply</b>
D	<b>Correct</b>	
<b>Unit Differences</b>		
<b>Proposed reference to be provided:</b> None		
<b>Technical Reference:</b> 40AO-9ZZ13, Loss of Class Inst or Control Power / OIM pg 72 / B01 ARP 41AL-1RK1A		
<b>K&amp;A:</b> 4.2 058 AA1.02: Ability to operate and / or monitor the following as they apply to the Loss of DC Power: Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector		

<b>Question 16 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	44044
User-Defined ID:	Q44044
Topic:	Q44044 monitor the static inverters following a loss of DC power
RO	3.1
SRO	3.1
KA#	4.2 058 AA1.02
<b>Revision</b>	<b>07/29/13 rev: 0</b>

### **Question 16 Table-Item Links**

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Explain the operation of the Class 1E Inverters under normal operating conditions.

Given the following conditions:

- Unit 1 has tripped from 100% power due to a Loss of Offsite Power (LOOP) event.
- The crew has cross connected Essential Cooling Water (EW) system "A" to Nuclear Cooling Water per Standard Appendix 63.

Which ONE of the following describes the reason for throttling closed EWA-HCV-53 (SDCHX 'A' Outlet Isolation) to a minimum EW system flow of 8500 gpm or until the RCP LO NC FLOW alarms are clear?

- A. Maintain operability of the EW "A" system.
- B. Provide the NCW priority loads with adequate flow.
- C. Ensure adequate flow to the Fuel Pool Heat Exchangers.
- D. Prevent EW pump damage due to operating in a runout condition.

Answer: B

<b>Justification:</b>		
A	Wrong	EW is INOP when cross tied. Examinee may think throttling flow will maintain operability
B	<b>Correct</b>	<b>This is to ensure adequate flow to NCW priority loads.</b>
C	Wrong	One train of EW not sized to provide both NCW and Fuel Pool cooling; this would require aligning the other train.
D	Wrong	Not for runout but examinee could believe this to be true when taking systems out of normal alignment.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> SA-63 and Tech Guide/ 40DP-9AP12, LOOP Tech Guide /</p> <p><b>K&amp;A:</b> 4.2 062 AK3.03: Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: Guidance actions contained in EOP for Loss of nuclear service water</p>		

<b>Question 17 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	3.00
System ID:	10499
User-Defined ID:	Q10499
Topic:	Q10499 X-tie EW to NC during a LOOP
RO	4.0
SRO	4.2
KA#	4.2 062 AK3.03
<b>Revision</b>	<b>04/04/2013 rev: 0</b>

### **Question 17 Table-Item Links**

#### Q - 10CFR Sections

55.41 (8) Components, capacity, and functions of emergency systems.

#### Q - Cognitive Level

Memory

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2010

RO Exam 2013

#### **Associated objective(s):**

X-tie EW to NC

Given the following conditions:

- Unit 1 is operating at 100% power.
- A grid disturbance has caused grid voltage to drop.
- Grid frequency is stable at 60 Hz.
- The Main Generator is responding per design.

Which ONE of the following would be an operational implication of this condition?

The Main Generator...

- A. could lose synchronism (pole slippage). The Maximum Excitation Limit (MEL) circuit will act to mitigate the over-excitation condition.
- B. field could be damaged due to overheating. The Maximum Excitation Limit (MEL) circuit will act to mitigate the over-excitation condition.
- C. field could be damaged due to overheating. The Underexcited Reactive Ampere Limit (URAL) will act to mitigate the under-excitation condition.
- D. could lose synchronism (pole slippage). The Underexcited Reactive Ampere Limit (URAL) will act to mitigate the under-excitation condition.

Answer: B

<b>Justification:</b>		
A	Wrong	Pole slippage is indicative of under-excitation in this case the generator will act to raise voltage and cause over-excitation
B	<b>Correct</b>	<b>With a low voltage the AC regulator will attempt to raise voltage the MEL circuits will act to limit the increase and activate a trip timing circuit if voltage goes beyond limits</b>
C	Wrong	Part one is correct but URAL is for under-excited conditions
D	Wrong	Both parts are wrong but these are plausible conditions.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b>40OP-9MB01, Main Generation and Excitation / LOIT lesson plans</p> <p><b>K&amp;A:</b> 4.2 077 AK1.02: Knowledge of the operational implications of the following concepts as they apply to Generator Voltage and Electric Grid Disturbances: Over-excitation</p>		

<b>Question 18 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	44046
User-Defined ID:	Q44046
Topic:	Q44046 implications of an over-excitation condition of the Main Generator
RO	3.3
SRO	3.4
KA#	4.2 077 AK1.02
<b>Revision</b>	<b>10/04/2013 rev: 1: Changed from "PV modified bank" to "PV bank"</b>

### Question 18 Table-Item Links

#### Q - 10CFR Sections

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

PV Bank

#### O - RO Tier Group Designations

Tier 1 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Explain the operation of the Maximum Excitation Limit (MEL) circuit under normal operating conditions.

Given the following conditions:

- Unit 1 was at 15% power.
- Reg Groups 4 and 5 CEAs began moving OUT uncontrollably.
- The CRS implemented 40AO-9ZZ11, CEA Malfunctions.
- CEDMCS was placed in "STANDBY."
- The cause of the malfunction has been corrected and CEAs can be moved..
- THREE (3) CEAs in Reg Group 4 are now deviating from other CEAs in the group by less than 6.6 inches.
- The CRS directs the RO to align the CEAs to the group.

Referring to the attached MCB picture, which ONE of the following identifies the switch manipulations required by the RO to realign the CEAs?

- A. INDIVIDUAL CEA SELECTION switch ONLY.
- B. GROUP SELECT and MODE SELECT switches ONLY.
- C. GROUP SELECT, MODE SELECT, and INDIVIDUAL CEA SELECTION switches ONLY.
- D. GROUP SELECT, PS GROUP SELECT, MODE SELECT, and INDIVIDUAL CEA SELECTION switches.

Answer: C

<b>Justification:</b>		
A	Wrong	Must also manipulate MODE SELECT, and INDIVIDUAL CEA SELECTION switches. Plausible because this is one of the switches required to realign the CEAs.
B	Wrong	Must also manipulate INDIVIDUAL CEA SELECTION switch. Plausible because these two switches <i>are</i> required to realign the CEAs.
C	<b>Correct</b>	<b>GROUP SELECT must be changed from 5 to 4.</b> <b>MODE SELECT must be changed from SB to MI.</b> <b>INDIVIDUAL CEA SELECTION must be changed to the three different CEAs to maintain a maximum of 2 step overlap.</b>
D	Wrong	PS GROUP SELECT is NOT required to be manipulated. Plausible because this is one of the four switches used to manipulate CEAs.
<p><b>Proposed reference to be provided:</b> CEDMCS picture, B04</p> <p><b>Technical Reference:</b> 40AO-9ZZ11, CEA Malfunctions.</p> <p><b>K&amp;A:</b> 4.2 001 AA1.01; Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal : Bank select switch</p>		

<b>Question 19 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	44075
User-Defined ID:	Q44075
Topic:	Q44075 (2013) MIN switches required to realign CEAs
RO	3.5
SRO	3.2
KA#	4.2 001 AA1.01
<b>Revision</b>	<b>5/22/13 rev: 0</b>

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

#### Q - 10CFR Sections

55.41 (6) Design, components, and functions of reactivity control mechanisms and instrumentation.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

perform actions to realign the CEAs if the entire group has moved



Given the following plant conditions:

- An event has occurred that requires an emergency boration.
- The crew has established a boration through CHN-UV-514, Boric Acid Makeup to Charging Pumps, with a Boric Acid Makeup pump running.

Subsequently

- NHN-M1528, power to CHN-UV-514, trips open.
- CHN-LT-227, VCT level transmitter, fails LOW.
- CHN-LI-226, VCT Level, reads 48%.

Which ONE of the following describes the impact of these conditions on the emergency boration flowpath?

- The crew must manually open CHE-UV-514 to establish an emergency boration flowpath.
- The crew must manually open CHE-HV-536 to establish an emergency boration flowpath.
- The emergency boration flowpath will be maintained through a single suction flowpath (via CHN-UV-514) to the charging pumps.
- The emergency boration flowpath will be maintained through two suction flowpaths (via CHN-UV-514 and CHN-HV-536) to the charging pumps.

Answer: D

Justification:		
A	Wrong	Incorrect because CHE-HV-536 will automatically open on a Low-Low VCT level, coincident with a loss of power to CHN-UV-514, to maintain an emergency boration flowpath. See Page 77 of the PVNGS Operator Information Manual. Plausible because CHE-UV-514 is a “fail-close” valve
B	Wrong	Incorrect because CHE-HV-536 does not need to be manually opened. It will automatically open on a Low-Low VCT level, coincident with a loss of power to CHN-UV-514. Plausible because CHE-HV-536 may be manually opened under certain conditions in 40AO-9ZZ01.
C	Wrong	Incorrect because when CHE-HV-536 opens, there will be a parallel suction path to the charging pumps since CHN-UV-514 is already open per 40AO-9ZZ01. Plausible because, under most circumstances in 40AO-9ZZ01, there is a single suction source to the charging pumps.
D	Correct	<b>CHN-UV-514 is open per the given conditions. When power is lost to CHN-UV-514, it will remain open since it is an MOV. Also, CHE-HV-536 will automatically open on a Low-Low VCT level, coincident with a loss of power to CHN-UV-514. This will result in parallel suction flowpaths to the charging pumps.</b>

**Proposed reference to be provided:** None

**Technical Reference:** 40AO-9ZZ01, Emergency Boration

**K&A:** 4.2 024 AK2.01: Knowledge of the interrelations between Emergency Boration and the following: Valves

<b>Question 20 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44077
User-Defined ID:	Q44077
Topic:	Q44077 (2013) Emergency Boration with LT-226 failed LOW and LOP to UV-514
RO	2.7
SRO	2.7
KA#	4.2 024 AK2.01
<b>Revision</b>	<b>7/9/13 rev: 0</b>

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

#### Q - 10CFR Sections

55.41 (6) Design, components, and functions of reactivity control mechanisms and instrumentation.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe the automatic functions associated with the RWT Gravity Feed to Charging Pump Suction Valve (CHE-HV-536).

The Functional Recovery Procedure directs feeding a ruptured and faulted Steam Generator at 1360 - 1600 gpm.

Which ONE of the following describes the **primary** purpose of this action?

- A. Rapidly depressurize the RCS.
- B. Rapidly depressurize the affected SG.
- C. Reduce the associated radioactive release.
- D. Equalize pressure between the SG and the RCS.

Answer: C

<b>Justification:</b>		
A	Wrong	This action would help to depressurize the RCS. Depressurizing the RCS is one of the actions to help stop the spread of contamination found in the FRP, making this answer plausible.
B	Wrong	This action will depressurize the SG making it plausible.
C	<b>Correct</b>	<b>This action is taken due the loss of Containment Integrity to limit the radioactive release.</b>
D	Wrong	Incorrect because equalizing pressure is not the reason for establishing 1360-1600 gpm AFW flow. Plausible because equalizing pressure is one of the goals for a SGTR.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> ESD and tech guide; FRP and tech guide</p> <p><b>K&amp;A:</b> 4.2 069 AK3.01: Knowledge of the reasons for the following responses as they apply to the Loss of Containment Integrity: Guidance contained in EOP for loss of containment integrity</p>		

<b>Question 21 Info</b>	
Points:	1.00
Time to Complete:	0
Difficulty:	0.00
System ID:	7291
User-Defined ID:	Q7291
Topic:	Q7291 GEN EOP MITIGATING STRAT required operator action for an uncontrolled SG
RO:	3.8
SRO:	4.2
KA:	4.2 069 AK3.01
<b>Revision</b>	<p><b>10/08/2013 rev: 2</b>  <b>Replaced “to reestablish SG as primary heat sink” with “to equalize SG and RCS pressure” in Choice D (and associated Justification) to make it more credible.</b></p> <p><b>10/09/2013 rev: 3: Added “primary” to question stem.</b></p>

#### Question 21 Table-Item Links

##### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

##### Q - Cognitive Level

Memory

##### Q - Question Source

PV Bank Not Modified

##### O - RO Tier Group Designations

Tier 1 Group 2

##### Q - RO Exam

RO AUDIT 2008

RO Exam 2013

#### **Associated objective(s):**

describe the required operator action for an uncontrolled SGTR steaming to atmosphere and its basis

Describe the required operator action for an uncontrolled SGTR steaming to atmosphere and its basis.

Given the following plant conditions:

- Unit 3 is in a Refueling Outage.
- The Containment LSRO is in the process of loading a fuel bundle into the core.
- The count rate on Startup Channel #1 increases by a factor of 5.
- The count rate on Startup Channel #2 increases by a factor of 3.
- No RMS alarms or trends are present in the Control Room.

Which ONE of the following is the correct required response to this event?

- A. Withdraw the last inserted fuel assembly and observe Startup Channel response.
- B. Stop all fuel movement and order an evacuation of non-essential personnel from containment.
- C. Stop all fuel movement and initiate a CPIAS, Containment Purge Isolation Actuation Signal.
- D. Fuel movement may continue provided that the Operability of Startup Channel #2 is confirmed.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<p><b>Per 72IC-9RX03, Core Reloading, Step 6.2.21.4:</b></p> <p><b>IF during insertion of a fuel assembly, the sustained count rate from either startup channel increases by a factor of five (5) from the last stable counts, excluding anticipated changes due to spatial effects, THEN <u>withdraw</u> the fuel assembly immediately.</b></p> <p><b>Lesson Plan NKA02C021601, Refueling Operations, Page 19:</b></p> <p><b>If during insertion of a fuel assembly the neutron count rate from either startup nuclear channel increases by a factor of five from the last counts stable value, excluding anticipated changes due to spatial effects (such as insertion of an irradiated fuel assembly near a detector), immediately withdraw the fuel assembly and observe the startup channel response.</b></p>
B	Wrong	An evacuation is not required in 72IC-9RX03, Core Reloading. Plausible since evacuate may be called for in other fuel handling procedures, such as 40AO-9ZZ22, Fuel Damage. Also plausible because 40OP-9ZZ23, Outage GOP, contains evacuation guidance in Appendix G - Containment Evacuation. 40OP-9ZZ23 is applicable under the conditions of the stem.
C	Wrong	Incorrect since fuel movement is not immediately stopped. The last assembly must be immediately removed.
D	Wrong	Incorrect since confirmation on both channels would not mitigate the conditions. Plausible because confirmation of a similar indication on the other channel is addressed in Step 6.2.21.6 of 72IC-9RX03 as follows:

	<p><b>IF</b> the count rate increase was the result of fuel assembly insertion <b>OR</b> the two channels simultaneously indicated an abnormally high count rate, <b>THEN</b> <u>perform</u> the following:</p> <p>a. <u>Discontinue</u> CORE ALTERATIONS.</p> <p>b. <u>REFER TO</u> Contingency 8.3.</p> <p>Also credible because this would be the correct answer if S/U Channel 1 had only increased by a factor of 4.</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 72IC-9RX03, Core Reloading, LOIT Lesson Plan NKA02C021601, EO1.9.</p> <p><b>K&amp;A:</b> 4.2 036 AK1.03: Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents : Indications of approaching criticality</p>	

<b>Question 22 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
System ID:	10193
User-Defined ID:	Q10189
Topic:	Q10189 (2013) SU Counts increase by 5X
RO	4.0
SRO	4.3
KA#	4.2 036 AK1.03
<b>Revision</b>	<b>9/26/13 rev: 1: Expanded Justification for Choice D</b>

## **Question 22 Table-Item Links**

### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

### Q - Cognitive Level

Memory

### Q - Question Source

PV Bank Not Modified

### O - RO Tier Group Designations

Tier 1 Group 2

### Q - RO Exam

RO Exam 2007

RO Exam 2013

### **Associated objective(s):**

State the required actions to take if count rate has increased.

Given the following conditions:

- A lowering vacuum condition has caused the Operating Crew to enter 40AO-9ZZ07, Loss of Condenser Vacuum.
- The Secondary Operator has transferred load to steam dump valves 1007 and 1008.
- Main Generator output is approximately 600 MWe.
- An Area Operator reports that air is being drawn past the vacuum breaker for the 'B' Condenser Shell and they are unable to fill it with water.
- Vacuum continues to degrade and passes 7" HgA.

Based on these conditions, the Operating Crew should...

- A. trip the Reactor.
- B. reduce Turbine load to 410 MWe
- C. initiate a RPCB to rapidly reduce Turbine load.
- D. trip the Turbine and continue efforts to correct the problem.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<p>Per 40AO-9ZZ07, Appendix F, Reactor Trip Criteria:</p> <p><b>CONDITION 1</b>  <b>BOTH</b> of the following conditions are met:</p> <ul style="list-style-type: none"> <li>• Condenser pressure &gt; 7 inches HgA and rising in any shell</li> <li>• Main Generator sync'd to the grid</li> </ul> <p><b>IF ANY</b> of the conditions exist,  <b>THEN</b> trip the Reactor and GO TO 40EP-9EO01, Standard Post Trip Actions.</p>
B	Wrong	<p>Incorrect because, under these conditions, a Reactor trip is required. Plausible because lowering load is an action taken in 40AO-9ZZ07 and 410 MWe is part of Condition 4 Reactor trip criteria in 40AO-9ZZ07, Appendix F; and it is part of Turbine trip criteria in 40AL-9RK6A, Window 6A16D.</p>
C	Wrong	<p>Incorrect because, under these conditions, a Reactor trip is required. Plausible since an RPCB is one method of quickly reducing plant load. Also plausible since plant load may be reduced via a RPCB during a condenser tube leak.</p>
D	Wrong	<p>Per 40AO-9ZZ07, Appendix F, Reactor Trip Criteria, the correct action is to trip the Reactor. Plausible since the Diagnostics page would require a Main Turbine trip if power was less than 12%.</p>



**Proposed reference to be provided:** None

**Technical Reference:** 40AO-9ZZ07, Loss of Condenser Vacuum.

**K&A:** 4.2 051 AA2.02: Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip

Question 23 Info	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44116
User-Defined ID:	Q44116
Topic:	Q44116 (2013) Loss Vacuum - Reactor trip
RO	3.9
SRO	4.1
KA#	4.2 051 AA2.02
<b>Revision</b>	<b>7/10/13 rev: 0</b>

### **Question 23 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 1 Group 2

#### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

Determine if a reactor trip OR a turbine trip is appropriate.

Given the following conditions:

- The Unit 3 Control Room has been evacuated due to a FIRE.
- The CRS is implementing 40AO-9ZZ19, Control Room Fire.
- The RO has been directed to perform Appendix A, Primary Reactor Operator Actions.

Which ONE of the following describes the operational impact after Appendix A is complete?

- A. EDG 'A' will be running.
- B. ALL charging pumps will be secured.
- C. Spurious operation of MSIVs will be prevented.
- D. Local operation of Train 'A' equipment will be isolated from the Control Room.

Answer: C

<b>Justification:</b>		
A	Wrong	The action is to <b>secure</b> , not to start EDG 'A.' Plausible because DGs are evaluated in 40AO-9ZZ19.
B	Wrong	CCP 'B' is to remain in operation to ensure seal injection to the RCP seals. Plausible because Charging Pumps A & E are secured in Appendix B (Steps 7 & 8) in 40AO-9ZZ19. Additionally, plausibility is established since Charging Pump B breaker is opened in Appendix E (Step 7) of 40AO-9ZZ19; it is then reclosed in Step 17. Under the given conditions, Appendix E will not be performed.
C	<b>Correct</b>	<b>This is accomplished by opening the DC supply breakers on PKA-M41 in the DC Equipment Room.</b>
D	Wrong	Train 'B' is the train that has disconnect switches installed. Appendices A and B are used to isolate Train 'B' equipment from the control room to prevent fire related operation while allowing for remote operation as well as disabling/de-energizing other equipment to prevent fire initiated operations.
<p><b>PRA Significant</b></p> <p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ19, Control Room Fire</p> <p><b>K&amp;A:</b> 4.2 0672.4.34: Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.</p>		

<b>Question 24 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	43755
User-Defined ID:	Q43755
Topic:	Q43755 (2013) RO actions outside CR during CR fire.
RO	4.2
SRO	4.1
KA#	4.2 067 2.4.34
<b>Revision</b>	<b>9/26/13 rev: 1: Added additional details to the Justification for Choice B.</b>

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

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

describe what is accomplished by performing the Primary and Secondary Reactor Operator Actions

Given the following plant conditions:

- Unit 1 was at 80% power.
- Due to toxic gas intrusion SM and CRS have directed the evacuation of the Control Room.

Which ONE of the following describes an action that is completed PRIOR to evacuating the Control Room and the reason?

- A. Ensure that Emergency Boration is established if all full strength CEAs did not fully insert.
- B. Initiate an MSIS to prevent over-pressurizing the Main Condenser in the event that a loss of vacuum occurs.
- C. Initiate an MSIS to prevent an uncontrolled cooldown in the event a steam bypass control valve fails open once the crew is at the Remote Shutdown Panel.
- D. Check that all full strength CEAs are inserted to determine if charging pump suction must be aligned to the RWT once the crew is at the Remote Shutdown Panel.

Answer: D

<b>Justification:</b>		
A	Wrong	Incorrect because the boration will occur <u>after</u> the CR is evacuated. Plausible because the 1 <sup>st</sup> part is correct. Also plausible because it is the 1 <sup>st</sup> action taken once the operators are at the RSP.
B	Wrong	Incorrect because an MSIS is not initiated until after the CR is evacuated. See Steps 17 and 32 of 40AO-9ZZ18.
C	Wrong	Incorrect because an MSIS is not initiated until after the CR is evacuated. See Steps 17 and 32 of 40AO-9ZZ18. Plausible because an MSIS <i>is</i> initiated prior to leaving the CR in the event of a CR Fire. See Step 3 of 40AO-9ZZ19, Control Room Fire. The 2 <sup>nd</sup> part is plausible because it could be true.
D	Correct	<b>CEAs are checked inserted at Step 3 of 40AO-9ZZ18, Shutdown Outside Control Room. Steps 7 &amp; 8 direct operators to the RSP. Step 9 directs the CRS to borate to the charging pump suction from the RWT.</b>
<p><b>PRA Significant</b></p> <p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ18, Shutdown Outside Control Room</p> <p><b>K&amp;A:</b> 4.2 068 AK3.12: Knowledge of the reasons for the following responses as they apply to Control Room Evacuation. Required sequence of actions for emergency evacuation of control room.</p>		

<b>Question 25 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44114
User-Defined ID:	Q44114
Topic:	Q44114 (2013) Action PRIOR to CR Evac & reason
RO	4.1
SRO	4.5
KA#	4.2 068 AK3.12
<b>Revision</b>	<b>7/8/13 rev: 0</b>

### **Question 25 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

State the operator actions that are required to be performed prior to Control Room evacuation.

Given the following conditions:

- The Reactor has tripped due to a LOCA.
- All RCPs are secured due to low RCS subcooling.
- Initial HPSI flow to each cold leg is 300 gpm.

Subsequently

- SIB-P02, HPSI Pump 'B' trips.

Which ONE of the following identifies the expected flowrates on the instruments listed below?

FT-331, HPSI TO 1A FLOW (SIA-FI-331)  
 FT-321, HPSI TO 2B FLOW (SIB-FI-311-1)

	<u>FT-331</u>	<u>FT-321</u>
A.	Approximately 75 gpm	0 (ZERO) gpm
B.	Approximately 150 gpm	0 (ZERO) gpm
C.	Approximately 75 gpm	Approximately 75 gpm
D.	Approximately 150 gpm	Approximately 150 gpm

Answer: D

<b>Justification:</b>		
A	Wrong	Incorrect because FT-331 will read approximately 150 gpm, not 75, and because FT321 will read approximately 150 gpm, not ZERO. Also plausible because a novice operator may deduce that since a Train B pump tripped, the "SIB" indicator will not indicate flow. ZERO flow is also possible because the associated flow indicator <i>would</i> read ZERO gpm if a LPSI pump tripped.
B	Wrong	Incorrect because FT-321 will read approximately 150 gpm, not ZERO. Plausible because the 1 <sup>st</sup> part is correct. Also plausible because a novice operator may deduce that since a Train B pump tripped, the "SIB" indicator will not indicate flow. ZERO flow is also possible because the associated flow indicator <i>would</i> read ZERO gpm if a LPSI pump tripped.
C	Wrong	Incorrect since FT-331 will read approximately 150 gpm, not 75. Plausible because the 2nd part is correct. Also plausible because a novice operator may deduce that, since 1 of 2 pumps tripped, the flowrate will be split between SIA and SIB indicators.
D	Correct	<b>Each Train of HPSI has redundant indicators which show injection flow to each of the 4 cold legs.</b>
<b>Proposed reference to be provided:</b> None		
<b>Technical Reference:</b> BO2 picture / Safety Injection prints		
<b>K&amp;A:</b> 4.1 074 EA1.27: Ability to operate and monitor the following as they apply to ICC: ECCS valve control switches and indicators		

<b>Question 26 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44122
User-Defined ID:	Q44122
Topic:	Q44122 (2013) How to throttle SI flow in HR-2?
RO	4.2
SRO	4.2
KA#	4.1 074 EA1.27
<b>Revision</b>	<b>5/28/13 rev: 0</b>

### **Question 26 Table-Item Links**

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 1 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

describe how the FRP will maintain or recover the Heat Removal Safety Function

Given the following conditions:

- The Reactor has tripped.
- An ESD has occurred on SG #1.
- SG #1 has just reached dryout.

The following indications are available to the Secondary Operator:

- Loop 1 T-cold 392°F
- Loop 1 T-hot 480°F
- Loop 2 T-cold 460°F
- Loop 2 T-hot 488°F

The BOP operator is now manipulating Atmospheric Dump Valves, which one of the following is the target pressure for SG #2?

- A. 225 psia.
- B. 465 psia.
- C. 565 psia.
- D. 610 psia.

Answer: A

<b>Justification:</b>		
<b>A</b>	<b>Correct</b>	<p><b>225 psia is the saturation pressure for 392°F. IAW 40EO-9EP05, Excess Steam Demand, the operating crew is required to stabilize RCS temperature at the lowest Tcold. This is accomplished by controlling SG pressure.</b></p> <p><b>Per 40EO-9EP05, Step 14, Page 10:</b></p> <p><b>14. Stabilize RCS temperature using the lowest Tc by performing the following:</b></p> <p><b>a. Maintain Tc within the P/T limits. REFER TO Appendix 2, Figures</b></p> <p><b>b. Steam the least affected Steam Generator using ANY of the following:</b></p> <ul style="list-style-type: none"> <li>• SBCS</li> <li>• ADVs from the Control Room</li> <li>• Appendix 18, Local ADV Operation</li> </ul> <p><b>c. Control feedwater to the least affected steam generator.</b></p> <p><b>d. WHEN control is regained, THEN record the following:</b></p> <p><b>Time: _____</b></p> <p><b>RCS Tc: _____</b></p> <p><b>PZR Pressure: _____</b></p>



B	Wrong	Incorrect because the required SG pressure is 225 psia, not 465 psia. Plausible because 465 psia is the saturation pressure for the given Loop 2 Tcold.
C	Wrong	Incorrect because the required SG pressure is 225 psia, not 565 psia. Plausible because 565 psia is the saturation pressure for the given Loop 1Thot.
D	Wrong	Incorrect because the required SG pressure is 225 psia, not 610 psia. Plausible because 610 psia is the saturation pressure for the given Loop 2Thot.
<p><b>Proposed reference to be provided:</b> Steam Tables</p> <p><b>Technical Reference:</b> 40EO-9EP05, Excess Steam Demand</p> <p><b>K&amp;A:</b> 4.4 A11 AK3.3 Manipulation of controls required to obtain desired operating results during abnormal and emergency situations.</p>		

Question 27 Info	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	6399
User-Defined ID:	Q9119
Topic:	Q9119 (2013)
RO	3.0
SRO	3.2
KA#	4.4 A11 AK3.3
<b>Revision</b>	<b>9/26/13 rev: 1: Added Steam Tables as a "Proposed Reference to be provided."</b>

**Question 27 Table-Item Links**

**Q - 10CFR Sections**

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

**Q - Cognitive Level**

Comprehension / Anal

**Q - Question Source**

PV Bank Not Modified

**O - RO Tier Group Designations**

Tier 1 Group 2

**Q - RO Exam**

RO Exam 2013

**Associated objective(s):**

determine when and how RCS temperature is stabilized during an ESD

Given the following conditions:

- Unit 1 was operating at 100% power.
- RCP 1A supply breaker trips.
- On the reactor trip, the DFWCS system fails.
- Operators take manual control of AFW and establish 350 gpm flow to each SG.

Which ONE of the following SG conditions should the Operator expect 10 minutes after the trip?

- A. SG #1 will have a higher level than SG #2.
- B. SG #2 will have a higher level than SG #1.
- C. Loop 1 Tcold will be higher than Loop 2 Tcold.
- D. Loop 2 Tcold will be higher than Loop 1 Tcold.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<b>SG #2 will have a lower SG level because it is generating more steam due to greater RCS flow.</b>
B	Wrong	Incorrect since SG#1 will have a higher level due to the lower steaming rate.
C	Wrong	There will be no difference in temperature even though there is a difference in the steaming rate. These are plausible distracters because there is a difference in the steaming rate of the two loops. Also plausible because there are conditions such as ESDs where Tcold will diverge after an MSIS is actuated.
D	Wrong	
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> LOIT lesson Plan / Validated in Simulator</p> <p><b>K&amp;A:</b> 3.4 003 K3.02 Knowledge of the effect that a loss or malfunction of the RCPs will have on the following: S/G.</p>		

<b>Question 28 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44123
User-Defined ID:	Q44123
Topic:	Q44123 (2013) RCP Effect on SG Level
RO	3.5
SRO	3.8
KA#	3.4 003 K3.02
<b>Revision</b>	<b>9/26/13 rev: 1: Changed stem to "10 minutes later." Added the difference in the Loop temperature distracters for symmetry.</b>

### **Question 28 Table-Item Links**

#### Q - 10CFR Sections

55.41 (4) Secondary coolant and auxiliary systems that affect the facility.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

Modified PV Bank

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

describe SG response when unbalanced RCS flow is established

Given the following conditions:

- Unit 1 is at 100% power.
- Alarm VCT TRBL (3A09A) actuates.
- The RO notes that VCT pressure is 5 psig and lowering slowly.

Which ONE of the following identifies (1) the required action and (2) the reason for that action?

- A. (1) raise hydrogen pressure  
(2) to prevent water from flashing inside the VCT
- B. (1) raise hydrogen pressure  
(2) to maintain charging pump NPSH
- C. (1) raise nitrogen pressure  
(2) to prevent water from flashing inside the VCT
- D. (1) raise nitrogen pressure  
(2) to maintain charging pump NPSH

Answer: B

<b>Justification:</b>		
A	Wrong	<p>Incorrect because VCT overpressure is not maintained to prevent flashing <b>within</b> the VCT – it helps prevent flashing in the charging pump suction. Plausible because there are components within many systems that maintain a pressure to prevent flashing. For example, in the CVCS, the two letdown backpressure control valves maintain a backpressure to prevent flashing upstream of the valves, to help prevent damage to the Letdown Heat Exchanger. (Refer to L.P. NNI02C141A04, Charging and Letdown Subsystem, Page 29). Also plausible because the 1<sup>st</sup> part is correct.</p>
B	Correct	<p><b>Per 40AL-9RK3A, Panel BO3A Alarm Responses, Window 3A09A, Group C (Volume Control Tank Pressure Hi-Lo), if VCT pressure is low, the operators are directed to raise pressure using either the hydrogen regulator or the nitrogen regulator. Since the Unit is at power, the hydrogen regulator should be used since a hydrogen overpressure exists on the VCT.</b></p> <p><b>Per L.P. NNI02C141A04, Charging and Letdown Subsystem, Page 38, one function of the VCT is to maintain NPSH to the charging pumps. This is accomplished by the hydrogen overpressure in the VCT while at power, the head due to the height of water in the VCT, and VCT/charging pump suction temperature. If pressure in the VCT drops, available NPSH will be reduced.</b></p>

C	Wrong	<p>Incorrect because VCT overpressure is not maintained to prevent flashing <b>within</b> the VCT – it helps prevent flashing in the charging pump suction. Plausible because there are components within many systems that maintain a pressure to prevent flashing. For example, in the CVCS, the two letdown backpressure control valves maintain a backpressure to prevent flashing upstream of the valves, to help prevent damage to the Letdown Heat Exchanger. (Refer to L.P. NNI02C141A04, Charging and Letdown Subsystem, Page 29).</p> <p>Also incorrect because, while at power, nitrogen would not be used to control VCT pressure. Nitrogen is plausible because it is used to maintain VCT pressure while the Unit is shutdown.</p>
D	Wrong	<p>Incorrect because, while at power, nitrogen would not be used to control VCT pressure. Nitrogen is plausible because it is used to maintain VCT pressure while the Unit is shutdown. Also plausible because the 2<sup>nd</sup> part is correct.</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AL-9RK3A, Panel BO3A Alarm Responses; L.P. NNI02C141A04, Charging and Letdown Subsystem</p> <p><b>K&amp;A:</b> 3.2 004 K5.26: Knowledge of the operational implications of the following concepts as they apply to the CVCS: Relationship between VCT pressure and NPSH for charging pumps</p>		

Question 29 Info	
Points:	1.00
Time to Complete:	3
Difficulty:	2.00
System ID:	44112
User-Defined ID:	Q44112
Topic:	Q44112 (2013) VCT < 5 psig: Actions and reason
RO	3.1
SRO	3.2
KA#	3.2 004 K5.26:
<b>Revision</b>	<b>7/5/13 rev: 0</b>

**Question 29 Table-Item Links**

Q - 10CFR Sections

55.41 (14) Principles of heat transfer thermodynamics and fluid mechanics.

Q - Cognitive Level

Memory

Q - Question Source

New

O - RO Tier Group Designations

Tier 2 Group 1

Q - RO Exam

RO Exam 2013

**Associated objective(s):**

Explain the operation of the Volume Control Tank under normal operating conditions.

What is the power supply to the Low Pressure Safety Injection pump B, SIB-P01?

- A. NBN-S01, 4160 kV bus.
- B. NBN-S02, 4160 kV bus.
- C. PBA-S03, 4160 kV bus.
- D. PBB-S04, 4160 kV bus.

Answer: D

<b>Justification:</b>		
A	Wrong	4160 kV buses but are not the power supply to LPSI pump B
B	Wrong	
C	Wrong	
D	<b>Correct</b>	<b>Class 4160kV PBB-S04 is the correct source</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40OP-9SI01, Shutdown Cooling Initiation</p> <p><b>K&amp;A:</b> 3.4 005 K2.01: Knowledge of bus power supplies to the following: RHR pumps</p>		

<b>Question 30 Info</b>	
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	44160
User-Defined ID:	Q44160
Topic:	Q44160 identify the power supplies to RHR pumps
RO:	3.0
SRO:	3.2
KA #:	3.4 005 K2.01
<b>Revision:</b>	<b>10/01/2013 rev: 0</b> <b>Replaces Q44145</b>



### **Question 30 Table-Item Links**

Q - 10CFR Sections

55.41 (4) Secondary coolant and auxiliary systems that affect the facility.

Q - Cognitive Level

Memory

Q - Question Source

New

O - RO Tier Group Designations

Tier 2 Group 1

Q - RO Exam

RO Exam 2013

**Associated objective(s):**

Identify the power supplies to SI related equipment.

In order to reset a SIAS that was manually initiated from B05, the operator MUST...

- A. ONLY press either LOCKOUT RESET pushbutton at each Auxiliary Relay Cabinet.
- B. ONLY press both LOCKOUT RESET pushbuttons at each Auxiliary Relay Cabinet simultaneously.
- C. FIRST press the INITIATION PATH RESET pushbutton at the PPS cabinet; then press either LOCKOUT RESET pushbutton at each Auxiliary Relay Cabinet.
- D. FIRST press the INITIATION PATH RESET pushbutton at the PPS cabinet; then press both LOCKOUT RESET pushbuttons at each Auxiliary Relay Cabinet simultaneously.

Answer: C

<b>Justification:</b>		
A	Wrong	Incorrect because the INITIATION PATH RESET pushbutton at the PPS cabinet must first be depressed. Plausible because it is partially correct in that <u>either</u> pushbutton will reset the function.
B	Wrong	Incorrect because <u>both</u> LOCKOUT RESET pushbuttons do <u>not</u> have to be reset. Plausible because a novice operator may not recall that <u>either</u> pushbutton will accomplish the reset and conclude that, in many cases, <u>both</u> pushbuttons must be depressed to reset a function.
C	<b>Correct</b>	IAW 40AO-9ZZ17, Appendix B, PPS-ESFAS Reset, Steps 5.2 (SIAS Initiation Relay lamps will <u>not</u> be illuminated), PPS Initiation Path is reset first. Then, in Appendix B, Step 6.1 (SIAS Actuation Signal lamps will <u>not</u> be illuminated), the PPS-ESFAS actuation is reset at the Aux Relay Panels.
D	Wrong	Incorrect because <u>both</u> LOCKOUT RESET pushbuttons do <u>not</u> have to be reset. Plausible because the first part is correct. Also plausible because a novice operator may not recall that <u>either</u> pushbutton will accomplish the reset and conclude that, in many cases, <u>both</u> pushbuttons must be depressed to reset a function.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ17, Inadvertent PPS-ESFAS Actuations;</p> <p><b>K&amp;A:</b> 3.2 006 K4.11: Knowledge of ECCS design feature(s) and/or interlock(s) which provide for the following: Reset of SIS</p>		

<b>Question 31 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	92
User-Defined ID:	Q9092
Topic:	Q9092 (2013) PPS - Resetting SIAS
RO	3.9
SRO	4.2
KA#	3.2 006 K4.11
<b>Revision</b>	<b>5/28/13 rev: 0</b>

### Question 31 Table-Item Links

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Memory

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

Describe the RPS controls and indications available to the operator at the Initiation Reset Panels.

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- Diesel Generator 'B' is out of service for maintenance.
- Offsite power is lost.
- A LOCA occurs and the crew implements 40EP-9EO03, Loss of Coolant Accident.
- RCS pressure and Pressurizer level are dropping rapidly.
- RCS pressure is 1100 psia.
- The RO notes the following indications for HPSI Pump "A".
  - 150 Amps.
  - Discharge pressure is 1000 psig.
  - Discharge flow is 75 gpm per loop.

Based on these indications, there is a \_\_ (1) \_\_ and the operating crew should \_\_ (2) \_\_ to establish HPSI flow.

- A. (1) a sheared shaft on HPSI Pump 'A'  
(2) enter 40EP-9EO09, Functional Recovery, and restore power to PBB-S04
- B. (1) a break in the HPSI Pump 'A' discharge header  
(2) enter 40EP-9EO09, Functional Recovery, and restore power to PBB-S04
- C. (1) a sheared shaft on HPSI Pump 'A'  
(2) remain in 40EP-9EO03 and restore power to PBB-S04 using 40AO-9ZZ12, Degraded Electrical Power
- D. (1) a break in the HPSI Pump 'A' discharge header  
(2) remain in 40EP-9EO03 and restore power to PBB-S04 using 40AO-9ZZ12, Degraded Electrical Power

Answer: B

<b>Justification:</b>		
A	<b>Wrong</b>	Incorrect because a sheared shaft would result in low amps on the pump. Plausible because low discharge pressure and low flow are also indications of a sheared shaft. Also plausible because the second part is correct.
B	<b>Correct</b>	High amps, low discharge pressure and low flow are indications consistent with a discharge header pipe rupture. The FRP is structured to restore power to class buses.  40DP-9AP16, Section 7.0.1, states:  The FRP might also be entered from an ORP if an ORP had been initially selected but failed the Safety Function Status Check or the ORP selected is not mitigating the event. If the Safety Function Status Check acceptance criteria are not satisfied at any time, then the operator is directed to evaluate the need to implement the FRP.  40DP-9AP16, Section 9.0, states:

		<p>Each ORP has its own Safety Function Status Check (SFSC) which must be used whenever the ORP is in use. The SFSC is used to check the status of safety functions. By satisfying the SFSC acceptance criteria, the operating staff is assured that the actions being taken are maintaining the plant in a safe condition. If SFSC criteria are not satisfied, the operators will take corrective actions to satisfy the safety functions, implement another ORP, or exit to the FRP.</p> <p>Since the RCS Pressure Control Safety Function Acceptance Criteria are not met (HPSI flow is in the Region Not Acceptable on Appendix 2), entry into the FRP is required.</p> <p>NOTE – K/A MATCH:</p> <p>If the question was structured to ask for “predict impact of an ECCS header rupture,” the answer would have to be similar to “reduced injection flow” and this would have little discriminatory value. Therefore, to improve discriminatory value, “reverse logic” was used to require the examinee to determine the event and the mitigating action.</p> <p>NOTE – APPROPRIATE LICENSE LEVEL</p> <p>This question is at the RO level because the conditions in the stem provide the Entry Conditions to a major EOP.</p>
C	Wrong	<p>Incorrect because a sheared shaft would result in low amps on the pump. Also incorrect because the EOP User’s Guide requires entry into the FRP when a Safety Function is not satisfied. Plausible because using 40AO-9ZZ12 would work.</p>
D	Wrong	<p>Incorrect because the EOP User’s Guide requires entry into the FRP when a Safety Function is not satisfied. Plausible because using 40AO-9ZZ12 would work. Also plausible because the first part is correct.</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO10, Standard Appendix 2, SI Throttle Criteria; 40DP-9AP16, Emergency Operating Procedure Users Guide</p> <p><b>K&amp;A:</b> 3.2 006 A2.11: 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: Rupture of ECCS header</p>		

<b>Question 32 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44086
User-Defined ID:	Q44086
Topic:	Q44086 (2013) What action if ECCS break during LOCA?
RO	4.0
SRO	4.4
KA#	3.2 006 A2.11
<b>Revision</b>	<b><i>5/29/13 rev: 1 revised the justification to support the KA match using reverse logic also stated reasons that this is an RO level question.</i></b>

### **Question 32 Table-Item Links**

#### Q - 10CFR Sections

55.41 (8) Components, capacity, and functions of emergency systems.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

analyze RCS Pressure Control to determine if the SFSC acceptance criteria is satisfied

Given the following conditions:

- Unit 1 is operating at 100% power.
- The #3 seal on Reactor Coolant Pump 1A has degraded.
- The crew has verified a 17 gpm leakrate per 40AO-9ZZ02, Excessive RCS Leakrate.
- Reactor Drain Tank (RDT) pressure is 5 psig and increasing.
- RDT level is 56% and increasing.
- Volume Control Tank (VCT) level is 41% and lowering.
- Pressurizer level is stable.

Which ONE of the following identifies (1) the result if NO operator action(s) are taken and (2) the required action to take to maintain parameters within limits?

- A. (1) the RDT rupture disk will blow.  
(2) vent the RDT to Containment.
- B. (1) the RDT rupture disk will blow.  
(2) vent the RDT to the gas surge header.
- C. (1) charging pump suction will be lost.  
(2) take manual control of makeup to the VCT.
- D. (1) charging pump suction will be lost.  
(2) align the Reactor Water Tank to the charging pump suction.

Answer: B

<b>Justification:</b>		
A	Wrong	Incorrect because 40AL-9RK3A requires that the RDT be vented to the gas surge header. Plausible because the first part is correct. Also plausible because venting to Containment is an option in 40AL-9RK3A.
B	Correct	<p><b>Explanation: VCT level will drop due to the loss of inventory. Pzr level will remain stable as letdown flow lowers. RDT level will increase as the RCS fluid flows past the failed seal. Containment temp and humidity are unaffected as failed RCP seal flow is collected in the RDT. The RDT rupture disc blows at 120#. If no actions are taken to relieve the increasing pressure, the rupture disc will eventually blow</b></p> <p><b>Per the NOTE in 40AL-9RK3A:</b></p> <p><b>If the reactor drain tank pressure continues to increase to 10 psig the RDT vent to gas surge header valve CHN-UV-540 and RDT outlet containment isolation valve CHA-UV-560, will close. At approximately 120 psid the RDT rupture disc, CHN-PSE-12 will rupture.</b></p> <p><b>Per the 40AL-9RK3A:</b></p> <p><b>Unit 2 Only: Vent the RDT to the gas surge header using CHN-UV-540 to maintain RDT pressure below 7 psig.</b></p> <p><b>Units 1 and 3 Only: Vent the RDT to the gas surge header using CHN-UV-540 to maintain RDT pressure below 10 psig.</b></p>

C	Wrong	Incorrect because the makeup capabilities exceed the given leak rate. VCT level will be maintained above 34%, above the point where charging pump suction is lost. The action is plausible because, if the VCT TRBL (due to LOW level) actuates, 40AL-9RK3A, window 3A09A requires manual makeup.
D	Wrong	Incorrect because the makeup capabilities exceed the given leak rate. VCT level will be maintained above 34%, above the point where charging pump suction is lost. The action is plausible because, if the VCT LVL LO-LO alarm actuates, 40AL-9RK3A, window 3A08B describes that the charging pump suction will auto-swap to the RWT (when CHN-UV-514 opens).
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> Alarm Procedure 40AL-9RK3A</p> <p><b>K&amp;A:</b> 3.5 007 A1.02: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank pressure.</p>		

Question 33 Info	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44089
User-Defined ID:	Q44089
Topic:	Q44089 (2013) RDT pressure increasing and the required action
RO	2.7
SRO	2.9
KA#	3.5 007 A1.02
<b>Revision</b>	<b>5/30/13 rev: 0</b>



### **Question 33 Table-Item Links**

#### **Q - 10CFR Sections**

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### **Q - Cognitive Level**

Comprehension / Anal

#### **Q - Question Source**

New

#### **O - RO Tier Group Designations**

Tier 2 Group 1

#### **Q - RO Exam**

RO Exam 2013

#### **Associated objective(s):**

Explain the operation of the Reactor Drain Tank (CHN-X02) under normal operating conditions.

Which ONE of the following identifies (1) the normal and (2) the backup makeup source to the Nuclear Cooling Water Surge Tank?

- A. (1) Condensate Storage Tank.  
(2) Cooling Water Holdup Tank.
- B. (1) Condensate Storage Tank.  
(2) Reactor Makeup Water Tank.
- C. (1) Demineralized Water System.  
(2) Cooling Water Holdup Tank.
- D. (1) Demineralized Water System.  
(2) Reactor Makeup Water Tank.

Answer: C

<b>Justification:</b>		
A	Wrong	Incorrect because the CST is not the normal makeup to the NC Surge Tank. Plausible because the CST supplies makeup to many surge tanks, such as the Essential Chilled Water Surge Tank and the Essential Cooling Water Surge Tank. Also plausible because the 2nd part is correct.
B	Wrong	Incorrect because the CST is not the normal makeup to the NC Surge Tank. Also incorrect because the RMWT does not supply backup makeup. Plausible because the CST supplies makeup to many surge tanks, such as the Essential Chilled Water Surge Tank and the Essential Cooling Water Surge Tank. RMWT is plausible because it is a source of pure makeup water for other tanks in the Auxiliary Building, such as the Equipment Drain Tank and the VCT.
C	<b>Correct</b>	Per DWG 01-M-NCP-001 (upper left corner), the normal makeup source is automatically supplied from Demineralized Water System via LCV 75. Backup makeup is from the Cooling Water Holdup Tank via normally-closed manual valve V070.
D	Wrong	Incorrect because the RMWT does not supply backup makeup. RMWT is plausible because it is a source of pure makeup water for other tanks in the Auxiliary Building, such as the Equipment Drain Tank and the VCT. Also plausible because the 1st part is correct.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> DWG 01-M-NCP-001.</p> <p><b>K&amp;A:</b> 3.8 008 K1.05: Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: Sources of makeup water</p>		

<b>Question 34 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44157
User-Defined ID:	Q44157
Topic:	Q44157 (2013) Normal & B/U makeup to the NC Surge Tank
RO	3.0
SRO	3.1
KA#	3.8 008 K1.05
<b>Revision</b>	<b>9/26/13 rev: 1: Replaced original question. This is the 1<sup>st</sup> submittal of this question.</b>

### **Question 34 Table-Item Links**

#### Q - 10CFR Sections

55.41 (8) Components, capacity, and functions of emergency systems.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

Explain the operation of the NC Surge Tank under normal operating conditions.

Given the following plant conditions:

- Unit 1 is MODE 4.
- An Inservice Test is being performed on containment penetration isolation valves using 73ST-9XI23, CP, EW, IA, and NC Valves – Inservice Test.
- The Close Stroke Time is slower than the Tech Spec Acceptance Criteria.

For this test, the valve stroke time is measured from handswitch operation to when the \_\_\_(1)\_\_\_ and the crew must apply the requirements of LCO \_\_\_(2)\_\_\_.

- A. (1) green light is ON.  
(2) 3.9.3, Containment Penetrations.
- B. (1) green light is ON.  
(2) 3.6.3, Containment Isolation Valves.
- C. (1) red light goes OUT.  
(2) 3.9.3, Containment Penetrations.
- D. (1) red light goes OUT.  
(2) 3.6.3, Containment Isolation Valves.

Answer: D

<b>Justification:</b>		
A	Wrong	<p>Incorrect because stroke time is until the red light goes out, not when the green light comes on. Plausible because each close stroke time test in 73ST-9XI23 contains the following step:</p> <p><u>“Verify only the green light is on at...”</u></p> <p>T.S. 3.9.3 is incorrect because it only applies during Refueling Ops.</p> <p>T.S. 3.9.3 is plausible because 73ST-9XI23 specifically cites entry into this T.S.’s actions when a Containment <i>Purge</i> Isolation Valve is declared INOPERABLE. These valves are also tested in 73ST-9XI23.</p> <p>Per 73ST-9XI23, Step 8.3:</p> <p><b>IF</b> any valve fails to satisfy the Technical Specification Acceptance Criteria <b>OR</b> is otherwise determined to be Inoperable, <b>THEN</b> <u>perform</u> the following:</p> <p>8.3.1 <u>Declare</u> the valve Inoperable. 8.3.1.1 <b>IF</b> any Containment Purge Isolation Valve is determined to be Inoperable, <b>THEN</b> <u>observe</u> the action requirements of LCO 3.9.3, Containment Penetrations.</p>
B	Wrong	<p>Incorrect because stroke time is until the red light goes out, not when the green light comes on. Plausible because each close stroke time test in 73ST-9XI23 contains the following step:</p>

		<p><u>Verify</u> only the green light is on at..." Also plausible because the second part is correct.</p>
C	Wrong	<p>T.S. 3.9.3 is incorrect because it only applies during Refueling Ops. Plausible because the first part is correct. T.S. 3.9.3 is plausible because 73ST-9XI23 specifically cites entry into this T.S.'s actions when a Containment <i>Purge</i> Isolation Valve is declared INOPERABLE. These valves are also tested in 73ST-9XI23.</p>
D	Correct	<p>Per several NOTES in 73ST-9XI23:  Valve close stroke time is measured from handswitch operation to when the red light goes out.  Per several Steps in 73ST-9XI23:  <u>Measure</u> stroke time from handswitch operation until red indication light goes out.  Per 73ST-9XI23, Step 8.3:  <b>IF</b> any valve fails to satisfy the Technical Specification Acceptance Criteria <b>OR</b> is otherwise determined to be Inoperable,  <b>THEN</b> <u>perform</u> the following:  8.3.1 <u>Declare</u> the valve Inoperable.</p> <p>Once a Containment Isolation Valve is declared INOPERABLE, T.S. 3.6.3 must be applied.</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 73ST-9XI23, CP, EW, IA, and NC Valves – Inservice Test.</p> <p><b>K&amp;A:</b> 3.8 008 2.2.12: Component Cooling water System (CE equivalent is Nuclear Cooling Water) - Knowledge of surveillance procedures.</p>		

<b>Question 35 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44092
User-Defined ID:	Q44092
Topic:	Q44092 (2013) Failure of a NC CIV stroke test
RO	3.7
SRO	4.1
KA#	3.8 008 2.2.12
<b>Revision</b>	<b>9/26/13 rev: 1: Revised the 2<sup>nd</sup> bullet in the Given Conditions to eliminate cueing (specific determiner), where given information had "isolation valves" and the correct answer also has "isolation valves." Deleted last part of 3<sup>rd</sup> bullet in the Given Conditions for the same reason.</b>

### Question 35 Table-Item Links

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

**Associated objective(s):**

Explain the operation of the NC Containment Isolation Valves under normal operating conditions.

Given the following plant conditions:

- The Unit is operating at 100% power.
- The selected Pressurizer pressure transmitter, PT-100Y, fails HIGH.

Assuming NO operator action, which ONE of the following identifies the effect of this failure on the

1. Steam Bypass Control System (SBCS)
2. Output of the Master Pressure Controller?
  - A. 1) modulate signal biases downward  
2) goes to MINIMUM output
  - B. 1) modulate signal biases downward  
2) goes to MAXIMUM output
  - C. 1) permissive signal biases downward  
2) goes to MINIMUM output
  - D. 1) permissive signal biases downward  
2) goes to MAXIMUM output

Answer: D

Justification:		
A	Wrong	Incorrect because the permissive signal will be biased downward, not the modulate signal. Plausible because downward bias is correct for the permissive signal. Also incorrect because the Master Pressure Controller goes to MAX, not MIN. Plausible because it is a common misconception that the output of the Master Pressure Controller acts "in reverse" of the direction of failure (HIGH failure – LOW output; LOW failure – HIGH output).
B	Wrong	Incorrect because the permissive signal will be biased downward, not upward. Plausible because downward bias is correct for the permissive signal. Also plausible because the 2 <sup>nd</sup> part is correct.
C	Wrong	Incorrect because the Master Pressure Controller goes to MAX, not MIN. Plausible because the 1st part is correct. Plausible because it is a common misconception that the output of the Master Pressure Controller acts "in reverse" of the direction of failure (HIGH failure – LOW output; LOW failure – HIGH output).
D	Correct	<p><b>Per Lesson Plan NKASYC014306, Pressurizer Pressure Control System: Selected Pressurizer pressure transmitter fails high:</b></p> <ul style="list-style-type: none"> <li>• "Pressurizer Trouble" annunciator.</li> <li>• "Pressurizer Pressure Hi-Lo" annunciator.</li> <li>• "Turbine Bypass Demand" annunciator.</li> <li>• <b>SBCS affected:</b> <ul style="list-style-type: none"> <li>• If PT-100X - Modulation signal biased downward (controller demand generated).</li> <li>• If PT-100Y - Permissive signal biased downward (permissive light lit).</li> </ul> </li> </ul>



		<ul style="list-style-type: none"> <li>• <b>Master Pressure Controller goes to Maximum output.</b></li> <li>• <b>Proportional heaters to minimum output.</b></li> <li>• <b>Pressurizer spray valve controller goes to maximum output.</b></li> <li>• <b>Spray valves go full open.</b></li> <li>• <b>All Backup heaters turn off.</b></li> <li>• <b>High Pressurizer pressure indication on B04.</b></li> </ul>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> Lesson Plan NKASYC014306, Pressurizer Pressure Control System; Alarm Response 40AL-9RK4A, Window 4A01B, Group A</p> <p><b>K&amp;A:</b> 3.3 010 K6.01: Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: Pressure detection systems</p>		

Question 36 Info	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	44124
User-Defined ID:	Q44124
Topic:	Q44124 (2013) PPCS response to PT-100Y (selected) fail HIGH
RO	2.7
SRO	3.1
KA#	3.3 010 K6.01
<b>Revision</b>	<b>7/29/13 rev: 1 verified supporting documentation matched answer.</b>

## **Question 36 Table-Item Links**

### **Q - 10CFR Sections**

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

### **Q - Cognitive Level**

Comprehension / Anal

### **Q - Question Source**

New

### **O - RO Tier Group Designations**

Tier 2 Group 1

### **Q - RO Exam**

RO Exam 2013

### **Associated objective(s):**

Describe the response of the Pressurizer Pressure Control System to a failure of an input transmitter.

Given the following conditions:

- The core is at 150 EFPD.
- Reactor Startup is in progress.

As power increases above \_\_\_(1)\_\_\_, the High Log Power Bypass Permissive light \_\_\_(2)\_\_\_.

- A. (1)  $10^{-2}\%$   
(2) goes out
- B. (1)  $10^{-2}\%$   
(2) illuminates
- C. (1)  $10^{-4}\%$   
(2) goes out
- D. (1)  $10^{-4}\%$   
(2) illuminates

Answer: D

<b>Justification:</b>																	
A	Wrong	Incorrect because the setpoint for the High Log Power Bypass Permissive is $10^{-4}\%$ , not $10^{-2}\%$ . Also incorrect because the light illuminates, not goes out. Plausible because the Hi Log Power trip setpoint is $10^{-2}\%$ . Also plausible because the light goes out as power drops below $10^{-4}\%$ .															
B	Wrong	Incorrect because the setpoint for the High Log Power Bypass Permissive is $10^{-4}\%$ , not $10^{-2}\%$ . Plausible because the Hi Log Power trip setpoint is $10^{-2}\%$ . Also plausible because the second part is correct.															
C	Wrong	Incorrect because the light illuminates, not goes out. Plausible because the first part is correct. Also plausible because the light goes out as power drops below $10^{-4}\%$ .															
D	<b>Correct</b>	<p>Per 41AL-1RK5A, Window 5A15B:</p> <table border="1"> <thead> <tr> <th>PT ID</th> <th>POSSIBLE CAUSE</th> <th>SETPOINT</th> </tr> </thead> <tbody> <tr> <td>SBJS10A</td> <td>Hi Log Power Byp Perm Ch A</td> <td>10-4% power</td> </tr> <tr> <td>SBJS10B</td> <td>Hi Log Power Byp Perm Ch B</td> <td>10-4% power</td> </tr> <tr> <td>SBJS10C</td> <td>Hi Log Power Byp Perm Ch C</td> <td>10-4% power</td> </tr> <tr> <td>SBJS10D</td> <td>Hi Log Power Byp Perm Ch D</td> <td>10-4% power</td> </tr> </tbody> </table> <p>Per 40OP-9ZZ03, Appendix F:</p> <p><b>Appendix F - Bypassing High Log Power Trips</b>  <b>1.0 Bypassing High Log Power Trips.</b>  1.1 <b>WHEN</b> the High Log Power Bypass Permissive light illuminates (HI LOG PWR BYP PERM, B05A15B will alarm also),  <b>THEN</b> perform the following:  1.1.1 Bypass the High Log Power Trips for each Log Safety Channel on B05.</p>	PT ID	POSSIBLE CAUSE	SETPOINT	SBJS10A	Hi Log Power Byp Perm Ch A	10-4% power	SBJS10B	Hi Log Power Byp Perm Ch B	10-4% power	SBJS10C	Hi Log Power Byp Perm Ch C	10-4% power	SBJS10D	Hi Log Power Byp Perm Ch D	10-4% power
PT ID	POSSIBLE CAUSE	SETPOINT															
SBJS10A	Hi Log Power Byp Perm Ch A	10-4% power															
SBJS10B	Hi Log Power Byp Perm Ch B	10-4% power															
SBJS10C	Hi Log Power Byp Perm Ch C	10-4% power															
SBJS10D	Hi Log Power Byp Perm Ch D	10-4% power															

<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40OP-9ZZ03, Reactor Startup; Alarm Procedure 41AL-1RK5A, Window 5A15B.</p> <p><b>K&amp;A:</b> 3.7 012 A4.03: Ability to manually operate and/or monitor in the control room: Channel blocks and bypasses. (As it applies to RPS)</p>	

Question 37 Info	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44094
User-Defined ID:	Q44094
Topic:	Q44094 (2013) Power level for High Log Power Bypass
RO	3.6
SRO	3.6
KA#	3.7 012 A4.03
<b>Revision</b>	<b>9/26/13 rev: 1: added</b> "(As it applies to RPS)" to the K/A statement above to make it easier to ID the system.

## **Question 37 Table-Item Links**

### **Q - 10CFR Sections**

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

### **Q - Cognitive Level**

Memory

### **Q - Question Source**

New

### **O - RO Tier Group Designations**

Tier 2 Group 1

### **Q - RO Exam**

RO Exam 2013

### **Associated objective(s):**

Describe the RPS operating bypasses.

Given the following conditions:

- The Unit is operating at 100% one week after a refueling outage.

Which ONE of the choices below completes the following statement?

There are a total of \_\_\_(1)\_\_\_ channels of ESF Matrix Logic and a loss of ALL of them will result in exceeding the peak fuel centerline temperature Safety Limit of \_\_\_(2)\_\_\_ in the event of a Design Basis Accident?

- A. (1) four  
(2) 5022°F
- B. (1) four  
(2) 5080°F
- C. (1) six  
(2) 5022°F
- D. (1) six  
(2) 5080°F

Answer: D

<b>Justification:</b>		
A	Wrong	Incorrect because there are 6 ESF Matrix Relays, not four. Plausible because there are 4 Initiation Relays. Also incorrect because the correct temperature limit is 5080°F, not 5022°F. 5022°F is plausible because this would be correct (5080 – 58 = 5022) for a burnup of 10000 MWD/MTU.
B	Wrong	Incorrect because there are 6 ESF Matrix Relays, not four. Plausible because there are 4 Initiation Relays. Also plausible because the 2 <sup>nd</sup> part is correct.
C	Wrong	Incorrect because the correct temperature limit is 5080°F, not 5022°F. 5022°F is plausible because this would be correct (5080 – 58 = 5022) for a burnup of 10000 MWD/MTU. Also plausible because the 1st part is correct.
D	Correct	<b>Per TS 2.1.1.2: In MODES 1 and 2, the peak fuel centerline temperature shall be maintained &lt; 5080°F (decreasing by 58°F per 10,000 MWD/MTU for burnup and adjusting for burnable poisons per CENPD-382-P-A). Stem states 1 week after startup.</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> TS Basis for TS 2.1.1.2; T.S. 3.3.6 Bases</p> <p><b>K&amp;A:</b> 3.2 013 K3.01: Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Fuel</p>		

<b>Question 38 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44096
User-Defined ID:	Q44096
Topic:	Q44096 (2013) # channels of INOP Init Logic & fuel melt temp
RO	4.4
SRO	4.7
KA#	3.2 013 K3.01
<b>Revision</b>	<b>9/26/2013 rev: 1: revised the 1<sup>st</sup> part to ask simply for the number of channels of ESF Matrix Logic. Deleted 2<sup>nd</sup> and 3<sup>rd</sup> bullets of Given Conditions because they weren't needed.</b>

### **Question 38 Table-Item Links**

#### Q - 10CFR Sections

55.41 (2) General design features of the core, including core structure, fuel elements, control rods, core instrumentation and coolant flow.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

state the Safety Limits and describe the bases behind these limits

Given the following conditions:

- Containment pressure Channel A is 3.4 psig.
- Containment pressure Channel B is 2.7 psig.
- Containment pressure Channel C is 3.1 psig.
- Containment pressure Channel D is 2.6 psig.
- Pressurizer pressure Channel A is 1845 psia.
- Pressurizer pressure Channel B is 1830 psia.
- Pressurizer pressure Channel C is 1832 psia.
- Pressurizer pressure Channel D is 1840 psia.
- SG 1 pressure Channel A is 980 psia.
- SG 1 pressure Channel B is 950 psia.
- SG 1 pressure Channel C is 970 psia.
- SG 1 pressure Channel D is 970 psia.

Assuming **NO** Operator actions, the SG sample valves are...

- A. closed, due to both the MSIS and CIAS actuations.
- B. closed, due to both the SIAS and MSIS actuations.
- C. open, Hi containment trip setpoint has not been reached.
- D. open, Lo SG pressure trip setpoint has not been reached.

Answer: B

<b>Justification:</b>		
A	Wrong	Incorrect because CIAS does not close these valves. Plausible because valves <i>will be</i> closed (this part is correct). Also plausible because "MSIS" is correct.
B	Correct	<b>3.0 psig in Containment will initiate CIAS, SIAS and MSIS signals on 2/4 channels. Valves will be closed due MSIS (Containment press) and SIAS (Pzr press). CIAS, although the same setpoint, does not close these valves.</b>
C	Wrong	Incorrect because valves will be closed, not open. Also wrong because CIAS initiates at 3 psig on 2/4 channels). Plausible because a novice operator may confuse the setpoint for CIAS with that of the Containment Spray Actuation Signal (CSAS) setpoint of 8.5 psig. See Operator Information Manual, Pages 48 and 49.
D	Wrong	Incorrect because valves will be closed, not open. Plausible because it is true that Lo S/G pressure MSIS has not initiated (setpoint is 960 psig).
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 41AL-9RK5B windows 5C, 7C, 8C; Operator Information Manual, Pages 48 and 49 of 88.</p> <p><b>K&amp;A:</b> Ability to monitor automatic operation of the ESFAS including: Input channels and logic</p>		



<b>Question 39 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	10516
User-Defined ID:	Q10516
Topic:	Q10516 (2013) logic and input channels used to monitor auto operation of CIV
RO	2.8
SRO	3.1
KA#	3.2 013 A3.01
<b>Revision</b>	<b>9/26/13 rev: 1: In Justification for Choice A, changed "SIAS" to "MSIS."</b>

### **Question 39 Table-Item Links**

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2008

RO Exam 2013

**Associated objective(s):**

Describe what automatically initiates the Containment Isolation Actuation System (CIAS) and its function.

Given the following conditions:

- Unit 3 is operating at rated power.
- The "A" train CEDM cooling fans (A02A/A02C) are running.

**THEN**

- Alarm window 7A9B, CEDM ACU COOLS SYS TRBL, alarms.
- The Operator observes that both CEDM cooling fans A02A/A02C have brighter than normal green lights.

Under these conditions, the "B" train CEDM fans should \_\_\_(1)\_\_\_ and, if cooling is NOT restored, then \_\_\_(2)\_\_\_.

- A. (1) start immediately  
(2) the Reactor must be tripped within 10 minutes of loss of cooling.
- B. (1) start within 2 minutes  
(2) the Reactor must be tripped within 10 minutes of loss of cooling.
- C. (1) start immediately  
(2) the Reactor must be tripped within 40 minutes of loss of cooling.
- D. (1) start within 2 minutes  
(2) the Reactor must be tripped within 40 minutes of loss of cooling.

Answer: D

<b>Justification:</b>		
A	Wrong	Incorrect because B trains fan will NOT start immediately. There is time delay installed in the auto start feature to allow time for damper closing. "Immediately" is plausible because there are some standby HVAC fans (PZR Cooling Fan and the Containment Normal ACU), that automatically start without a time delay. The shutdown is plausible because 40AO-9ZZ20 requires a <i>cooldown</i> if cooling flow cannot be restored; it just doesn't have to be started within 40 minutes.
B	Wrong	The fans will start within 2 minutes. There is time delay installed in the auto start feature to allow time for damper closing. The cooldown must be started within 10 minutes. Also plausible because the first half is correct.
C	Wrong	Incorrect because B trains fan will NOT start immediately. Also plausible because the second half is correct.
D	<b>Correct</b>	The B train fans have a 2 minute time delay and 40AO-9ZZ20 directs a Reactor trip if cooling not restored within 40 minutes.  40OP-9HC01, Containment HVAC (HC), Limitations and Precautions 3.13 states:  "When one set of CEDM fans is running, the other set may be spinning backwards. A time delay agastat of 120 seconds is installed so that when the set of running CEDM fans is shut down, that the other set won't auto-start for 120 seconds (meaning the second set of fans is no longer running backwards.) There should be no need to manually start the second set of fans unless 120 seconds

		<p>has passed and they still haven't started.”</p> <p>40AO-9ZZ20, Section 10.0, Step 7 states:</p> <p><b>IF</b> at least one CEDM ACU Fan is <b>NOT</b> restored within 40 minutes of the initial loss,  <b>THEN</b> perform the following:</p> <p>a. Trip the reactor.</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b>. 40AO-9ZZ20, Loss of HVAC; Alarm Response 40AL-9RK7A; 40OP-9HC01, Containment HVAC (HC)</p> <p><b>K&amp;A:</b> 3.5 022 K4.04: Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Cooling of control rod drive motors</p>		

<b>Question 40 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	10281
User-Defined ID:	Q10281
Topic:	Q10281 (2013) Loss of CEDM cooling fans
RO	2.5
SRO	2.7
KA#	3.5 022 K4.04
<b>Revision</b>	<b>6/5/13 rev: 0</b>

## **Question 40 Table-Item Links**

### **Q - 10CFR Sections**

55.41 (4) Secondary coolant and auxiliary systems that affect the facility.

### **Q - Cognitive Level**

Memory

### **Q - Question Source**

PV Bank Not Modified

### **Q - SRO Exam**

SRO Exam 2007

### **O - RO Tier Group Designations**

Tier 2 Group 1

### **Q - RO Exam**

RO Exam 2013

### **Associated objective(s):**

Describe the automatic functions associated with the CEDM Normal ACU fans (HCN-A02-A, & C and HCN-A02-B, & D).

Given the following conditions:

- Unit 1 has tripped due to a LOCA inside Containment.
- Containment pressure is 9.2 psig and rising.
- Both Containment Spray trains have failed to actuate.
- The CRS has entered 40EP-9EO09, Functional Recovery.
- CTPC-2 is being implemented to supply CS flow using LPSI Pump 'A.'

Which ONE of the below listed sets of parameters will be monitored to satisfy CPTC-2? Containment...

- A. humidity and LPSI pump amps.
- B. pressure and LPSI pump amps.
- C. humidity and CS "A" discharge flow transmitter SIA-FI-338.
- D. pressure and CS "A" discharge flow transmitter SIA-FI-338.

Answer: B

<b>Justification:</b>		
A	Wrong	Incorrect because humidity will be high initially from the LOCA, so a change would not be seen. Plausible because the second part is correct. Also plausible because Containment humidity is a parameter that could be used to determine Containment conditions and diagnose a LOCA; therefore a novice operator may deduce this parameter is used to monitor CTPC-2.
B	Correct	<b>40EP-9EO09, CTPC-2 step 3.1.f limits amps to ensure continued operation of the LPSI pump. Containment pressure will drop if the section is performed correctly. Containment pressure is also used in subsequent steps to monitor CTPC-2 (Steps 9 and 10).</b>
C	Wrong	Incorrect because, when LPSI is cross tied to CS, CS header flow is not available. (40EP-9EO09, CTPC-2, note by step 3). Also incorrect because humidity will be high initially from the LOCA, so a change would not be seen. Plausible because Containment humidity is a parameter that could be used to determine Containment conditions and diagnose a LOCA; therefore a novice operator may deduce this parameter is used to monitor CTPC-2.
D	Wrong	Incorrect because, when LPSI is cross tied to CS, CS header flow is not available. (40EP-9EO09, CTPC-2, note by step 3). Plausible because the first part is correct.

**Proposed reference to be provided:** None

**Technical Reference:** 40EP-9EO09, Functional Recovery

**K&A:** 3.5 026 K1.01: Knowledge of the physical connections and/or cause effect relationships between the CSS and the following systems: ECCS

<b>Question 41 Info</b>	
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	43989
User-Defined ID:	Q43989
Topic:	Q41 (2013) (Q43989) RO Monitoring CS parameters with LPSI flow
RO	4.2
SRO	4.2
KA#	3.5 026 K1.01
<b>Revision</b>	<b>6/5/13 rev: 0</b>

**Question 41 Table-Item Links**

Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Q - Cognitive Level

Memory

Q - Question Source

PV Bank Not Modified

O - RO Tier Group Designations

Tier 2 Group 1

Q - RO Exam

RO Exam 2007

RO Exam 2012

RO Exam 2013

**Associated objective(s):**

Describe the design basis associated with the Containment Spray system.



Given the following conditions:

- Unit 1 at normal operating temperature and pressure.
- Testing of AFA-P01 in progress.
- AFA-P01 is tripped from the control room due to SGA-UV-134, Main Steam Supply Valve, not opening.
- SGA-UV-134A, Main Steam Bypass Valve, has been closed.

WHICH ONE of the following identifies the required operator actions to reset AFA-P01?

- A. Open AFA-HV-54 ONLY.
- B. Close AFA-HV-54, then open AFA-HV-54 ONLY.
- C. Reset trip linkage on AFA-HV-54, then open AFA-HV-54 ONLY.
- D. Close AFA-HV-54, then reset trip linkage on AFA-HV-54, then open AFA-HV-54.

Answer: B

<b>Justification:</b>		
A	Wrong	Incorrect because the valve must first be closed, then opened. Plausible because the valve must be opened to reset AFA-P01.
B	<b>Correct</b>	IAW 40OP-9AF01, Section 11.3 (Steps 11.3.7-9), after AFA-P01 is manually tripped from the CR, AFA-HS-54D is placed in JOG CLOSE, then in JOG OPEN to fully reset the valve.  IAW 40OP-9AF01, Section 11.3:  11.3.7 Trip AFA-HV-54, AFA-P01 Trip & Throttle valve using AFA-HS-54A, "ESS STM DRIVEN AFW PMP MANUAL TRIP" (B06). 11.3.8 Reset AFA-HV-54 by performing the following (B06): 1. Place and hold AFA-HS-54D in "JOG CLOSE". 2. <b>WHEN</b> AFA-HV-54 stem closed rotation stops, <b>OR</b> the valve indication shows the valve full closed, <b>THEN</b> release AFA-HS-54D. 11.3.9 Direct the Nuclear Operator to perform the following locally: 1. Take AFA-HS-54E, AFA-P01 Trip & Throttle Valve, to "JOG OPEN" until the valve stem is observed to move in the open direction.
C	Wrong	Incorrect because the operator does NOT have to reset the trip linkage on AFA-HV-54 for a manual trip from the CR. Plausible because the trip linkage must be reset locally if an overspeed condition occurs. See 40OP-9AF01, Step 11.3.28 for resetting AFA-P01 after an overspeed.
D	Wrong	Incorrect because the operator does NOT have to reset the trip linkage on AFA-HV-54 for a manual trip from the CR. Plausible because the trip linkage must be reset locally if an overspeed condition occurs. See 40OP-9AF01, Step 11.3.28 for resetting AFA-P01 after an overspeed. Plausible because these are the correct steps for resetting AFA-P01 after an overspeed condition.

**Proposed reference to be provided:** None

**Technical Reference:** 40OP-9AF01, Essential Auxiliary Feedwater System

**K&A:** 3.4 039 A4.04 Ability to manually operate and/or monitor in the control room:  
Emergency feedwater pump turbines

<b>Question 42 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	4813
User-Defined ID:	Q6822
Topic:	Q42 (2013) (Q6822) AF Trip/throttle valve operation
RO	3.8
SRO	3.9
KA#	3.4 039 A4.04
<b>Revision</b>	<b>6/5/13 rev: 0</b>

**Question 42 Table-Item Links**

Q - 10CFR Sections

55.41 (8) Components, capacity, and functions of emergency systems.

Q - Cognitive Level

Memory

Q - Question Source

PV Bank Not Modified

O - RO Tier Group Designations

Tier 2 Group 1

Q - RO Exam

RO Exam 2013

**Associated objective(s):**

Explain the operation of the AFW Pump Turbine Trip and Throttle Valve (AFA-HV-54).

Given the following conditions:

- Unit 1 was operating at 100% power
- ALL Main Feedwater is lost.

The Auxiliary Feedwater System will initiate feeding the SGs at (1) WR level and terminate AFW flow at (2).

- A. (1) 20.3 (2) 40.8% WR level.
- B. (1) 20.3 (2) 44.3% WR level.
- C. (1) 25.8 (2) 40.8% WR level.
- D. (1) 25.8 (2) 44.3% WR level.

Answer: C

Justification:		
A	Wrong	20.3% WR is the DAFAS setpoint which is wrong but plausible since it is a SG level setpoint. 44.3% is also wrong but it is the RPS SG level trip setpoint, also plausible
B	Wrong	
C	<b>Correct</b>	<b>This is the control band for AFW flow to the SGs</b>
D	Wrong	25.8% is the setpoint for AFAS but 44.3% is the RPS trip setpoint making this choice plausible but wrong.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> PVNGS Operator Information Manual, Pages 49 and 50; LOIT lesson plan; B05 ARP</p> <p><b>K&amp;A:</b> 3.4 059 K3.02: Knowledge of the effect that a loss or malfunction of the MFW will have on the following: AFW system</p>		

<b>Question 43 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44159
User-Defined ID:	Q44159
Topic:	Q44159 (2013) Loss MFW - Start signals for AFA & AFB
RO:	3.6
SRO:	3.7
KA #:	3.4 059 K3.02
<b>Revision:</b>	<b><i>10/03/2013 rev: 1 - revised Given Conditions to postulate a loss of MFW, not an inadvertent MSIS (better match to the K/A). Replaces Q44099</i></b>

### **Question 43 Table-Item Links**

#### Q - 10CFR Sections

55.41 (8) Components, capacity, and functions of emergency systems.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Discuss the purpose and conditions under which the Auxiliary Feedwater System is designed to function.

Unit 1 is operating at rated power, while monitoring DFWCS you observe the following:

- SG 1 LT-1111 indicates 50% NR level and stable.
- SG 1 LT-1112 has failed to 54% NR and stabilized.
- SG 2 LT-1121 indicates 51% NR level and stable
- SG 2 LT-1122 indicates 50% NR level and stable

1. What effect will the failure of LT-1112 have on SG 1 level?
2. Which of the following automatic **OR** manual actions are found in 40AL-9RK6A, ARP that must occur to control SG 1 level?
  - A.
    1. Actual SG 1 level will lower.
    2. When SG 1 level deviation exceeds 8%, then a canned value will be inserted into the SG 1 DFWCS to restore level.
  - B.
    1. Actual SG 1 level will rise.
    2. Place LT-1112 in the maintenance mode, SG 1 level will lower to the level setpoint.
  - C.
    1. Actual SG 1 level will rise.
    2. SG 1 DFWCS will then use SG 2 LT-1121 signal and lower SG 1 level.
  - D.
    1. Actual SG 1 level will lower.
    2. Place LT-1112 in the maintenance mode and then slowly raise SG 1 level to the level setpoint

Answer: D

<b>Justification:</b>		
A	Wrong	Level will lower because the failed signal is > the setpoint ~ 52%. There is no 8% deviation that causes an auto action in level control there 8% deviations which occur in FW temperature and reactor power.
B	Wrong	Actual level will lower but these are the actions for a failed transmitter.
C	Wrong	Actual level will lower but the 15% deviation will not occur in the control signal since the DFWCS uses the higher level, only the actual SG levels
D	<b>Correct</b>	<b>Level will lower because the failed signal is &gt; the setpoint ~ 52%. These are the steps as described in the ARP for actual level &lt; than setpoint that will be used.</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AL-9RK6A, B06 - ARP</p> <p><b>K&amp;A:</b> 3.4 059 A2.11: Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of feedwater control system</p>		

<b>Question 44 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	4.0
System ID:	44142
User-Defined ID:	Q44142
Topic:	Q44142 SG levels fails hi but w/i band
RO	3.0
SRO	3.3
KA#	3.4 059 A2.11
<b>Revision</b>	<b>9/26/2013 rev: 1: In Choices B &amp; C, deleted the 2<sup>nd</sup> half of the 1<sup>st</sup> part to better balance the 1<sup>st</sup> parts of all 4 choices. Choice D – revised 2<sup>nd</sup> half of 2<sup>nd</sup> part from “back to 52%” to “to the level setpoint” to balance with Choice B and to eliminate cueing (specific determiner) between the values in the Given Conditions (close to 52%) and the value in Choice D (52%).</b>

### Question 44 Table-Item Links

#### Q - 10CFR Sections

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe the NR steam generator level inputs to DFWCS and their function.





According to the Limitations and Precautions of 40OP-AF01, Essential Auxiliary Feedwater System, Auxiliary Feedwater flow should be maintained \_\_\_(1)\_\_\_. This limitation is intended to \_\_\_(2)\_\_\_,

- A. (1) less than 250 gpm to both SGs when differential steam pressure is less than 50 psig.  
(2) balance primary side cooling action
- B. (1) less than 250 gpm to both SGs when differential steam pressure is less than 50 psig.  
(2) minimize damage due to voiding in the feed ring
- C. (1) between 250 & 1000 gpm to both SGs when SG levels are less than 27%NR  
(2) balance primary side cooling action
- D. (1) between 250 & 1000 gpm to both SGs when SG levels are less than 27%NR  
(2) minimize damage due to voiding in the feed ring

Answer: D

<b>Justification:</b>		
A	Wrong	<p>Incorrect because operators are not required to maintain &lt;250 gpm if DP is less than 50 psig. Plausible because there is a L&amp;P in 40OP-9AF01 related to 50 psid between SGs.</p> <p>40OP-9AF01, Limitation and Precaution 3.12:</p> <p>Attempt to maintain less than 50 psig differential steam pressure between the Steam Generators while feeding with the Essential Auxiliary Feedwater System. This action helps balance the primary side cooling action of the Steam Generators.</p> <p>Also plausible because the 2<sup>nd</sup> part is the correct reason for L&amp;P 3.12 in 40OP-9AF01.</p>
B	Wrong	<p>Incorrect because operators are not required to maintain &lt;250 gpm if DP is less than 50 psig. Plausible because there is a L&amp;P in 40OP-9AF01 related to 50 psid between SGs (see A, above). Also plausible because 250 gpm is the lower limit for AFW flow when SG levels are &lt;27% NR and this limitation is based on voiding in the feed ring (see D, below).</p>
C	Wrong	<p>Incorrect because operators are not required to maintain &lt;250 gpm if DP is less than 50 psig. Plausible because there is a L&amp;P in 40OP-9AF01 related to 50 psid between SGs (see A, above). Also plausible because 250 gpm is the lower limit for AFW flow when SG levels are &lt;27% NR and this limitation is based on voiding in the feed ring (see D, below).</p>
D	Correct	<p><b>40OP-9AF01, Essential Auxiliary Feedwater System, Limitations and Precautions:</b></p> <p><b>3.25 Minimize the use of Aux Feed to maintain Steam Generator levels at</b></p>

	<p>less than or equal to 27% narrow range to prevent damage to the downcomer feed ring and piping. A flowrate of less than 250 gpm, while level is less than 27% NR, may cause damage to the downcomer feed ring and piping due to voiding that occurs within the feed ring at this reduced flowrate.</p> <p>3.26 If it is necessary to feed with Steam Generator level less than or equal to 27% narrow range, establish a feed flow of greater than or equal to 250 gpm until level is greater than 27% narrow range.</p> <p>Lesson Plan NKASYC012105, Auxiliary Feedwater System page 21 of 56, EO1.5:</p> <p>Design modifications to the downcomer feed rings have imposed operational restrictions to minimize voiding and water hammer in the downcomer lines. Since very little feedwater is required of the S/Gs during normal shutdown conditions, the lines become voided when S/G level dips below 27% narrow range indication. When this occurs, a minimum feed of 250 gpm is required to quickly collapse the void and minimize the effect of the waterhammer. Above this level, the voiding does not occur, and any minimum feeding rate is acceptable.</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40OP-9AF01, Essential Auxiliary Feedwater System.</p> <p><b>K&amp;A:</b> 3.4 061 K5.05: Knowledge of the operational implications of the following concepts as they apply to the AFW: Feed line voiding and water hammer.</p>	

Question 45 Info	
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	44154
User-Defined ID:	Q44154
Topic:	Q44154 (2013) MIN AFW flow while <27% NR
RO	2.7
SRO	3.2
KA# (original 3.4 061 K5.02)	3.4 061 K5.05 (new KA)
<b>Revision</b>	<b>9/27/13 rev: 1: Replaced original Q45 due to LOD=1.</b>

**Question 45 Table-Item Links**

Q - 10CFR Sections

55.41 (4) Secondary coolant and auxiliary systems that affect the facility.

Q - Cognitive Level

Memory

Q - Question Source

New

O - RO Tier Group Designations

Tier 2 Group 1

Q - RO Exam

RO Exam 2013

**Associated objective(s):**

Explain the operation of the Non Essential Auxiliary Feedwater Pump AFN-P01 under normal operating conditions.

Given the following conditions:

- Unit 1 has tripped on Low SG level.
- AFAS-1 automatically initiated.
- The CRS directed the manual initiation of AFAS-2 on trend.
- The operator placed all 4 AFAS-2 handswitches on B05 to the initiate position and released the handswitches.
- Both SG levels are now 45% WR level and rising.

Which ONE of the following describes the AFAS response to these conditions?

- A. AFW flow to both SGs will stop.
- B. AFW flow to both SGs will continue until SG levels reaches the AFAS reset setpoint.
- C. SG-1 AFW flow will stop, SG-2 AFW flow will continue to feed until overridden by the Operator.
- D. SG-1 AFW flow will stop, SG-2 AFW flow will continue until the high level override setpoint is reached.

Answer: C

<b>Justification:</b>		
A	Wrong	Incorrect because flow will continue to SG-2. Plausible because this choice would be true if the AFAS-2 handswitches had been returned to "normal."
B	Wrong	Incorrect because flow to SG-1 AFW flow will stop as level rises above 40.8% WR. "Both SGs" is plausible because <i>this part</i> would be true if the AFAS-2 switches had been returned to "normal." "45.8%" is plausible because it is a derivation of the two setpoints (40.8% and 25.8%) around which the AFW FCVs cycle.
C	<b>Correct</b>	<p>Since AFAS-1 was automatically initiated, SG-1 AFW FCVs will open automatically at 25.8% WR and close at 40.8% WR. Since the AFAS-2 switches were NOT returned to normal, the FCVs will open and remain open.</p> <p>Per Lesson Plan NKASYC012105, Auxiliary Feedwater System, Page 43:</p> <p>"Additionally, the AFAS channel actuation switches on B05 do not spring return to a normal position. They must be intentionally returned to the normal position by the operator. This is an important point, because if these switches are not returned to the normal position the isolation and flow control valves will not auto cycle based on S/G level, as described above. The valves will open and remain open until the operator overrides them to take manual control."</p>
D	Wrong	Incorrect since the SG-2 AFW FCVs will NOT close on the High Level Override. Plausible because the first part is correct. Also plausible because <b>MFV</b> valves will close on HLO at 88% NR.

**Proposed reference to be provided:** None

**Technical Reference:** Lesson Plan NKASYC012105, Auxiliary Feedwater System; Operator Information Manual, DFWCS Logic Diagram, Page 31 of 88.

**K&A:** 3.4 061 A3.03: Ability to monitor automatic operation of the AFW, including: AFW S/G level control on automatic start

<b>Question 46 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	4.00
System ID:	22609
User-Defined ID:	Q22609
Topic:	Q22609 (2013) SYS manual AFAS and initiation switches not returned to normal position
RO	3.9
SRO	3.9
KA#	3.4 061 A3.03
<b>Revision</b>	<b>10/15/2013 rev: 1 - changed SG level in stem from 40.8 to 45% WR level to avoid cueing Q43.</b>

## **Question 46 Table-Item Links**

### **Q - 10CFR Sections**

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

### **Q - Cognitive Level**

Comprehension / Anal

### **Q - Question Source**

PV Bank Not Modified

### **O - RO Tier Group Designations**

Tier 2 Group 1

### **Q - RO Exam**

RO Exam 2013

### **Associated objective(s):**

Describe the System Response to a Auxiliary Feedwater Actuation Signal.

Given the following conditions:

- Unit 1 is operating at 100% power.
- The 4.16 kV bus NBN-S01 faults and is de-energized.

Which ONE of the following correctly identifies:

- (1) Condensate pump(s) that remain running?  
 (2) Heater Drain pumps that remain running?

- A. (1) Condensate Pump C only (2) Heater Drain Pump A.  
 B. (1) Condensate Pump C only (2) Heater Drain Pump B.  
 C. (1) Condensate Pump B and C (2) Heater Drain Pump A.  
 D. (1) Condensate Pump B and C (2) Heater Drain Pump B.

Answer: A

Justification:		
A	Correct	Per the AOP. Condensate pumps are a PRA important load because, on a Loss of MFW, SGs may be depressurized to feed from the Condensate Pumps.
B	Wrong	Condensate pumps A and B are supplied by NBN-S01. Heater Drain pump B is supplied by NBN-S01.
C	Wrong	
D	Wrong	
<p><b>PRA Important</b></p> <p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ12, Degraded Electrical</p> <p><b>K&amp;A:</b> Knowledge of bus power supplies to the following: Major system loads.</p>		

<b>Question 47 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44129
User-Defined ID:	Q44129
Topic:	Q44129 describe major AC loads - condensate pumps
RO:	3.3
SRO:	3.4
KA:	3.6 062 K2.01:
<b>Revision:</b>	<b><i>09/30/2013 rev: 1. In Justification for Choice A, added comment about PRA importance.</i></b>

### **Question 47 Table-Item Links**

#### Q - 10CFR Sections

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe how the Condensate System is supported by the following systems:

#### **4.16 KV Electrical Distribution (NB)**



Given the following conditions:

- Unit 1 is operating at 100% power.
- 1-E-NAN-S05 faults and is de-energized.
  - PBA-II-S03L, 4.16 KV Bus S03 Norm Sply, is CLOSED.
  - PBA-II-S03K, 4.16 KV Bus S03 Alt Sply, is OPEN.
  - NO 86 lockouts are present.

30 seconds later, what is the expected condition of PBA-S03, 4160 kV bus?

- A. Energized; the NAN-S01 / NAN-S03 "fast bus transfer" will actuate.
- B. De-energized; power can be restored by closing PBA-II-S03K, alternate supply breaker.
- C. De-energized; power can be restored by opening the normal supply breaker, PBA-II-S03L.
- D. Energized; PBA-II-S03B, DG output breaker, closed since there are no 86 lockouts on the bus.

Answer: C

<b>Justification:</b>		
A	Wrong	There is a fast bus transfer between these buses but it only works to keep NAN-S01 energized in case of a turbine trip.
B	Wrong	This is an available means of energizing the bus as identified MVAC step 3 of the FRP. This will not work with the normal supply breaker still closed in.
C	<b>Correct</b>	<b>Per appendix M of 40AO-9ZZ12, Degraded Electrical Power. Ensure that PBA-S03L and K are OPEN. This will allow the DG breaker to auto close.</b>
D	Wrong	As identified in the SPTAs, No lockout present is one of the conditions for the DG breaker, PBA-S03B, to close making this a plausible distracter.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b>40EP-9EO1, Standard Post Trip Actions; 40AO-9ZZ12, Degraded Electrical Power; Lesson Plan NKASYC012711, Emergency Diesel Generator</p> <p><b>K&amp;A:</b>3.6 062 A2.12: 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: Restoration of power to a system with a fault on it</p>		

<b>Question 48 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44161
User-Defined ID:	Q44161
Topic:	Q44161 Action to restore power to PBA-S03 during SPTAs
RO:	3.2
SRO:	3.6
KA #:	3.6 062 A2.12
<b>Revision:</b>	<b>10/01/2013 rev: 0</b> <b>Replaces Q22455</b>

### **Question 48 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

identify any special considerations for restoration of power

Given the following conditions:

- Unit 1 is in Mode 1.
- Battery Charger 'AC' (PKA-H15) is connected to Battery Bus 'C' (PKC-M43).
- Battery Charger 'A' (PKA-H11) trips.

Under these conditions, Battery Charger 'AC' cannot be aligned to both PKA-M41 and PKC-M43 due to a(n) \_\_\_(1)\_\_\_ interlock and the loss of PKA-H11 also results in the loss of \_\_\_(2)\_\_\_.

- A. (1) electrical  
(2) MSIV Logic Control Power
- B. (1) mechanical  
(2) MSIV Logic Control Power
- C. (1) electrical  
(2) AFN-P01 Backup Control Power
- D. (1) mechanical  
(2) AFN-P01 Backup Control Power

Answer: D

<b>Justification:</b>		
A	Wrong	Incorrect because the interlock is mechanical, not electrical. Also incorrect because MSIV Logic Control Power is NOT lost since the battery will still supply the DC loads. Plausible because there <i>are</i> electrical interlocks in the AC electrical distribution system, such as the fast bus transfers between NBN-S01 and NBN-S02 (also NAN-S01-S03; NAN-S02-S04). Also plausible because MSIV Logic Control Power is fed from the PKA-M41 DC control center and because a loss of power to the MSIV logic cabinet will result in a 125V IE CC M41 CHGR A/AC PNL D21 TRBL alarm.
B	Wrong	Incorrect because MSIV Logic Control Power is NOT lost since the battery will still supply the DC loads. Plausible because the first part is correct. Also plausible because MSIV Logic Control Power is fed from the PKA-M41 DC control center and because a loss of power to the MSIV logic cabinet will result in a 125V IE CC M41 CHGR A/AC PNL D21 TRBL alarm.
C	Wrong	Incorrect because the interlock is mechanical, not electrical. Also incorrect because MSIV Logic Control Power is NOT lost since the battery will still supply the DC loads. Plausible because there <i>are</i> electrical interlocks in the AC electrical distribution system, such as the fast bus transfers between NBN-S01 and NBN-S02 (also NAN-S01-S03; NAN-S02-S04). Also plausible because the second part is correct.
D	<b>Correct</b>	Per Operator Information Manual, 4.16kv to 125vdc Electrical Distribution, page 72 of 88, if PKA-H11 trips, Backup Control Power to AFN-P01 will be lost since the Battery Charger supply breaker to PKA-M41 is downstream of the breaker for the AFN-P01 Control Power.  Per Lesson Plan NKASYC128D02, 125 VDC Class IE Power (PK):

“Each charger has four breakers associated with it. The supply breaker located at the MCC, the AC Input and DC Output breakers located on the charger, and the control center feed breaker located on the 125 Vdc control center. Since the backup chargers are capable of supplying either control center in its load group, a mechanical interlock is provided to prevent aligning this charger up to BOTH control centers at the same time.”

**Proposed reference to be provided:** None

**Technical Reference:** Operator Information Manual, 4.16kv to 125vdc Electrical Distribution; Lesson Plan NKASYC128D02, 125 VDC Class IE Power (PK)

**K&A:** 3.2 063 K4.02: Knowledge of DC electrical system design feature(s) and/ or interlock(s) which provide for the following: Breaker interlocks, permissives, bypasses and cross-ties.

<b>Question 49 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44103
User-Defined ID:	Q44103
Topic:	Q44103 (2013) Interlocks on swing chargers
RO	2.9
SRO	3.2
KA#	3.6 063 K4.02
<b>Revision</b>	<b>6/11/13 rev: 0</b>

**Question 49 Table-Item Links**

Q - 10CFR Sections

55.41 (4) Secondary coolant and auxiliary systems that affect the facility.

Q - Cognitive Level

Memory

Q - Question Source

New

O - RO Tier Group Designations

Tier 2 Group 1

Q - RO Exam

RO Exam 2013

**Associated objective(s):**

Explain the operation of the Class IE 125 VDC Battery Chargers under normal operating conditions.

Given the following conditions:

- Unit 1 is operating at 100% power.
- DG "A" left bank Starting Air Receiver is under clearance.
- There is an inadvertent "A" train Safety Injection System actuation.

The remaining right bank receiver and starting air subsystem will apply air to \_(1)\_ diesel cylinder bank(s) and the "A" DG starts in the \_(2)\_ mode.

- A. (1) both  
(2) Test Run
- B. (1) both  
(2) Emergency
- C. (1) only the right  
(2) Test Run
- D. (1) only the right  
(2) Emergency

Answer: B

<b>Justification:</b>		
A	Wrong	Crossover piping allows starting air to be supplied to both banks of diesel cylinders. The diesel starts in the Emergency run mode of operation on an inadvertent SIAS.
B	<b>Correct</b>	<b>Crossover piping allows starting air to be supplied to both banks of diesel cylinders. The diesel starts in the Emergency mode of operation on an inadvertent SIAS.</b>
C	Wrong	Crossover piping allows starting air to be supplied to both banks of diesel cylinders. The diesel starts in the Emergency run mode of operation on an inadvertent SIAS.
D	Wrong	Crossover piping allows starting air to be supplied to both banks of diesel cylinders. The diesel starts in the Emergency run mode of operation on an inadvertent SIAS.
<p><b>PRA SIGNIFICANT QUESTION</b></p> <p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b></p> <p><b>K&amp;A:</b> 3.6 064 K6.07: Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: Air receivers</p>		

<b>Question 50 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44106
User-Defined ID:	Q44106
Topic:	Q44106 (2013) Effect of Loss of 1 Air Receiver on DG
RO	2.7
SRO	2.9
KA#	3.6 064 K6.07
<b>Revision</b>	<b>08/14/2013 rev: 0</b>

### **Question 50 Table-Item Links**

#### Q - 10CFR Sections

55.41 (8) Components, capacity, and functions of emergency systems.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

Modified PV Bank

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe the operation of the Diesel Generator Air Starting Sub-system under normal conditions.

Given the following plant conditions:

- A loss of offsite power has occurred.
- Diesel Generator 'A' has started and is carrying PBA-S03.
- The operator selects "LOWER" on the voltage regulator control switch.

Assuming NO Operator actions (other than those addressed in the choices below), which ONE of the following identifies the effect, if any, of this action?

- A. The indicated amps will rise.
- B. The indicated voltage lowers AS the switch is held.
- C. The indicated voltage will change ONLY when the DG is taken to override.
- D. The VAR meter will move in the counter-clockwise direction AS the switch is held.

Answer: C

<b>Justification:</b>		
A	Wrong	Incorrect because ONLY the <i>internal</i> voltage setting WILL change as the switch is placed in LOWER. Plausible because, in the Test Start mode, amps will increase as voltage is lowered if the DG is supplying a leading pF.
B	Wrong	Incorrect because indicated voltage will NOT change until the DG is in override. Plausible because the <i>internal</i> voltage setting WILL change as the switch is placed in LOWER.  Per Lesson Plan NKASYC012711, Emergency Diesel Generator, Page 60:  “When the DG is started in Emergency Mode, the following conditions will exist: <ul style="list-style-type: none"> <li>• Diesel generator voltage and frequency are preset</li> <li>• It is important to note that while in emergency run, the controls will not affect diesel generator speed or voltage, however the potentiometers for these circuits are still being adjusted. When the diesel generator is taken to override, the speed and/or voltage will immediately go to the value determined by the position of these potentiometers. This may result in unacceptable speed or voltage transients when the DG is taken to override.”</li> </ul>
C	Correct	Per Lesson Plan NKASYC012711, Emergency Diesel Generator, Page 60:  “When the DG is started in Emergency Mode, the following conditions will exist: <ul style="list-style-type: none"> <li>• Diesel generator voltage and frequency are preset</li> <li>• It is important to note that while in emergency run, the controls will not affect diesel generator speed or voltage; however, the potentiometers for these circuits are still being adjusted. When the diesel generator is taken to override, the speed and/or voltage will immediately go to the value determined by the position of these potentiometers. This may result in unacceptable speed or voltage transients when the DG is taken to override.”</li> </ul>



		<p>Per Lesson Plan NKASYC012711, Emergency Diesel Generator, Page 42:</p> <p>“In the emergency run mode, the governor controls on the local or remote panels have no effect on the setting of the governor, but in the test mode or in override they will.”</p> <p>Per Lesson Plan NKASYC012711, Emergency Diesel Generator, Page 44:</p> <p>“It is important to note that while in emergency run, the controls will not affect diesel generator speed or voltage, however the potentiometers for these circuits are still being adjusted. When the diesel generator is taken to override, the speed and/or voltage will immediately go to the value determined by the position of these potentiometers. This may result in unacceptable speed or voltage transients when the DG is taken to override.”</p> <p>Per 40ST-9DG01, Diesel Generator A Test, Section 3.2.6:</p> <p>“Emergency Mode Conditions:</p> <p>When the engine is started in the emergency run mode, speed and voltage are maintained automatically. Raise and lower switches will have no effect on running engine speed or voltage; they will, however, continue to change the settings of the rheostats.”</p>
D	Wrong	<p>Incorrect because indicated VARs will NOT change until the DG is in override. Plausible because the <i>internal</i> voltage setting (and subsequently VARs) WILL change as the switch is placed in LOWER.</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> Lesson Plan NKASYC012711, Emergency Diesel Generator; 40ST-9DG01, Diesel Generator A Test</p> <p><b>K&amp;A:</b> 3.6 064 A4.01: Ability to manually operate and/or monitor in the control room: Local and remote operation of the ED/G</p>		

<b>Question 51 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	611
User-Defined ID:	Q6141
Topic:	Q6141 (2013) DG voltage switch to LOWER w/o override first
RO	4.0
SRO	4.3
KA#	3.6 064 A4.01
<b>Revision</b>	<b>9/27/13 rev: 1: Choice A – Replaced “no effect” with “DG amps will rise.” Revised Justification for Choice A accordingly.</b>

### **Question 51 Table-Item Links**

#### **Q - 10CFR Sections**

55.41 (8) Components, capacity, and functions of emergency systems.

#### **Q - Cognitive Level**

Comprehension / Anal

#### **Q - Question Source**

PV Bank Not Modified

#### **O - RO Tier Group Designations**

Tier 2 Group 1

#### **Q - RO Exam**

RO Exam 2013

### **Associated objective(s):**

Describe the operation of the following Diesel Generator Control Features:

- Start/Run
- DGSS
- Loss of Power
- Stopping



Given the following conditions:

- Unit 1 has entered 40AO-9ZZ03. Loss of Cooling Water.
- Essential Cooling Water train "A" has been cross-tied to the Nuclear Cooling Water system.
- An RCS leak into the Nuclear Cooling Water system now occurs.

The Process Radiation Monitoring system will respond by alarming...

- A. RU-6, Nuclear Cooling Water, ONLY.
- B. RU-2, "A" Essential Cooling Water, ONLY.
- C. RU-2, "A" Essential Cooling Water, AND RU-6, Nuclear Cooling Water.
- D. RU-2, "A" Essential Cooling Water, ONLY and closing the EW-NC cross-tie valves.

Answer: B

<b>Justification:</b>		
A	Wrong	<p>Incorrect because <i>RU-2</i> will alarm, not <i>RU-6</i>. Plausible because the alarm response for <i>RU-2</i> directs the Operator to perform the <i>RU-6</i> alarm response, in addition to the <i>RU-2</i> alarm response, if <i>EW</i> is cross-connected to <i>NC</i>. Also plausible because <i>RU-6</i> is the normal monitor for the <i>NC</i> System.</p> <p>Per 74RM-9EF41, Page 13 of 83, Appendix A, Monitor No. <i>RU-2/RU-3</i>:</p> <p>"If <i>EW</i> is cross-tied to the <i>NC</i> system, concurrently perform <i>RU-6</i> alarm response."</p> <p>Per Lesson Plan NKASYC010403, Nuclear Cooling Water System, Page 24:</p> <p>"NOTE: If the <i>NCW</i> system is being supplied by the Essential Cooling Water System, <i>RU-6</i> is NOT in the flowpath, the monitor is still on line and would alarm if contaminated water were to migrate to the detector but it is not expected to alarm due to no flow through the detector to transport the contamination to the detector. Under these conditions, either <i>RU-2</i> (ECWS "A") or <i>RU-3</i> (ECWS "B") is used to monitor for activity in the <i>NC</i> system depending on what train is cross-connected to the <i>NCW</i> system."</p>
B	Correct	<p><b>Per Lesson Plan NKASYC010403, Nuclear Cooling Water System, Page 24:</b></p> <p><b>"NOTE: If the <i>NCW</i> system is being supplied by the Essential Cooling Water System, <i>RU-6</i> is NOT in the flowpath, the monitor is still on line and would alarm if contaminated water were to migrate to the detector but it is not expected to alarm due to no flow through the detector to transport the contamination to the detector. Under these conditions, either <i>RU-2</i> (ECWS "A") or <i>RU-3</i> (ECWS "B") is used to monitor for activity in the <i>NC</i> system depending on what train is cross-connected to the <i>NCW</i> system."</b></p>

C	Wrong	<p>Incorrect because <i>RU-2</i> will alarm, not <i>RU-6</i>. Plausible because the alarm response for <i>RU-2</i> directs the Operator to perform the <i>RU-6</i> alarm response, in addition to the <i>RU-2</i> alarm response, if <i>EW</i> is cross-connected to <i>NC</i>. Also plausible because <i>RU-6</i> is the normal monitor for the <i>NC</i> System.</p> <p>Plausible because the first part is correct.</p>
D	Wrong	<p>Incorrect because the <i>EW-NC</i> cross-tie valves will not close on a high radiation alarm. Plausible because the 1<sup>st</sup> part is correct and because other systems have automatic actions when a radiation monitor goes into alarm. For example, <i>RU-7</i> will swap discharge from the Auxiliary Steam Condenser Receiving Tanks from the Main Condenser to the Low TDS Holdup Tank.</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 74RM-9EF41, Radiation Monitoring System Alarm Response; Lesson Plan NKASYC010403, Nuclear Cooling Water System</p> <p><b>K&amp;A:</b> 3.7 073 K1.01: Knowledge of the physical connections and/or cause/effect relationships between the PRM system and the following systems: Those systems served by PRMs</p>		

Question 52 Info	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	22549
User-Defined ID:	Q22549
Topic:	Q22549 (2013) PRM alarms when EW cross-tied to NCW
RO	3.6
SRO	3.9
KA#	3.7 073 K1.01
<b>Revision</b>	<b>9/27/13 rev: 1: Revised original Choice A from “no alarms” to “RU-2 ONLY and EW-NC cross-ties closed” and resequenced Choices shortest-longest. Reordered Justifications for all 4 Choices accordingly.</b>

**Question 52 Table-Item Links**

Q - 10CFR Sections

55.41 (4) Secondary coolant and auxiliary systems that affect the facility.

Q - Cognitive Level

Comprehension / Anal

Q - Question Source

PV Bank Not Modified

O - RO Tier Group Designations

Tier 2 Group 1

Q - RO Exam

RO Exam 2009

RO Exam 2013

**Associated objective(s):**

Explain the operation of the Process Radiation Monitors under normal operating conditions.

Given the following conditions:

- Nuclear cooling water has been lost due to a pipe rupture in the yard.
- Essential Cooling Water Train "A" has been cross-connected to supply priority loads.
- No other equipment is out of service or in an abnormal lineup.

WHICH ONE of the following identifies the plant conditions that will isolate essential cooling water to the Reactor Coolant Pumps?

- A. RCS pressure of 1800 psia.
- B. HIGH level in EW 'A' Surge Tank.
- C. Containment pressure of 2.6 psig.
- D. LOW pressure in EW 'A' Surge Tank.

Answer: A

<b>Justification:</b>														
A	<b>Correct</b>	<p>An RCS pressure of 1800 psia is less than the SIAS setpoint of 1837 psia.                      Per Lesson Plan NKASYC010703, Essential Cooling Water System, Page 18:</p> <p>“The EW to NC cross-tie valves will automatically close on either of the following signals:</p> <ul style="list-style-type: none"> <li>• SIAS</li> <li>• LO Level in the Surge Tank”</li> </ul>												
B	Wrong	<p>Incorrect and plausible because a LOW level, NOT a HIGH level will isolate the cross-connect valves.</p> <p>Per 41AL-1RK2A, Panel B02A Alarm Responses, Window No. 2A09A:</p> <p>Lo Alarm                      1. If Train A EW is cross connected to nuclear cooling water, and the EW surge tank level drops to 17 inches, the EW to NC cross-tie valves (EWA-UV-65/145) will auto close.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">PT. ID</th> <th style="text-align: left;">POSSIBLE CAUSE</th> <th style="text-align: left;">SETPOINT</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;"><u>GROUP A</u></td> <td></td> </tr> <tr> <td>EWLS97</td> <td>Ess Cooling Water Surge Tank A level Hi-Lo</td> <td>Hi 50 inches Lo 20 inches</td> </tr> <tr> <td>EWLS98</td> <td>Ess Cooling Water Surge Tank B level Hi-Lo</td> <td>Hi 50 inches Lo 20 inches</td> </tr> </tbody> </table>	PT. ID	POSSIBLE CAUSE	SETPOINT		<u>GROUP A</u>		EWLS97	Ess Cooling Water Surge Tank A level Hi-Lo	Hi 50 inches Lo 20 inches	EWLS98	Ess Cooling Water Surge Tank B level Hi-Lo	Hi 50 inches Lo 20 inches
PT. ID	POSSIBLE CAUSE	SETPOINT												
	<u>GROUP A</u>													
EWLS97	Ess Cooling Water Surge Tank A level Hi-Lo	Hi 50 inches Lo 20 inches												
EWLS98	Ess Cooling Water Surge Tank B level Hi-Lo	Hi 50 inches Lo 20 inches												

C	Wrong	Incorrect because 2.6 psig is below the SIAS setpoint of 3.0. Plausible because, if Containment pressure was greater than 3.0, this would be true and the cross-connect valves would close.
D	Wrong	<p>Incorrect because the EW-NC cross-connect valves do NOT close on LOW <u>pressure</u> in the surge tank. Plausible because the cross-connect valves will close on LOW <u>level</u>. Also plausible because the ESS CLG WTR SYS TRBL (Window No. 2A09A) alarm response draws a clear correlation between surge tank pressure and surge tank level in the NOTE preceding Second Priority Action 1 as follows:</p> <p>Per 41AL-1RK2A, Panel B02A Alarm Responses, Window No. 2A09A:</p> <p>“Normal EW surge tank pressure is 0.5 to 2.0 psig. A rising pressure in the EW Surge Tank may be the result of rising level in the surge tank.”</p> <p>Conversely, a <i>lowering</i> surge tank pressure may be indicative of a <i>lowering</i> tank level.</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 41AL-1RK2A, Panel B02A Alarm Responses; Lesson Plan NKASYC010703, Essential Cooling Water System</p> <p><b>K&amp;A:</b> 3.4 076 A3.02: Ability to monitor automatic operation of the SWS, including: Emergency heat loads</p>		

Question 53 Info	
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	4761
User-Defined ID:	Q20824
Topic:	Q20824 (2013) Automatic functions associated with EW "A" when cross-connected to NC
RO	3.7
SRO	3.7
KA#	3.4 076 A3.02
<b>Revision</b>	<b>6/12/13 rev: 0</b>



## **Question 53 Table-Item Links**

### Q - 10CFR Sections

55.41 (4) Secondary coolant and auxiliary systems that affect the facility.

### Q - Cognitive Level

Comprehension / Anal

### Q - Question Source

PV Bank Not Modified

### O - RO Tier Group Designations

Tier 2 Group 1

### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

Describe the normal operation of the Essential Cooling Water system.

Describe the automatic functions associated with the Essential Cooling Water Cross-tie to Nuclear Cooling Water Valves EWA-UV-145 and EWA-UV-65.

Given the following plant conditions:

- The Unit 1 crew has implemented 40AO-9ZZ06, Loss of Instrument Air.
- IAA-UV-2, Outside Contmt Isol Valve, has failed CLOSED and will not reopen from B07.
- When attempting to align Service Air via the cross-tie, the Cross-Tie filters indicated a need for replacement (yellow indicator).

In accordance with 40AO-9ZZ06, \_\_ (1) \_\_ which ONE of the following actions must be taken to restore the Containment Instrument Air header and \_\_ (2) \_\_ what will be the makeup source?

- A. (1) Manually open UV-2, in the East Penetration of the AB 120' elevation, using the LOCAL valve operator  
(2) Service Air
- B. (1) Manually open UV-2, in the East Penetration of the AB 120' elevation, using the LOCAL valve operator  
(2) Instrument Air
- C. (1) Install a temporary modification to route a rubber hose between two valves on the 90' elevation inside Containment  
(2) Instrument Air
- D. (1) Install a temporary modification to route a rubber hose between two valves on the 90' elevation inside Containment  
(2) Low pressure Nitrogen

Answer: D

Justification:		
A	Wrong	Incorrect because the valve cannot be locally operated. Also incorrect because the makeup source will be LP Nitrogen, not Service Air. Plausible because a novice operator may believe that the isolation valve is an AOV or MOV, which may have a local operator, not a solenoid. Also plausible because the second part <i>may</i> be correct if the valve <i>could be</i> locally opened. Also plausible because Step 5 of 40AO-9ZZ06, directs the operator to (manually) open IAA-UV-2, although from B07, not locally.
B	Wrong	Incorrect because the valve cannot be locally operated. Also incorrect because the makeup source will be LP Nitrogen, not Instrument Air. Plausible because a novice operator may believe that the isolation valve is an AOV or MOV, which may have a local operator, not a solenoid. Also plausible because the second part <i>may</i> be correct if the valve <i>could be</i> locally opened. Also plausible because Step 5 of 40AO-9ZZ06, directs the operator to (manually) open IAA-UV-2, although from B07, not locally.
C	Wrong	Incorrect because the makeup source will be LP Nitrogen, not Instrument Air. Plausible because the first part is correct. Also plausible because a novice operator may believe that the purpose of the temporary modification is to jumper around IAA-UV-2 and supply the Containment header from its normal source.

Per NOTE prior to Step 2 in 40AO-9ZZ06, Loss of Instrument Air, Appendix J, Aligning N2 to the CTMT Instrument Air Header:

“This appendix will install a T-Mod to place Low Pressure N2 in service on the CTMT IA Header when IAA-UV-2 has failed closed and will not reopen. This appendix routes a rubber hose between GAN-V062 and IAN-V1036 inside Containment.”

Per Contingency Action 5.2 of 40AO-9ZZ06, Loss of Instrument Air:

“**IF** any Instrument Air/Service Air Cross-Tie filter indicate the need for replacing, **THEN** consider aligning nitrogen to the Containment Instrument Air header, REFER TO Appendix J, Aligning N2 to the CTMT Instrument Air Header.”

Plant Event - Unit 3 Loss of IA:

While a Loss of Instrument Air to the Containment can be caused by other failures, the loss of IA in Unit 3 on 12/3/09 resulted from a failure of the solenoid on IAA-UV-2, Instrument Air to the Containment Isolation Valve. This failure brought in an alarm associated with PKA-M41. The alarm, Bus Undv/Ground/Breaker, cleared when the AO investigated. When instrument air is lost to containment, it initially results in RCP seal bleed-off flow being redirected to the RDT via a relief valve as CHA-UV-506 fails closed. Also, RCP Seal Injection valves fail open and the Charging Line Back Pressure Control Valve (CHNPDV-240) fails closed.

IIR3-2-90-047: Switching of Air Dryers causes a Loss of Instrument Air, TCS 91-0425, Dec. 18, 1990

### **PVNGS OE and recent MOD**

**Proposed reference to be provided:** None

**Technical Reference:** 40AO-9ZZ06, Loss of Instrument Air; Lesson Plan NKASMC030607, Loss of Instrument Air

**K&A:** 3.8 078 2.1.30: Ability to locate and operate components, including local controls. (Instrument Air)

<b>Question 54 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
System ID:	44108
User-Defined ID:	Q44108
Topic:	Q44108 (2013) Actions and source if UV-2 won't open during Loss of IA
RO	4.4
SRO	4.0
KA#	3.8 078 2.1.30
<b>Revision</b>	<b>9/27/13 rev: 1: Added specific locations to all 4 Choices to better match the "locate" aspect of the K/A.</b>

### **Question 54 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

Determine what actions will be taken if IAA-UV-2, Outside Containment Isolation Valve has failed closed.



Given the following conditions:

- Containment Building Normal ACU Fans A01A and A01C are running.
- Containment Building Normal ACU Fans A01B and A01D control switches are in Normal After Stop.
- Fan A01A trips.

Two minutes after the A01A fan trips, fans \_\_\_\_(1)\_\_\_ will be running to help maintain Containment Air Temperature within the Technical Specification 3.6.5 limit of \_\_\_\_(2)\_\_\_ °F.

- A. 1) A01B and A01D  
2) 117
- B. 1) A01B and A01D  
2) 170
- C. 1) A01B and A01C  
2) 117
- D. 1) A01B and A01C  
2) 170

Answer: C

<b>Justification:</b>		
A	Wrong	Incorrect since A01B and A01C will be running, not A01B and A01D. Plausible because the CEDM Normal ACU fans operate in pairs (B/D and A/C) and a novice operator may confuse operation of the Containment Building Normal ACU Fans with the CEDM fans. Also plausible because the 2 <sup>nd</sup> part is correct. Also plausible because the two minute time provided in the stem is the time delay for auto-start of the standby CEDM fans.
B	Wrong	Incorrect since A01B and A01C will be running, not A01B and A01D. Plausible because the CEDM Normal ACU fans operate in pairs (B/D and A/C) and a novice operator may confuse operation of the Containment Building Normal ACU Fans with the CEDM fans. Also incorrect because the TS limit is 117°F, not 170°F. Also plausible because 170°F is the Containment Temperature value for harsh conditions in EOPs. Also plausible because the two minute time provided in the stem is the time delay for auto-start of the standby CEDM fans.  Per 40EP-9EO03, Loss of Coolant Accident, NOTE prior to Step 1: “Harsh conditions are containment temperature greater than 170°F or containment radiation level greater than 10 <sup>8</sup> mR/hr. Harsh containment values are placed in brackets next to the normal setpoint or band.”
C	<b>Correct</b>	Per T.S. 3.6.5 LCO:  “3.6.5 Containment Air Temperature LCO 3.6.5 Containment average air temperature shall be ≤ 117°F.”

		<p>Per Lesson Plan NKASYC130B02, Containment Building HVAC, Page 15:          “The fans are all of vane-axial type and are paired together, with each pair discharging to a common duct. The pair arrangement is the “A” and “B” along with the “C” and “D”. Under normal conditions, one fan in each pair is operating. Power is supplied by Class 1E 480 Vac Load Centers.”</p> <p>Per Lesson Plan NKASYC130B02, Containment Building HVAC, Page 18:          “Upon a trip of an operating fan (sensed by a low D/P across the fan), the other fan will automatically start after a 60 second time delay as long as its control switch is in the “Normal After Stop” position.”</p>
D	Wrong	<p>Incorrect since A01B and A01C will be running, not A01B and A01D. Plausible because the CEDM Normal ACU fans operate in pairs (B/D and A/C) and a novice operator may confuse operation of the Containment Building Normal ACU Fans with the CEDM fans. Also incorrect because the TS limit is 117°F, not 170°F. Also plausible because 170°F is the Containment Temperature value for harsh conditions in EOPs.</p> <p>Per 40EP-9EO03, Loss of Coolant Accident, NOTE prior to Step 1:          “Harsh conditions are containment temperature greater than 170°F or containment radiation level greater than 10<sup>8</sup> mR/hr. Harsh containment values are placed in brackets next to the normal setpoint or band.”</p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> T.S. 3.6.5 LCO; 40AL-9RK6B, Panel B06B Alarm Responses; Lesson Plan NKASYC130B02, Containment Building HVAC; 40OP-9HC01, Containment HVAC (HC); 40EP-9EO03, Loss of Coolant Accident</p> <p><b>K&amp;A:</b> 3.5 103 A1.01: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the containment system controls including: Containment pressure, temperature, and humidity</p>		

<b>Question 55 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44110
User-Defined ID:	Q44110
Topic:	Q44110 (2013) Time delay to start stby Cont Norm ACUs and TS Cont temp limit
RO	3.7
SRO	4.1
KA#	3.5 103 A1.01
<b>Revision</b>	<b>6/13/13 rev: 0</b>

### **Question 55 Table-Item Links**

#### Q - 10CFR Sections

55.41 (4) Secondary coolant and auxiliary systems that affect the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 1

#### Q - RO Exam

RO Exam 2013

### **Associated objective(s):**

Explain the operation of the Containment Building Normal ACUs (HCN-A01-A, B, C, & D) under normal operating conditions.



Given the following conditions:

- Unit 1 is operating at 50% power.
  - Letdown flow is 65 gpm and lowering.
  - Charging pumps CHA-P01 and CHE-P01 are running.
  - Charging pump CHB-P01 is available.
  - RCS temperature is stable.
  - PZR level is 40% and lowering at 0.5% per minute.
1. The leakrate IS WITHIN/EXCEEDS the capacity of all three charging pumps with letdown isolated.
  2. Per 40AO-9ZZ02, Excessive RCS Leakrate the following actions should be taken...
    - A.
      1. EXCEEDS
      2. Isolate letdown; then start an additional charging pump and trip the reactor.
    - B.
      1. EXCEEDS
      2. Start an additional charging pump; then isolate letdown and trip the reactor.
    - C.
      1. IS WITHIN
      2. Isolate letdown; if level continues to lower then start an additional charging pump.
    - D.
      1. IS WITHIN
      2. Start an additional charging pump; if level continues to lower then isolate letdown.

Answer: D

<b>Justification:</b>		
A	Wrong	Pzr level lowering at .5% minute = 33 gallons a minute, which is well within either the capacity of starting a charging pump or reduction of letdown flow. Two charging pumps makeup at 88 gpm. Three charging pumps makeup at approximately 130 gpm.  COMMENT ON OVERLAP: This question was reviewed against the 2013 Operating exam and that there was enough difference to keep this question on the written exam.
B	Wrong	
C	Wrong	Start a charging pump then isolate letdown is the procedural direction
D	<b>Correct</b>	<b>Per 40AO-9ZZ02</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ02, Excessive RCS Leakrate</p> <p><b>K&amp;A:</b> Knowledge of abnormal condition procedures.</p>		

<b>Question 56 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44093
User-Defined ID:	Q44093
Topic:	Q44093 knowledge of the Excessive RCS leakrate procedure
RO:	4.0
SRO:	4.2
KA #:	2.4.11
<b>Revision:</b>	<b>10/04/2013 rev:1: A"COMMENT ON OVERLAP" to Justification for Choice A:</b>

### **Question 56 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

describe the basic procedure methodology, including Reactor Trip is thresholds,

What are the power supplies to the Charging Pumps?

1. Charging Pump #1, CHA-P01
2. Charging Pump #2, CHB-P01
3. Charging Pump #3, CHE-P01
  - A.
    1. PGA-L31
    2. PGB-L32
    3. PGA-L33 or PGB-L34
  - B.
    1. PGA-L31
    2. PGB-L32
    3. PGA-L35 or PGB-L36
  - C.
    1. PHA-M31
    2. PHB-M32
    3. PHA-M33 or PHB-M34
  - D.
    1. PHA-M31
    2. PHB-M32
    3. PHA-M35 or PHB-M36

Answer: B

<b>Justification:</b>		
A	Wrong	L31 and L32 are correct but the power supply to CHE-P01 is incorrect, but are credible since they are class Load Centers
B	<b>Correct</b>	<b>As found in the CH01 operating procedure</b>
C	Wrong	The PH designator indicates the 480 vac motor control centers and is wrong since these pumps come off of the 480 vac LCs. Credible since they are also 480vac class power and located in the Control Building. PH powers other motors such as EC circ pump, DG oil transfer pump, DG Jacket Water pump and Condensate transfer pumps.
D	Wrong	
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40OP-9CH01, CVCS Normal Operations</p> <p><b>K&amp;A:</b> Knowledge of bus power supplies to the following: Charging Pumps</p>		

<b>Question 57 Info</b>	
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	44166
User-Defined ID:	Q44166
Topic:	Q44166 charging pump power supplies
RO:	3.1
SRO:	3.2
KA #:	3.2 011 K2.01
<b>Revision:</b>	<b>10/02/2013 rev: 0</b> <b>Replaces Q44095</b>

### **Question 57 Table-Item Links**

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Explain the operation of the Charging Pumps under normal operating conditions.

Given the following conditions:

- Unit 1 is operating at 80% power following a SNOW outage.
- Group 5 CEAs are 120 inches withdrawn.
- The CRS directs a 10 inch withdrawal for ASI control.
- The operator is monitoring CEA 14 on SEN-JI-17, Selected CEA Position.
- On the 4th step out CEA 16 motion stops due to a Timer Card failure.
- The operator continues the CEA withdrawal.

Which ONE of the following reflects CEA 16s:

1. Reed Switch Position Transmitters, CEACs
2. Board 4 alarms that will be generated
  - A. (1) 123 inches (2) CEA Withdrawal Prohibit, CWP.
  - B. (1) 124 inches (2) CEA Withdrawal Prohibit, CWP.
  - C. (1) 123 inches (2) Automatic Withdrawal Prohibit, AWP.
  - D. (1) 124 inches (2) Automatic Withdrawal Prohibit, AWP.

Answer: A

<b>Justification:</b>		
<b>A</b>	<b>Correct</b>	<b>4 x .75 = 3 inches of movement. As the remaining CEAs withdrawl a CWP will be generated at 5.5 inch deviation within a subgroup.</b>
<b>B</b>	<b>Wrong</b>	CEAs move $\frac{3}{4}$ inch with each step not 1 inch. 2 <sup>nd</sup> part is correct - CWP
<b>C</b>	<b>Wrong</b>	4 x .75 = 3 inches of movement. As the remaining CEAs withdrawl a CWP will be generated at 5.5 inch deviation within a subgroup. AWP is generated to stop CEA motion due to temp or SBCS demands
<b>D</b>	<b>Wrong</b>	CEAs move $\frac{3}{4}$ inch with each step not 1 inch. AWP is generated to stop CEA motion due to temp or SBCS demands
<p><b>PVNGS MOD - ACTM</b></p> <p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> LOIT Lesson Plans</p> <p><b>K&amp;A:</b> Knowledge of the operational implications of the following concepts as they apply to the RPIS: RPIS independent of demand position</p>		

<b>Question 58 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44098
User-Defined ID:	Q44098
Topic:	Q44098 Explain the operation of the RSPT (Reed Switch Position Transmitter).
RO:	2.8
SRO:	3.3
KA #:	3.1 014 K5.02
<b>Revision:</b>	<b>06/05/2013 rev: 0</b>

### **Question 58 Table-Item Links**

#### Q - 10CFR Sections

55.41 (6) Design, components, and functions of reactivity control mechanisms and instrumentation.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Explain the operation of the RSPT (Reed Switch Position Transmitter).

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- Group 5 CEAs are at 140 inches withdrawn.
- The Reactor Regulating System (RRS) is aligned to average Tav<sub>g</sub>.
- RCN-TT-111Y (Tcold) input into the RRS fails LOW.

Which ONE of the following conditions has, or could, occur due to this failure?

- A. The letdown control valve(s) will modulate open.
- B. Prevents a "Quick Open Block" following a reactor trip.
- C. Prevents turbine runback demand to RPCS on a cutback.
- D. A maximum SG refill demand would be generated following a reactor trip.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<b>Low temperature causes the PLCS to lower its program setpoint causing the letdown control valves to come open.</b>
B	Wrong	This would be generated on a hi temp failure. See Appendix B, Page 1 of 3, of 40AO-9ZZ16, RRS Malfunctions.
C	Wrong	This would be generated on a hi temp failure. See Appendix B, Page 1 of 3, of 40AO-9ZZ16, RRS Malfunctions.
D	Wrong	This would be generated on a hi temp failure. See Appendix B, Page 1 of 3, of 40AO-9ZZ16, RRS Malfunctions.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ16, RRS Malfunctions; PVNGS Operator Information Manual, Page 60 of 88</p> <p><b>K&amp;A:</b> 3.7 016 K3.02: Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: PZR LCS</p>		

<b>Question 59 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
System ID:	44105
User-Defined ID:	Q44105
Topic:	Q44105 response of the Pressurizer Level Control System to a failure of a Temperature transmit
RO:	3.4
SRO:	3.5
KA #:	3.7 016 K3.02
<b>Revision:</b>	<b>09/30/2013 rev: 1: Replaced "A CEA insertion demand will be generated" with "Prevents turbine runback demand to RPCS on a cutback." to improve credibility. Resequenced choices shortest-longest. Resequenced Justifications accordingly and expanded Justifications. Inserted "SG" in Choice D to clarify "what refill."</b>

### **Question 59 Table-Item Links**

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe the response of the Pressurizer Level Control System to a failure of a Temperature transmitter.



Given the following conditions:

- The CRS has entered 40EP-9EO03, LOCA, following a major plant transient.
- The hydrogen analyzers indicate 0.4% hydrogen and rising in containment.
- Containment pressure is 4.2 psig and rising.
- Containment Spray flow is adequate.

To prevent exceeding the \_\_\_(1)\_\_\_ limit of 4% hydrogen, 40EP-9EO03 **FIRST** directs the crew to place the \_(2)\_ in service.

- A. (1) explosive  
(2) Hydrogen Recombiners
- B. (1) flammable  
(2) Hydrogen Recombiners
- C. (1) explosive  
(2) Hydrogen Purge Exhaust System
- D. (1) flammable  
(2) Hydrogen Purge Exhaust System

Answer: B

<b>Justification:</b>		
A	Wrong	Recombiners are placed in service as directed by the LOCA procedure and at the discretion of the CRS/SM. Placed in service if H2 concentration is > 0.7% per step 67 of LOCA. Also placed in service when CSAS is actuated (Step 17).
B	<b>Correct</b>	<b>Recombiners are placed in service as directed by the LOCA procedure and at the discretion of the CRS/SM. Placed in service if H2 concentration is &gt; 0.7% per step 67 of LOCA.</b>
C	Wrong	Use of the H2 Purge Exhaust System is normally limited to when the Hydrogen Recombiners are ineffective.
D	Wrong	
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO03, LOCA; 40OP-9HP02, Hydrogen Recombiners; LOIT Lesson Plan</p> <p><b>K&amp;A:</b> Malfunctions or operations on the HRPS; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: LOCA condition and related concern over hydrogen</p>		

<b>Question 60 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44162
User-Defined ID:	Q44162
Topic:	Q44162 LOCA - Flammable/explosive limit for H2 & action required
RO:	3.5
SRO:	3.9
KA #:	3.5 028 A2.02
<b>Revision:</b>	<b>09/30/2013 rev: 1: Rewrote stem to ask for "flammable/explosive" (prediction/consequence) to better match the K/A and required action in LOCA procedure.</b>

### Question 60 Table-Item Links

#### Q - 10CFR Sections

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Discuss the purpose and conditions under which the Hydrogen Control System is designed to function.



Given the following conditions:

- PCA-P01 (Spent Fuel Pool Cooling Pump A) is operating on the Spent Fuel Pool.
- A large break occurs in the discharge of the pump.

Which ONE of the following will prevent Spent Fuel Pool level from lowering to the point of uncovering fuel assemblies?

- A. Excessive flow check valves will automatically close.
- B. PCA-P01 (Spent Fuel Pool Cooling Pump A) will trip on high discharge flow.
- C. PCA-P01 (Spent Fuel Pool Cooling Pump A) will trip on low suction pressure.
- D. Fuel pool cooling suction piping will become uncovered by the lowering spent fuel pool level.

Answer: D

<b>Justification:</b>		
A	Wrong	The check valves installed on the discharge of the pump are not excessive flow check valves as used in other locations in the plant.
B	Wrong	PC Cooling Pumps are not provided with a high discharge flow trip. Some pumps at PVNGS do have a high discharge pressure trip.
C	Wrong	PC Cooling Pumps are not provided with a low suction pressure trip. Some pumps installed at PVNGS do have a low suction trip.
D	<b>Correct</b>	<b>Fuel pool cooling suction piping is in the upper level of the SFP</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> LOIT PC Lesson Plan</p> <p><b>K&amp;A:</b> 3.8 033 K4.01: Knowledge of design feature(s) and/or interlock(s) which provide for the following: Maintenance of spent fuel level</p>		

<b>Question 61 Info</b>	
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	43770
User-Defined ID:	Q43770
Topic:	Q43770 PC anti-siphon
RO:	2.9
SRO:	3.2
KA #:	3.8 033 K4.01
<b>Revision:</b>	<b>06/13/2013 rev: 0</b>

### **Question 61 Table-Item Links**

#### Q - 10CFR Sections

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### Q - Cognitive Level

Memory

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2010

RO Exam 2013

#### **Associated objective(s):**

Describe the flowpaths of the PC System to include these major components:

- Spent Fuel Pool
- PC Cooling Pumps
- PC Heat Exchangers

Explain the operation of the Spent Fuel Pool under normal operating conditions.

Which ONE of the following is the procedural guidance found in the Standard Appendices, 40EP-9EO10, with regards to establishing feedwater flow if both SGs are dry?

- A. Feed both SGs at a maximum of 1000 gpm.
- B. Feed only one (1) SG at a maximum of 1000 gpm.
- C. Feed both SGs at a maximum of 1600 gpm.
- D. Feed only one (1) SG at a maximum of 1600 gpm.

Answer: B

<b>Justification:</b>		
A	<b>Wrong</b>	Fill only one SG as stated in the Std App associated with restoring FW flow to dry SGs.
B	<b>Correct</b>	Per the procedures 1000 gpm or less and only 1 SG.
C	<b>Wrong</b>	The max fill rate is 1000 gpm as stated in all of the SA associated with restoring FW flow to dry SGs. The 1600 gpm is the upper FW flow rate with a dual event; an ESD on a SG with a tube leak that is releasing to atmosphere.
D	<b>Wrong</b>	
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> Standard Appendices, 40EP-9EO10</p> <p><b>K&amp;A:</b> 3.4 035 A4.02: Ability to manually operate and/or monitor in the control room: Fill of dry S/G</p>		

<b>Question 62 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44117
User-Defined ID:	Q44117
Topic:	Q44117 Feedrate limits to a dry SG
RO:	2.7
SRO:	2.8
KA #	3.4 035 A4.02
<b>Revision:</b>	<b>07/17/13 rev: 0</b>

### **Question 62 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

describe the feedrate used when feeding a SG that has experienced dryout (including the bases)

Given the following conditions:

- The Reactor is stable at 50% power.
- The Main Turbine has tripped.
- Normal CEA overlap has been established.

Subsequently

- CEAs are withdrawn 10 inches in Manual Sequential.

If the Steam Bypass Master Controller, SGN-PIC-1010 is in Remote/Auto, which ONE of the following correctly describes the expected response?

RCS T-cold increases \_\_(1)\_\_ and reactor power \_\_(2)\_\_.

- (1) and remains higher (2) increases slightly but returns to 50%
- (1) and remains higher (2) increases and remains at a higher level
- (1) then returns to program (2) increases slightly but returns to 50%
- (1) then returns to program (2) increases and remains at a higher level

Answer: D

<b>Justification:</b>		
A	Wrong	SBCS in auto means it is controlling temperature not power. Examinees may confuse 100% power response with what happens when SBCS is maintaining the plant. CEA withdrawal at power raises temperature since the turbine is maintaining power.  This is an old PVNGS event, in an attempt: following a turbine trip the crew was attempting to raise temperature by withdrawing CEAs. The operator pulled CEAs until a VOPT trip occurred.
B	Wrong	
C	Wrong	
D	<b>Correct</b>	<b>Tcold will increase as CEAs are withdrawn then return to program as the SBCS controls temperature. Power increases due to the positive reactivity</b>
<b>PVNGS OE</b>		
<b>Proposed reference to be provided:</b> None		
<b>Technical Reference:</b> 40AO-9ZZ08, Load Rejection		
<b>K&amp;A:</b> 3.4 041 A3.02: Ability to monitor automatic operation of the SDS, including: RCS pressure, RCS temperature, and reactor power		



<b>Question 63 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44109
User-Defined ID:	Q44109
Topic:	Q44109 Control Room indications associated with monitoring the RCS.
RO:	3.3
SRO:	3.4
KA #:	3.4 041 A3.02
<b>Revision:</b>	<b>06/13/2013</b>

### **Question 63 Table-Item Links**

#### Q - 10CFR Sections

55.41 (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe the Control Room indications associated with monitoring the RCS.

Given the following conditions:

- Unit 1 is operating at 100% power.
- Main Turbine Control and Stop valve testing is about to commence.

Which ONE of the following is a set of plant perturbations and an associated mitigating action identified in 40OP-9MT02, Main Turbine?

- A.     1. Due to swings in RCS temperature, ensure CEDMCS **is** in Auto Sequential.  
        2. Due to deviations between steam flow transmitters, place DFWCS in single element control.
- B.     1. Due to swings in RCS temperature, ensure CEDMCS **is not** in Auto Sequential.  
        2. Due to deviations between steam flow transmitters, place DFWCS in single element control.
- C.     1. Due to swings in RCS temperature, ensure CEDMCS **is** in Auto Sequential.  
        2. Due to oscillations in RCS pressure, place the Pressurizer in Boron Equalization.
- D.     1. Due to swings in RCS temperature, ensure CEDMCS **is not** in Auto Sequential.  
        2. Due to oscillations in RCS pressure, place the Pressurizer in Boron Equalization.

Answer:         D

<b>Justification:</b>		
A	Wrong	<p>Per 40OP-9MT02, Personnel Indoctrination 7:</p> <p>All plant control systems should remain in the "automatic" mode of control when possible, with the exception of the CEDMCS system, which shall be placed in one of the "manual" modes as directed prior to testing, due to the Tave and Tref difference which may occur, causing undesired CEA movement.</p> <p>Incorrect because, under the Given Conditions, the procedure does NOT direct the crew to place, or consider placing, the DFWCS in Single Element control. Plausible because Personnel Indoctrination 8 states that testing may cause the DFWCS to go into Single element control, but does not direct use of Single element control. Personnel Indoctrination 6 admonishes the crew to minimize time in Single Element control.</p> <p>Per 40OP-9MT02, Personnel Indoctrination 8:</p> <p>Main Turbine testing may place the DFWCS in Single Element control or switch transmitters out of average due to steam flow oscillations.</p> <p>Also plausible because Personnel Indoctrination 4 states:</p> <p>Main Turbine Stop Valve testing with a steam flow transmitter out of service and in maintenance, will be performed with the DFWCS in Single Element control due</p>

		to the lower magnitude of S/G level oscillations, which are predicted to be up to 7% NR.
B	Wrong	Incorrect because the procedure does NOT direct the crew to place, or consider placing, the DFWCS in Single Element control. Plausible because Personnel Indoctrination 8 states that testing may cause the DFWCS <b>to go into</b> Single element control, but does <u>not</u> direct use of Single Element control. Personnel Indoctrination 6 admonishes the crew to minimize time in Single Element control. Plausible because the 1 <sup>st</sup> part is correct.
C	Wrong	Incorrect because the procedure does NOT direct the crew to place, or consider placing, the DFWCS in Single Element control. Plausible because Personnel Indoctrination 8 states that testing may cause the DFWCS <b>to go into</b> Single element control, but does <u>not</u> direct use of Single Element control. Personnel Indoctrination 6 admonishes the crew to minimize time in Single Element control.  Also plausible because Personnel Indoctrination 4 states:  Main Turbine Stop Valve testing with a steam flow transmitter out of service and in maintenance, will be performed with the DFWCS in Single Element control due to the lower magnitude of S/G level oscillations, which are predicted to be up to 7% NR.  Also plausible because the 2 <sup>nd</sup> part is correct.
D	Correct	Per 40OP-9MT02, Personnel Indoctrination 7:  All plant control systems should remain in the "automatic" mode of control when possible, with the exception of the CEDMCS system, which shall be placed in one of the "manual" modes as directed prior to testing, due to the Tave and Tref difference which may occur, causing undesired CEA movement.  A NOTE prior to Step 4.6.3.5 states:  <b>NOTE</b>  RCS pressure oscillations may be experienced during Control Valve testing. Consideration should be given to going to Boron Equalization in the Pressurizer while performing this test.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40OP-9MT02, Main Turbine</p> <p><b>K&amp;A:</b> 3.5 045 K1.06: Knowledge of the physical connections and/or cause-effect relationships between the MT/G system and the following systems: RCS, during steam valve test.</p>		

<b>Question 64 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44111
User-Defined ID:	Q44111
Topic:	Q44111effect of MT valve testing on the RCS
RO:	2.6
SRO:	2.6
KA #:	3.5 045 K1.06
<b>Revision:</b>	<b>09/30/2013 Rev: 1: corrected typo in Technical Reference. Revised the Justification for all 4 choices to better explain why Choices are incorrect and why D is correct. Inserted the word "an" into the question to avoid the implication that the associated mitigating action is <u>required</u>. As worded now, the action is associated with the perturbation and will mitigate, if used.</b> <b>10/09/2013 Rev 2: In stem, changed "MT01" to "MT02."</b>

### Question 64 Table-Item Links

#### Q - 10CFR Sections

55.41 (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

perform Main Turbine Valve Testing

Given the following conditions:

- Unit 1 is operating at 100% power.
- RU-31, Spent Fuel Pool Area, monitor exceeds the high trip setpoint.
- The Fuel Building Normal Supply and Exhaust units have stopped.
- The Control Room Essential AHUs have started.

Which ONE of the following describes the response of the Fuel Building Essential Air Filtering Unit A and the Control Room Essential Air Handling Units Outside Air Intake Damper?

	<u>FB Ess AFU A</u>	<u>CR Ess AHUs OSA Damper</u>
A.	Started	Open
B.	Started	Closed
C.	Stopped	Open
D.	Stopped	Closed

Answer: A

Justification:		
A	Correct	<p><b>According to 40OP-9SA01, BOP/ESFAS Module Operation, Appendix F, FBEVAS Actuated Equipment Train A and B, page 1 of 1: Fuel Bldg. Ess Exh Damper M05/Fuel Bldg. Ess AFU A, the Actuated Condition is Open/Started.</b></p> <p><b>According to 40OP-9SA01, BOP/ESFAS Module Operation, Appendix G, CREFAS, Actuated Equipment Train A: Contl Rm Ess AHU A (B) OSA Intake Damper M01 (M03) Actuated Condition is Open.</b></p>
B	Wrong	Incorrect because the OSA damper opens, not closes. Plausible because the 1 <sup>st</sup> part is correct. Also plausible because a novice operator may deduce that, in a high radiation condition, it would be logical to isolate all paths to the environment.
C	Wrong	Incorrect because the FB AFU starts, not stops. Plausible because the 2nd part is correct.
D	Wrong	Incorrect because the OSA damper opens, not closes. Also incorrect because the FB AFU starts, not stops. Plausible because a novice operator may deduce that, in a high radiation condition, it would be logical to isolate all paths to the environment.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40OP-9SA01, BOP/ESFAS Module Operation; 74RM-9EF41, Rad Monitor System ARP; 41AL-1RK5A, B05 ARP</p> <p><b>K&amp;A:</b> Ability to monitor automatic operation of the ARM system, including: Changes in ventilation alignment</p>		

<b>Question 65 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	4.00
System ID:	44163
User-Defined ID:	Q44163
Topic:	Q44163 (2013) Response of FB AFU and CR OSA Damper to RU-31 F.H.
RO:	2.9
SRO:	3.1
KA#:	3.7 072 A3.01
<b>Revision:</b>	<b>09/30/13 Rev: 1: Changed Choices to limit to a 2x2 (FB Ess AFU and CR OSA Damper). Revised Justifications accordingly and resequenced answers shortest-longest.</b>

### **Question 65 Table-Item Links**

#### Q - 10CFR Sections

55.41 (11) Purpose and operation of radiation monitoring systems, including alarms and survey equipment..

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 2 Group 2

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Explain the operation of the Area Radiation Monitors under normal operating conditions.

Given the following conditions:

- Unit 1 is at 80% power.
  - You are a trainee performing OJT duties on shift.
  - The unit is staffed with 3 Reactor Operators.
  - You are under the direct supervision of the third RO, (TRO).
1. Which of the following evolutions are specifically listed in Operations Department Practices, ODP-1 as requiring a Peer Check? (not all inclusive)
  2. If you as the trainee were to perform an manipulation requiring a Peer Check who could provide it?
    - A. (1) All B01 manipulations and Turbine Load Adjustments  
(2) Reactor or Control Operators ONLY.
    - B. (1) All B01 manipulations and Turbine Load Adjustments  
(2) Reactor, Control or Third Reactor Operator.
    - C. (1) All B03 manipulations and CEA manipulations from B04  
(2) Reactor or Control Operators ONLY.
    - D. (1) All B03 manipulations and CEA manipulations from B04  
(2) Reactor, Control or Third Reactor Operator.

Answer: A

<b>Justification:</b>		
<b>A</b>	<b>Correct</b>	<b>Per ODP-1 and Conduct of Shift Operations</b>
<b>B</b>	<b>Wrong</b>	All B01 manipulations and Turbine Load adjustments require a Peer check. But the operator who is supervising the examinee cannot perform the peer check because they are considered the "performer". Plausible because the 1 <sup>st</sup> half is correct and ROs on shift are required to perform peer checks.
<b>C</b>	<b>Wrong</b>	Not ALL manipulations on B03 require a peer check but the boration/dilution and CEA manipulations do, making this plausible. Plausible because the ROs on shift are required to perform peer checks.
<b>D</b>	<b>Wrong</b>	
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> Operations Principles and Standards, ODP-1 / Conduct of Shift Operations, 40DP-9OP02</p> <p><b>K&amp;A:</b> 2.1.1: Knowledge of conduct of operations requirements.</p>		

<b>Question 66 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44130
User-Defined ID:	Q44130
Topic:	Q44130 peer check requirements for UI
RO:	3.8
SRO:	4.2
KA#:	2.1.1
<b>Revision:</b>	<b>10/04/2013 rev: 1 – changed (1) to list which manipulations require a peer check. (2) Remained the same.</b>

### **Question 66 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Routine Shift Operations



Given the following conditions:

- Unit 1 is operating at 100% power
- You have been off-site for 7 days.

Per 40DP-9OP33, Shift Turnover, which of the following **must** be reviewed prior to taking the shift as a Reactor Operator?

- A. LCO tracking log and Night Orders
- B. Unit logs for last 3 days and Night Orders.
- C. LCO tracking log and QSPDS Top Level Displays.
- D. Unit logs for last 3 days and QSPDS Top Level Displays.

Answer: D

<b>Justification:</b>		
A	Wrong	Per the turnover procedure Night Orders and LCO tracking Logs can be reviewed after taking the shift
B	Wrong	
C	Wrong	
D	<b>Correct</b>	<b>Per the turnover procedure Unit Logs and QSPDS must be reviewed prior to assuming the shift</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> Shift Turnover, 40DP-9OP33</p> <p><b>K&amp;A:</b> 2.1.3: Knowledge of shift or short-term relief turnover practices.</p>		

<b>Question 67 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44131
User-Defined ID:	Q44131
Topic:	Q44131 shift turnover requirements
RO:	3.7
SRO:	3.9
KA#:	2.1.3
<b>Revision:</b>	<b>08/15/2013 rev: 0</b>

### **Question 67 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

describe the required review of operating logs prior to this relief

Per 40AC-0ZZ06, (Locked Valve, Breaker, and Component Control), when verifying the position of a locked throttled valve, the second checker MUST:

- A. independently verify the valve is throttled by position indication, then lock it.
- B. independently check the valve closed and return it to throttled position and install lock.
- C. concurrently verify the correct throttled position and verify the lock installed correctly.
- D. concurrently verify the valve is throttled by position indication, then independently verify position by alternate verification methods and install lock.

Answer: C

<b>Justification:</b>		
A	Wrong	Incorrect since throttled valves must be concurrently verified. Plausible because this is similar to a second check described in Step 4.2.4.2 of 40AC-0ZZ06: "The person performing the second check shall verify that the valve, breaker, or component is in the required position using local and remote indication where possible per 02DP-0ZZ01 and verify that the locking device is locked."
B	Wrong	Incorrect since throttled valves must be concurrently verified. Plausible because this is similar to a second check described in Step 4.2.4.3: "If the second checker can not determine the position of the locked valve, breaker, or component, the CRS may authorize removal of the lock and the use of concurrent verification to place the valve, breaker, or component in the locked position per 02DP-0ZZ01."
C	<b>Correct</b>	Per 40AC-0ZZ06, Locked Valve, Breaker, and Component Control: "4.2.4.4 For valves placed in a throttled position, the person performing the second check shall perform the verification concurrently with the initial manipulation of the valve. The person performing the second check shall then verify that the locking device is installed and locked."
D	Wrong	Incorrect since the independent verification by alternate methods is not required. Plausible because this is similar to a second check described in Appendix B, Step 1.7.2 of 02DP-0ZZ01, Verification of Plant Activities:  "1.7 Alternative Verification Methods  1.7.1 Performance of Alternative Verification Methods 1.7.2, 1.7.3 and 1.7.4 in lieu of those verification methods listed in step 1.6 shall be authorized by the Shift Manager and documented in a retrievable document.  1.7.2 Process parameters (i.e., flow, pressure, current, voltage, etc.)  If using process parameters as a second verification ensure the check is valid by considering alternate flow paths or other conditions that could result in false indications."

**Proposed reference to be provided:** None

**Technical Reference:** 40AC-0ZZ06, Locked Valve, Breaker, and Component Control;  
02DP-0ZZ01, Verification of Plant Activities

**K&A:** 2.1.29: Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.

<b>Question 68 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	6388
User-Defined ID:	Q7885
Topic:	Q7885 ADMIN IV of throttled valve
RO:	4.1
SRO:	4.0
KA #:	2.1.29
<b>Revision:</b>	<b><i>10/2/2013 Rev: 2: Added "independently" to original Choice A to better balance with original Choice B. Resequenced Choices A &amp; B shortest-longest and changed Justifications accordingly. Modified Choice D to better balance with Choice C and to make it more credible.</i></b>

### **Question 68 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2009  
RO Exam 2013

**Associated objective(s):**

describe how independent verification (IV) is accomplished with locked valves, breakers or components

describe how independent verification (IV) is accomplished with locked valves, breakers or components

Given the following conditions:

- A Temporary Approved Procedure Action (TAPA) is required due to a procedure deficiency.
- The task cannot be completed without a change to the procedure.
- The proposed change meets all the requirements of 01DP-0AP01, Procedure Process.
- The change has been approved by two members on the plant supervisory staff including the Shift Manager.

After the TAPA is approved for use it...

- A. will be cancelled upon completion of the task.
- B. is routed as a permanent procedure change with no further review required.
- C. must undergo completion of an Independent Quality Review (IQR) and Owner approval within 4 days.
- D. must undergo completion of an Independent Quality Review (IQR) and Owner approval within 14 days.

Answer: D

<b>Justification:</b>		
A	Wrong	It would be reasonable for the examinee to believe that a “temporary “ change would be cancelled upon completion of the specific task
B	Wrong	It would be reasonable for the examinee to believe that once all the required reviews for the TAPA have been completed and the procedure change has been used then no further reviews would be required to make the change permanent.
C	Wrong	Incorrect because 14 days is allowed, not 4. Plausible because 4 days is the review time for a “minor” revision
D	Correct	<p><b>Per 4.12.5.2 of Procedure Process:</b></p> <p><b>4.12.5 Post-Approval Process</b></p> <p><b>4.12.5.1 The Procedure Preparer notifies the Procedure Owner that the TAPA has been approved for use.</b></p> <p><b>4.12.5.2 Completion of an IQR review and Owner approval of the TAPA must occur within 14 days of the TAPA change.</b></p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 01DP-0AP01, Procedure Process</p> <p><b>K&amp;A:</b> 2.2.6: Knowledge of the process for making changes to procedures.</p>		

<b>Question 69 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	8269
User-Defined ID:	Q10018
Topic:	Q10018 ADMIN Life of a TAPA
RO:	3.0
SRO:	3.6
KA #:	2.2.6
<b>Revision:</b>	<b><i>09/30/2013 Rev: 1: Changed original Choice B from "remains active for 4 days, after which it is cancelled." to "must undergo completion of an Independent Quality Review (IQR) and Owner approval within 4 days." To balance length of choices. Swapped choices B &amp; C to arrange shortest-longest and changed Justifications accordingly.</i></b>

### **Question 69 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2013

**Associated objective(s):**

Describe the process for generating a TAPA.

Describe the process that converts a TAPA into a permanent revision.

Describe what a TAPA is and what situations would it be used for.

Describe the process for generating a TAPA.

Describe the process that converts a TAPA into a permanent revision.



Which one of the following meets the MINIMUM requirements of 40DP-9OP29, Power Block Clearance and Tagging with regards to High Energy systems?

Fluid or gas systems that operate with temperatures greater than (1) should be isolated by two valves in series and (2) .

- A. (1) 200°F (2) if possible OPEN a vent or drain between the two closed isolation valves.
- B. (1) 200°F (2) ensure there are NO open vents or drains between the two closed isolation valves.
- C. (1) 500°F (2) if possible OPEN a vent or drain between the two closed isolation valves.
- D. (1) 500°F (2) ensure there are NO open vents or drains between the two closed isolation valves.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<b>Per the procedure</b>
B	Wrong	Examinee may believe that closing the vents and drains is required to prevent any release of energy if a leak develops in the first isolation valve
C	Wrong	500 relates to the high energy pressure limit of 500 psig.
D	Wrong	
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40DP-9OP29, Power Block Clearance and Tagging</p> <p><b>K&amp;A:</b> 2.2.13: Knowledge of tagging and clearance procedures.</p>		

<b>Question 70 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44085
User-Defined ID:	Q44085
Topic:	Q44085 2 valve isolation requirements
RO:	4.1
SRO:	4.3
KA #:	2.2.13
<b>Revision:</b>	<b>5/29/2013 rev: 0</b>

### **Question 70 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

describe the method(s) of identifying tagout boundaries

Given the following conditions:

- A motor-operated ESF valve is disabled and unable to perform its function.
- The valve is NOT alarmed.
- The impairment will last more than one shift.

In accordance with 40DP-9OP02, Conduct of Shift Operations, the operating crew shall...

- A. perform and document an IV of the valve's position.
- B. rack out the valve breaker after it has been disabled.
- C. hang a Yellow Caution Tag on the valve's handswitch.
- D. insert a manual SESS alarm associated with the valve.

Answer: D

<b>Justification:</b>		
A	Wrong	Incorrect since an IV is not required by 40DP-9OP02. Plausible because this could be one method of tracking the valve's status.
B	Wrong	Incorrect since racking the breaker out is not required by 40DP-9OP02. Plausible because this could be one method of tracking the valve's status.
C	Wrong	Incorrect since hanging tags on the valve is not required by 40DP-9OP02. Plausible because this could be one method of tracking the valve's status.
D	Correct	<p><b>There is no alarm to alert operations that the ECCS system is out of its normal alignment/status so the manual SESS alarm is inserted.</b></p> <p><b>Per 40DP-9OP02, Conduct of Shift Operations:</b></p> <p><b>6.2.1 A manual SESS alarm input shall be initiated when any ES annunciator panel monitored component or system is either:</b></p> <ul style="list-style-type: none"> <li>• Disabled and unable to perform its function by any method that is not alarmed</li> <li>• Rendered incapable of performing its design function by any method that is not alarmed</li> </ul> <p><b>The impairment may be the result of a Permit, T-mod., procedural alignment, or component failure.</b></p> <p><b>6.2.2 The manual SESS alarm is required if the impairment or failure is anticipated to last longer than the current shift.</b></p>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40DP-9OP02, Conduct of Shift Operations</p> <p><b>K&amp;A:</b> 2.2.14: Knowledge of the process for controlling equipment configuration or status.</p>		

<b>Question 71 Info</b>	
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	44165
User-Defined ID:	Q44165
Topic:	Q44165 ADMIN Describe when a manual SESS alarm is required to be inserted.
RO:	3.9
SRO:	4.3
KA #:	2.2.14
<b>Revision:</b>	<b>10/2/2013 Rev: 1: Replaced original question (Q9816) with a more generic question which focuses on "the process" vs a system-specific example.</b>

### **Question 71 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Describe when a manual SESS alarm is required to be inserted.

Which ONE of the following correctly identifies the Federal Exposure Limits?

- A. 1.5 Rem/year, Whole Body and 15 Rem/year Eye Dose.
- B. 1.5 Rem/year, Whole Body and 50 Rem/year Eye Dose.
- C. 5 Rem/year, Whole Body and 15 Rem/year Eye Dose.
- D. 5 Rem/year, Whole Body and 50 Rem/year Eye Dose.

Answer: C

<b>Justification:</b>		
A	Wrong	1.5 is the first PVNGS hold point
B	Wrong	1.5 is the first PVNGS hold point and 50 is the extremities limit
C	<b>Correct</b>	5 whole body and 15 eyes are both correct
D	Wrong	5 is correct but 50 is the extremities limit not eyes.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> RWP training</p> <p><b>K&amp;A:</b> 2.3.4: Knowledge of radiation exposure limits under normal or emergency conditions.</p>		

<b>Question 72 Info</b>	
Points:	1.00
Time to Complete:	2
Difficulty:	2.00
System ID:	44087
User-Defined ID:	Q44087
Topic:	Q44087 (RO) Normal Exposure Limits
RO:	3.2
SRO:	3.7
KA #:	2.3.4
<b>Revision:</b>	<b>05/31/2013 rev: 0</b>

### **Question 72 Table-Item Links**

#### Q - 10CFR Sections

55.41 (12) Radiological safety principles and procedures.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Radiological questions

Given the following conditions:

- RU-37, Power Access Purge "A", is in HIGH alarm.
- RU-38, Power Access Purge "B", is in HIGH alarm.
- RU-34, Containment Building Refueling Purge, is in HIGH alarm.

74RM-9EF41, Radiation Monitoring System Alarm Response, requires the operator to verify CPIAS and CREFAS have actuated.

Which ONE of the following describes the reason for performing this action?

- A. CREFAS and CPIAS both actuated off the RU-37/38 HIGH alarms.
- B. CREFAS actuated off the HIGH alarms; CPIAS actuated off the cross trip.
- C. CPIAS actuated off the HIGH alarms; CREFAS actuated off the cross trips.
- D. CPIAS actuated off the RU-37/38 HIGH alarms; CREFAS actuated off the RU-34 HIGH alarm.

Answer: C

<b>Justification:</b>		
A	Wrong	BOTH CREFAS and CPIAS will be actuated, RU-37/38 actuate a CPIAS which will cause a cross trip of CREFAS.
B	Wrong	
C	<b>Correct</b>	<b>RU-37/38 actuate a CPIAS, CREFAS actuates off the cross trip.</b>
D	Wrong	CREFAS is actuated off RU-29/30 high alarms not RU-34.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 74RM-9EF41, Radiation Monitoring System Alarm Response</p> <p><b>K&amp;A:</b> 2.3.13: Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.</p>		

<b>Question 73 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44081
User-Defined ID:	Q44081
Topic:	Q44081 Describe the operator's responsibility in response to RU-37/38 in high alarm
RO:	3.4
SRO:	3.8
KA #:	2.3.13
<b>Revision:</b>	<b>05/28/2013 rev: 0</b>

### **Question 73 Table-Item Links**

Q - 10CFR Sections

55.41 (12) Radiological safety principles and procedures.

Q - Cognitive Level

Memory

Q - Question Source

New

O - RO Tier Group Designations

Tier 3

Q - RO Exam

RO Exam 2013

**Associated objective(s):**

Describe the operator's responsibility when acknowledging RMS alarms



Given the following conditions:

- Unit 1 is operating at 100% power.

Subsequently

1. The running Plant Cooling Water pump faults and trips.
2. The standby Plant Cooling Water pump does not auto-start.
3. Attempts to manually start the standby pump have failed.

Which ONE of the following was the correct use of procedures?

Implement a(n) (1) when attempting to start the standby Plant Cooling Water pump, then transition to a(n) (2)

- A. (1) Normal Operating procedure (2) General Operating procedure
- B. (1) Abnormal Operating procedure (2) General Operating procedure.
- C. (1) Normal Operating procedure (2) Abnormal Operating procedure
- D. (1) Abnormal Operating procedure (2) Emergency Operating procedure.

Answer: D

<b>Justification:</b>		
A	Wrong	OPs are used for switching pumps under normal conditions; GOP is plausible if the examinee does not realize that a reactor trip is required for a loss of PCW.
B	Wrong	GOP is plausible if the examinee does not realize that a reactor trip is required for a loss of PCW.
C	Wrong	OPs are used for switching pumps under normal conditions; EOP – SPTAs and Reactor Trip will be implemented
D	<b>Correct</b>	AOP for the abnormal condition followed by the EOP after the reactor is tripped
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ03, Loss of Cooling Water</p> <p><b>K&amp;A:</b> 2.4.5: Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.</p>		

<b>Question 74 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44088
User-Defined ID:	Q44088
Topic:	Q44088 Generic Procedure questions
RO:	3.7
SRO:	4.3
KA #:	2.4.5
<b>Revision:</b>	<b><i>05/31/2013 rev: 1 changed distracter C 2<sup>nd</sup> part from EOP to AOP</i></b>

### **Question 74 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - RO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Generic Procedure questions

Given the following conditions:

- Unit 1 has tripped from 100% power.
- SPTAs are complete and the CRS has implemented the appropriate EOP.
- You have been directed to perform a Standard Appendix.
- You determine that a step on the left side column **cannot** be completed.

What should be done if the contingency action **cannot** be completed either?

- A. Proceed to the next step in the left hand column.
- B. Proceed to the next step in the right hand column.
- C. Exit the Appendix/EOP and enter the Functional Recovery Procedure.
- D. Progress thru the Standard Appendix must be halted until the step can be completed.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	Per the EOP users guide
B	Wrong	This is normal procedure progression to stay in the column you are in
C	Wrong	If conditions cannot be met such as safety functions then exit to the FRP is reasonable
D	Wrong	This would be true for an OP
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40DP-9AP16, EOP Users Guide; 01DP-0AP09, Procedure Use and Adherence</p> <p><b>K&amp;A:</b> 2.4.14: Knowledge of general guidelines for EOP usage.</p>		

<b>Question 75 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	3228
User-Defined ID:	Q9702
Topic:	Q9702 (2013) EOP/ORP/Procedure Use
RO:	3.8
SRO:	4.5
KA #:	2.4.14
<b>Revision:</b>	<b>5/31/2013 rev: 0</b>

### **Question 75 Table-Item Links**

#### Q - 10CFR Sections

55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

#### Q - Cognitive Level

Memory

#### Q - Question Source

PV Bank Not Modified

#### O - RO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2007

RO Exam 2013

#### **Associated objective(s):**

describe what actions are required if a step in the left (instruction) or right (contingency) column can not be performed

Identify what actions are required if a step in the left (instruction) or right (contingency) column can not be performed.

Given the following conditions:

- Unit 1 tripped on DNBR LO.
- SIAS/CIAS have auto actuated.
- Containment pressure is 2.8 psig and slowly rising.
- The CRS has implemented 40EP-9EO03, LOCA.
- The 1A and 2A RCPs have been secured, RCPs 1B and 2B are running.
- Reactor Drain Tank HI pressure and temperature alarms have annunciated.
- Reactor Vessel Level Monitoring System readings have been erratic.
- RCS T-cold is 560°F and stable.
- RCS pressure is 1800 psia and stable.
- Pressurizer level is 33% and stable
- HPSI throttle criteria has been met.
- The RO has closed the "A" train HPSI injection valves.
- The CO has initiated a 40°F/hr cooldown.
- The RO has initiated main spray flow to de-pressurize the RCS.

30 minutes later:

- RCS T-cold is 540°F and lowering.
- RCS pressure is 1790 psia and stable.
- Pressurizer level is 55% and rising.

Which ONE of the following is the cause and associated mitigation strategy identified in the LOCA procedure?

- A. Safety Injection flow is not adequate; perform Std App -15, RCS Void Control.
- B. A void has formed in the Reactor Vessel Upper Head; perform Std App -15, RCS Void Control.
- C. Safety Injection flow is not adequate; vent the RCS per Std App -115, Depressurizing the RCS for Inventory Control.
- D. A void has formed in the Reactor Vessel Upper Head; vent the RCS per Std App -115, Depressurizing the RCS for Inventory Control.

Answer: B

Justification:		
A	Wrong	Safety Injection flow is adequate.
B	<b>Correct</b>	<b>VOID is forming in the RVUH, LOCA directs the use of SA-15</b>
C	Wrong	Safety Injection flow is adequate.
D	Wrong	Not directed by LOCA for Void control
<b>Proposed reference to be provided:</b> None		
<b>Technical Reference:</b> 40EP-9EO03, LOCA / LOCA Tech Guide / Std Appendix 15, Void Control		
<b>K&amp;A:</b> Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: The effects of bubble in reactor vessel		

<b>Question 76 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	44063
User-Defined ID:	Q44063
Topic:	Q44063 effects of a bubble in the RVUH on LOCA response and mitigation
RO:	3.9
SRO:	4.2
KA #:	4.2 008 AA2.29
<b>Revision:</b>	<b>05/07/2013 rev: 0</b>

### **Question 76 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 1 Group 1

#### **Associated objective(s):**

analyze the data to determine the status of the PZR safety valve

Given the following conditions:

- Unit 1 tripped from 100% power.
- The crew has implemented 40EP-9EO03, LOCA.
- SIAS/CIAS/MSIS have actuated.
- RCPs 1A and 2A have been secured.
- A cooldown and depressurization to SDC entry conditions has commenced.
- The cooldown was started 70 minutes ago.

Current conditions:

- RCS Tcold is 396°F.
- RCS Thot is 399°F.
- REP CET is 407°F.
- RCS pressure is 1500 psia.
- Containment pressure is 5.2 psig and slowly lowering.
- Containment temperature is 185°F and slowly lowering.

Which ONE of the following would be the proper implementation of step 37 (provided) of the LOCA procedure? (Std App 2 is provided)

- A. P/T limits have been exceeded; continued cooldown is permitted but at a lower rate.
- B. P/T limits have NOT been exceeded; continue the cooldown/depressurization at the current rate.
- C. P/T limits have been exceeded; stop the cooldown and depressurize the RCS. Because the cooldown limits have been exceeded an RCS "soak" is required before the cooldown can be continued.
- D. P/T limits have been exceeded; stop the cooldown and depressurize the RCS. There is no requirement to "soak" the RCS, cooldown may continue once the RCS has been restored to within the P/T limits.

Answer: C

<b>Justification:</b>		
A	Wrong	CD rate limits have been exceeded. The examinee must evaluate conditions to determine this. Not permitted to continue a soak is required. Plausible because this part of the answer is correct but further evaluation will determine that the more restrictive limit has also been exceeded.
B	Wrong	Examinee may pick this if they use the "Normal" containment curves or REP CET temperature. Making this a plausible choice/evaluation.
C	<b>Correct</b>	<b>The examinee must properly evaluate Thot and "HARSH" curve to determine that the 200° limit has been exceeded. Then they must determine that the CD rate has been exceeded and therefore a "soak" is required.</b>
D	Wrong	Examinee must correctly interrupt contingency action 37.2 to determine that a soak is required. Since the candidate must evaluate graphs and curves this choice is one of choices that could be made.
<p><b>Proposed reference to be provided:</b> Std App-2 (RCP curves) / Step 37 of 40EP-9EO03, LOCA  <b>Technical Reference:</b> 40EP-9EO03, LOCA, 40DP-9AP08, LOCA Tech Guideline  <b>K&amp;A:</b> Ability to interpret and execute procedure steps. Large Break LOCA</p>		

<b>Question 77 r1 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
System ID:	44066
User-Defined ID:	Q44066
Topic:	Q44066 describe what actions are necessary if the RCS becomes over subcooled
RO:	4.6
SRO:	4.6
KA #:	2.1.20
<b>Revision:</b>	<b>05/10/2013 rev: 0</b> <b>0926/2013 rev: 1</b> <b>1. Changed the wording of distracters A &amp; B for symmetry to C &amp; D.</b> <b>2. Added that SA 2 is provided to the stem.</b>

### Question 77 r1 Table-Item Links

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 1 Group 1

#### **Associated objective(s):**

describe what actions are necessary if the RCS becomes over subcooled



Given the following conditions:

- Unit 1 tripped from 100% power due to a Loss of the 525 kV switchyard.
- Conditions have required the CRS to enter 40EP-9EO08, Blackout.
- SG levels are 50% WR and lowering.
- RCS pressure is 2050 psia slowly lowering.
- RCS Tcold is 562°F and stable.
- RCS Thot is 585°F and stable.
- REP CET temperature is 592°F and stable.
- AFA-P01, Turbine Driven AFP was feeding each SG at 150 gpm, but has been secured.
- Reactor Makeup Water tank level is 36 feet.
- The Condensate Storage Tank has been damaged and level is 4 feet and lowering.

(1) Natural Circulation conditions

(2) SG feed flow can be restored by implementing Standard Appendix ...

- A. (1) have been established (2) 45, Feeding Unit 1 SGs with the Unit 2 Condensate Pumps.
- B. (1) have been established (2) 42, Aligning Essential Aux Feedwater Pumps Suction to RMWT.
- C. (1) have NOT been established (2) 45, Feeding Unit 1 SGs with the Unit 2 Condensate Pumps.
- D. (1) have NOT been established (2) 42, Aligning Essential Aux Feedwater Pumps Suction to RMWT.

Answer: B

<b>Justification:</b>		
A	Wrong	Nat'l Circ conditions have been established (refer to Blackout procedure-references). Std App 45, Condensate Pumps would be legitimate for a single unit LOOP event or other LOAF scenarios but will not work for a loss of 525kV grid event. This is plausible because part 1 is correct
B	<b>Correct</b>	<b>Nat'l Circ conditions have been established (refer to Blackout procedure-references). Blackout procedure directs the use of SA 42 if CST level is below 9 feet and cannot be recovered or filled.</b>
C	Wrong	Nat'l Circ conditions have been established (refer to Blackout procedure-references). Plausible because using ther other units Condensate pumps is a procedurally directed step although it will not work for a LOOP.
D	Wrong	Nat'l Circ conditions have been established (refer to Blackout procedure-references). Part two is correct making this plausible.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO08, Blackout</p> <p><b>K&amp;A:</b> Ability to determine or interpret the following as they apply to a Station Blackout: RCS core cooling through natural circulation cooling to S/G cooling.</p>		

<b>Question 78 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	44152
User-Defined ID:	Q44152
Topic:	Q44152 determine RCS core cooling and take actions in Blackout
RO:	4.4
SRO:	4.6
KA #:	4.1 055 EA2.02
<b>Revision:</b>	<b>09/17/2013 rev: 0</b>

### **Question 78 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 1 Group 1

#### **Associated objective(s):**

Maintain RCS temp

Given the following conditions:

- Unit 2 has tripped from 100% power due to a Loss of Offsite Power.
- AFB-P01, Essential Aux Feed Pump is feeding the SGs at 350 gpm.
- PKA-M41, Class 125Vdc bus has faulted and is de-energized.
- 40EP-9EO07, Loss of Offsite Power/Loss of Forced circulation has been entered.
- MSIS has been manually actuated.

Subsequently

- AFB-P01, Essential Aux Feed Pump faults.

Which ONE of the following describes the appropriate actions?

- A. Remain in LOOP/LOFC, AFW flow can be restored by starting AFA-P01 from the Control Room.
- B. Remain in LOOP/LOFC, AFW flow can be restored by starting AFN-P01 and then overriding and opening the downcomer isolation valves.
- C. Transition to 40EP-9EO06, Loss of all Feedwater and restore AFW flow by implementing SA 40, Local Operation of AFA-P01 using Main Steam.
- D. Transition to 40EP-9EO06, Loss of all Feedwater and use 40AO-9ZZ13, Loss of Class Instrument or Control Power to shift AFN-P01 control power to PKA-H11 then restore AFW flow using AFN-P01.

Answer: C

Justification:		
A	Wrong	The combination of LOOP and loss of M41 (prevents DG A from starting) means that the only energized bus is PBB-S04 so the crew must transition to LOAF to restore AFW flow.
B	Wrong	
C	<b>Correct</b>	<b>LOAF will allow the crew to use manual operation of AFA-P01 (SA-40) to recover AFW flow. The SFSCs is met for LOAF so entry to the FRP is not mandatory.</b>
D	Wrong	ZZ13 does transfer control power to the A battery charger but PBA-S03 is de-energized with no DG A running
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ13, Loss of Class Instrument or Control Power / 40EP-9EO06, LOAF</p> <p><b>K&amp;A:</b> Ability to determine and interpret the following as they apply to the Loss of DC Power: DC loads lost; impact on ability to operate and monitor plant systems</p>		

<b>Question 79 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	4.00
System ID:	44125
User-Defined ID:	Q44125
Topic:	Q10485 respond to a loss DC power and restore FW flow
RO:	3.5
SRO:	3.9
KA #:	4.2 058 AA2.03
<b>Revision:</b>	<b>08/05/2013 rev: 0</b>

### **Question 79 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 1 Group 1

#### **Associated objective(s):**

Given a loss of PN or PK  
describe the availability of Auxiliary Feedwater

With regards to the (EW) Essential Cooling Water system in mode 1, which of the following is the correct application of Tech Specs?

- (1) When cross connected to the Nuclear Cooling Water (NCW) system, EW is INOPERABLE...  
 (2) When cross connected to the Fuel Pool Cooling, EW is INOPERABLE...

- A. (1) and remains inoperable while cross connected.  
 (2) and remains inoperable while cross connected.
- B. (1) and remains inoperable while cross connected.  
 (2) but operability can be restored if a flow balance is performed because the EW system is sized to supply the SDC heat exchanger, Essential Chiller and the SFP heat exchanger.
- C. (1) but operability can be restored if a flow balance is performed because the EW system is sized to supply the NCW priority loads and the SDC heat exchanger.  
 (2) and remains inoperable while cross connected.
- D. (1) but operability can be restored if a flow balance is performed because the EW system is sized to supply the NCW priority loads and the SDC heat exchanger.  
 (2) but operability can be restored if a flow balance is performed because the EW system is sized to supply the SDC heat exchanger, Essential Chiller and the SFP heat exchanger.

Answer: B

<b>Justification:</b>		
A	<b>Wrong</b>	Operability is not restored for EW when cross tied to NC even if a flow balance is completed. EW is not sized to supply both NC priority loads and the SDC heat exchanger. EW is sized to carry the SFP heat exchanger, Essential chiller and the SDC heat exchanger. Operability is restored if a flow balance is completed after cross ting to Fuel Pool Cooling. Distracters A and D are plausible because one part of the answer is correct. Distracter C is plausible because the answers are true for the opposite condition
B	<b>Correct</b>	
C	<b>Wrong</b>	
D	<b>Wrong</b>	
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40OP-9EW01, Essential Cooling Water</p> <p><b>K&amp;A:</b> Ability to explain and apply system limits and precautions. Loss of Nuclear Service Water</p>		

<b>Question 80 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44048
User-Defined ID:	Q44048
Topic:	Q44153 explanation of notes and cautions in the EW procedure
RO	3.8
SRO	4.0
KA#	2.1.32
<b>Revision</b>	<b>09/24/2013 rev; 0</b> <b>Replaces Q44048</b>

### **Question 80 Table-Item Links**

#### Q - 10CFR Sections

55.43 (2) Facility operating limitations in the technical specifications and their bases.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 1 Group 1

#### **Associated objective(s):**

describe how flow to the RCPs is increased after EW has been cross tied

Given the following conditions:

- Units 1-3 all operating at 100% power.
- Unit 2 has DG "A" out of service for scheduled maintenance.

Subsequently

- Startup transformer NAN-X01 faults and is de-energized.

Refer to the provided Tech Spec to determine which ONE of the following is the correct application of the LCO 3.8.1.

Unit - (1)

Unit - (2)

Unit - (3)

- A. (1) enters condition C only.  
(2) enters conditions A and B only.  
(3) no condition entry is required.
- B. (1) no condition entry is required.  
(2) enters conditions A and B only.  
(3) no condition entry is required.
- C. (1) enters condition C only.  
(2) enters condition D as well as LCO 3.8.9 due to a de-energized AC bus only.  
(3) enters condition A only.
- D. (1) no condition entry is required.  
(2) enters condition D as well as LCO 3.8.9 due to a de-energized AC bus only.  
(3) enters condition A only.

Answer: D

Justification:		
A	Wrong	Examinee may choose this if they don't know the switchyard distribution scheme and realize that the A DG and X01 secondary winding are on the same class bus or that X01 is the backup supply to U1 and the normal supply to U3-S06.
B	Wrong	
C	Wrong	Examinee may choose this if they do not understand that the alternate supply to the class buses would not require entry into the LCO
D	Correct	<b>These are correct for the switchyard scheme and application of the LCO 3.8.1</b>
<p><b>Proposed reference to be provided:</b> LCO 3.8.1</p> <p><b>Technical Reference:</b> Tech Spec 3.8.1 / Operator Information Manual – Switchyard Layout</p> <p><b>K&amp;A:</b> Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.</p>		

<b>Question 81 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44064
User-Defined ID:	Q44064
Topic:	Q44064 apply Tech Spec 3.8.1 with DG maintenance and a grid disturbance
RO:	3.1
SRO:	4.2
KA #:	2.2.36
<b>Revision:</b>	<b>05/08/2013 rev: 0</b>

### **Question 81 Table-Item Links**

#### Q - 10CFR Sections

55.43 (2)Facility operating limitations in the technical specifications and their bases.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 1 Group 1

#### **Associated objective(s):**

apply Tech Spec 3.8.1 (AC Sources - Operating)



Given the following conditions:

- Unit 1 is in a refueling outage.
- Core offload is in progress.
- It is reported that a fuel assembly has been dropped in the Spent Fuel pool.
- RU-31 is in alert alarm
- RU-145 is in high alarm.
- RU-146 channel 1 reads  $2.13E-01$  uCi/cc.
- No field survey reports have been received at this time.

Based on these conditions, this event should currently be classified as a(n)...  
(EAL table provided)

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

Answer: B

<b>Justification:</b>		
A	Wrong	Various monitors in alert or RU-145 reading $> 1.13E-01$ uCi/cc would be an alert but readings are higher
B	<b>Correct</b>	<b>Meets alert criteria</b>
C	Wrong	RU-146 readings must be considered but levels have not reached these criteria
D	Wrong	
<p><b>Proposed reference to be provided:</b> Cold EAL tables only</p> <p><b>Technical Reference:</b> EAL tables</p> <p><b>K&amp;A:</b> Knowledge of the emergency action level thresholds and classifications. Fuel Handling Accident</p>		

<b>Question 82 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44049
User-Defined ID:	Q44049
Topic:	Q44049 determine the emergency plan classification for a fuel handling accident.
RO:	2.9
SRO:	4.6
K/A #:	2.4.41
<b>Revision</b>	<b>04/10/2013 rev: 0</b>

### Question 82 Table-Item Links

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 1 Group 1

#### **Associated objective(s):**

determine the emergency plan classification.

Given the following conditions:

- Unit 1 is in Mode 3.
- Pressurizer level is 32% and stable.
- Letdown flow is 60 gpm and stable.
- 2 charging pumps are operating.
- Containment temperature is 90°F and stable.
- RU-1, Containment Atmosphere is stable.
- RU-6, Nuclear Cooling Water System is stable.
- RU-141, Condenser Vacuum/Gland Seal Exhaust is in Alert with a rising trend.
- RU-142, (all channels) Main Steam Line N-16 monitor trends are rising.

Which ONE of the following is the correct application of procedures for this event?

The CRS should implement....

- A. 40AO-9ZZ02, Excessive RCS Leakrate and isolate letdown.
- B. 40EP-9EO11, Lower Mode Functional Recovery and isolate letdown.
- C. 40AO-9ZZ02, Excessive RCS Leakrate and take actions to minimize release to atmosphere.
- D. 40EP-9EO11, Lower Mode Functional Recovery and take actions to minimize release to atmosphere.

Answer: C

<b>Justification:</b>		
A	Wrong	Pzr level is stable so not required to isolate letdown
B	Wrong	Do not meet LMFRP entry conditions
C	<b>Correct</b>	<b>Per section 5 perform app C to minimize release to atmosphere</b>
D	Wrong	Do not meet LMFRP entry conditions
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40AO-9ZZ02, RCS Leakage</p> <p><b>K&amp;A:</b> Ability to perform specific system and integrated plant procedures during all modes of plant operation. Steam Generator Tube Leak</p>		

<b>Question 83 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44050
User-Defined ID:	Q44050
Topic:	Q44050 identify mitigating steps of 40AO-9ZZ02 for a SGT
RO	4.3
SRO	4.4
KA#	2.1.23
<b>Revision</b>	<b>04/10/2013 rev: 0</b> <b>09/24/2013 rev: 1- changed stem to show RU-141 in alert and a rising trend on RU-142</b>

### **Question 83 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

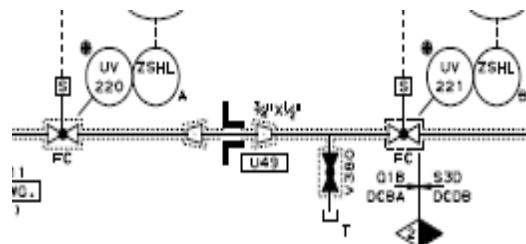
Tier 1 Group 2

#### **Associated objective(s):**

Given indications of a Steam Generator Tube Leak, describe the possible adverse effects of SBCS and Aux. Stream operation, and the operator action to minimize these consequences.

Given the following conditions:

- Unit 1 is stable at 220°F.
- Preparations are being made for a plant heat-up.
- An RO reports that all B06 position indications for SGB-HS-221, SG sample valve are out.
- The valve has been stroked and all lights remain extinguished.



Which ONE (if any) is the maximum time limit with regards to LCO 3.6.3, Containment Isolation Valves?

- LCO 3.6.3 is not applicable in the current mode.
- SGA-UV-220 must be closed and de-energized within 1 hour.
- SGA-UV-220 must be closed and de-energized within 4 hours.
- SGA-UV-220 must be closed and de-energized within 24 hours.

Answer: C

Justification:		
A	Wrong	Mode 4 LCO does apply
B	Wrong	Action for two CI valves INOP
C	<b>Correct</b>	<b>Per condition A of LCO 3.6.3</b>
D	Wrong	Purge valve leakage not within limits
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> Conduct of Shift Operations, 40DP-9OP02</p> <p><b>K&amp;A:</b> Ability to determine and interpret the following as they apply to the Loss of Containment Integrity: Verification of automatic and manual means of restoring integrity</p>		

<b>Question 84 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	44126
User-Defined ID:	Q44126
Topic:	Q44126 CI has failed, apply Tech Specs (SRO)
RO:	3.9
SRO:	4.4
KA#:	4.2 069 AA2.02
<b>Revision</b>	<b>08/05/2013 rev: 0</b>

### **Question 84 Table-Item Links**

#### Q - 10CFR Sections

55.43 (1) Conditions and limitations in the facility license.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 1 Group 2

#### **Associated objective(s):**

apply the action statements that are greater than one hour for T.S. 3.6

Given the following conditions:

- Unit 1 is operating at 55% power.
- Main Feedpump A is in service.
- Main Feedpump B is in standby.
- AFA-P01 is out of service for scheduled maintenance.

Subsequently

- The reactor trips due to a complete loss of vacuum.
- PBA-S03, normal supply breaker, PBA-S03L, has an 86 lockout trip and has tripped open.
- DG "A" starts but it's output breaker, PBA-S03B, did not close.
- AFB-P01 trips when started.

Which ONE of the following procedures should be used to establish feedwater flow?

- A. 40EP-9EO09, FRP, implement MVAC-2; DGs.
- B. 40EP-9EO09, FRP, implement HR-1; SG with no SI.
- C. 40EP-9EO06, LOAF, implement Standard Appendix 43, Restarting MFPs.
- D. 40EP-9EO06, LOAF, implement Standard Appendix 41, Local Operation of AFN-P01.

Answer: B

<b>Justification:</b>		
A	Wrong	Examinee may not realize that the bus will not energize with an 86 LO on PBA-S03L
B	<b>Correct</b>	<b>SA 44 would be directed by HR-1 to restore FW flow</b>
C	Wrong	Could believe that the B MFP could be available to restore FW flow but loss of vacuum trips the MFPs
D	Wrong	This is an available success path in the LOAF procedure and therefore credible but the candidate must determine that AFN-P01 has no power source available at this time.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO09, FRP / 40EP-9EO06, LOAF</p> <p><b>K&amp;A:</b> Facility conditions and selection of appropriate procedures during abnormal and emergency operations. Functional Recovery Procedure</p>		

<b>Question 85 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	4.00
System ID:	44051
User-Defined ID:	Q44051
Topic:	Q44051 select the appropriate EOP (FRP)
RO	3.2
SRO	4.4
KA#	4.4 CE/E09 EA2.1
<b>Revision</b>	<b>04/11/2013 rev: 0</b> <b>9/26/2013 rev 1: changed dist D to std app 41</b>

### **Question 85 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 1 Group 2

#### **Associated objective(s):**

Determine whether or not entry into the FRP is appropriate



Given the following conditions:

- Unit 1 had been operating at 100% power.
- A large break has occurred on the RCS 1A cold leg.
- Automatic reactor trip on low DNBR.
- 40EP-9EO03, LOCA has been implemented.
- RAS has actuated.
- All RAS automatic and manual actions are complete.

Subsequently

- Emergency Core Cooling System (ECCS) pumps display the following characteristics...

Pump	Discharge Pressure	Flow	Amps
HPSI Pump A	Steady	Steady	Steady
CS Pump A	Steady	Steady	Steady
HPSI Pump B	Lowering	Lowering	Erratic
CS Pump B	Lowering	Lowering	Erratic

The CRS should direct the crew to...

- Immediately stop CS pump "B"; go to 40EP-9EO09, FRP.
- Immediately stop BOTH CS pump "B" and HPSI pump "B"; remain in 40EP-9EO03, LOCA.
- Immediately stop BOTH CS pump "B" and HPSI pump "B"; go to 40EP-9EO09, FRP.
- Immediately stop CS pump "B", evaluate HPSI pumps performance; remain in 40EP-9EO03, LOCA.

Answer: D

Justification:		
A	Wrong	These actions are performed in LOCA there is no need to go to FRP still have one good CS pump
B	Wrong	Both pumps are stopped in the contingency actions and stopping the pumps would seem reasonable to prevent pump damage.
C	Wrong	Both pumps are stopped in the contingency actions and stopping the pumps would seem reasonable to prevent pump damage.
D	<b>Correct</b>	<b>As directed by the LOCA procedure</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO03, LOCA / 40DP-9AP08, LOCA Tech Guide</p> <p><b>K&amp;A:</b> 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: Loss of flow path</p>		

<b>Question 86 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
System ID:	44070
User-Defined ID:	Q44070
Topic:	Q44070 response to RAS sump blockage
Num Field 1:	3.9
Num Field 2:	4.3
Text Field:	3.3 006 A2.02
<b>Revision:</b>	<b>05/16/2013 rev: 0</b> <b>09/26/2013 rev: 1 changed B distracter to match C for better symmetry.</b>

### **Question 86 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 2 Group 1

#### **Associated objective(s):**

describe why it is necessary to ensure that each operating HPSI pump is running at 250 gpm and what actions are required if this is not met

Given the following conditions:

- Unit 1 is operating at 100% power.
- The RJ point SAYS65, CSAS A Leg 1 - 3 trip, is in alarm.
- **ONLY** the following alarm windows have actuated:



Using the provided picture of B05 and LCOs 3.3.5 and 3.3.6, determine which ONE of the following is the correct application of Tech Specs?

- Enter LCO 3.3.5, Condition A.
- Enter LCO 3.3.6, Condition A.
- Enter LCO 3.3.6, Condition B.
- Enter LCO 3.3.6, Condition D.

Answer: C

<b>Justification:</b>		
A	Wrong	Any time an ESFAS function alarms the first choice would be a transmitter failure affecting LCO 3.3.5. The examinee has to determine with no other alarms in that no transmitter failed.
B	Wrong	If the examinee does not understand the relationships between matrix, initiation and actuation functions this would be a viable choice due to multiple windows in alarm.
C	<b>Correct</b>	<b>This is an initiation failure, good transmitters and the initiation light extinguished.</b>
D	Wrong	If the examinee does not understand the relationships between matrix, initiation and actuation functions this would be a viable choice but no actuations have actually occurred.
<p><b>Proposed reference to be provided:</b> LCOs 3.3.5 and 3.3.6 (ESFAS) / B05 picture</p> <p><b>Technical Reference:</b> 40AO-9ZZ15, Inadvertent ESFAS Actuations / LCOs 3.3.5 and 3.3.6 Operator Information Manual</p> <p><b>K&amp;A:</b> Knowledge of limiting conditions for operations and safety limits. ESFAS</p>		

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<b>Question 87 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
System ID:	44053
User-Defined ID:	Q44053
Topic:	Q44053 Identify LCO 3.3.5/6 (ESFAS) entry requirements and affected instrumentation
RO:	4.0
SRO:	4.7
KA #:	2.2.22
<b>Revision</b>	<b>04/16/2013 rev: 0</b>

### **Question 87 Table-Item Links**

#### Q - 10CFR Sections

55.43 (2)Facility operating limitations in the technical specifications and their bases.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 2 Group 1

#### **Associated objective(s):**

State the LCO associated with the Engineered Safety Feature Actuation Logics and Manual Initiation, including its basis.

Given the following conditions:

- Unit 1 was manually tripped from 100% power due to lowering pressurizer level.
- The CRS has entered 40EP-9EO03, LOCA.
- Containment pressure is 9.0 psig and rising.
- Containment level is indicated.
- RCPs are off and controlled bleedoff is isolated.
- Containment Spray flow instrument SIA-FI-338 indicates 3700 gpm.
- The "B" train SESS window 16J, CS PUMP B P03 status is:
  - White SEIS light in alarm.
  - Blue SEAS light in alarm.

Which ONE of the following is correct regarding the status and required actions (if any) associated with the CTPC safety function?

Containment Temperature and Pressure Control safety function is currently....

- A. met: with Containment pressure < 55psig and CS flow indicated, remain in the LOCA procedure.
- B. not met: transition to 40EP-9EO09, FRP and implement CTPC-1 to restore Containment Fans.
- C. not met: transition to 40EP-9EO09, FRP and implement CTPC-2 to align LPSI pump "B" to the "B" CS header.
- D. met: CS pump B failed to auto start, start the pump by going to start on SIB-HS-6, remain in the LOCA procedure.

Answer: C

<b>Justification:</b>		
A	Wrong	Cntmt pressure < 55# and 4350 gpm would meet criteria.
B	Wrong	CTPC-1 could be used if Cntmt level is not indicated.
C	<b>Correct</b>	<b>CTPC-2 directs x-tying LPSI to the CS hdr</b>
D	Wrong	The CS pump could be in this condition during an inadvertent CS when the crew is directed to "anti-pump" the breaker to stop CS flow. In that case resetting the 86 would start the pump. SF would be met if a fail to auto start is the only fault.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO03, LOCA / 40EP-9EO09, FRP / 41AL-9ES2A. SESS ARP</p> <p><b>K&amp;A:</b> Ability to interpret and execute procedure steps. Containment Spray</p>		

<b>Question 88 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44054
User-Defined ID:	Q44054
Topic:	Q44054 execute procedure steps for inadequate CS flow
RO:	4.6
SRO:	4.6
KA #:	2.1.20
<b>Revision</b>	<b>04/17/2013 r: 0</b> <b>09/26/2013 r: 1 changed D distracter to remove the word "not" for symmetry.</b>

### Question 88 Table-Item Links

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 2 Group 1

#### **Associated objective(s):**

determine if the selected CTPC success path safety function status checks are being met

Given the following conditions:

- Unit 1 is coming out of a SNOW outage.
- RCS pressure is 2250 psia.
- RCS temperature is 450°F and rising.
- RCPs 1A, 2A and 1B are operating.
- Alarm window 4A03A RCP 1B TRB is alarming.
- RCP 1B has the following indications
  - RCN-PI-153, No. 2 Seal Outlet Pressure - 1750 psig and stable
  - RCN-FI-166, Controlled Bleedoff flow 10.1 gpm and rising.
  - RCN-HV-431, RCP 1B Controlled Bleedoff valve is OPEN.
  - CHN-FIC-242, RCP 1B Seal Injection Flow Control 5.8 gpm and stable.

Evaluate the above readings and determine which ONE of the following actions should be taken?

- A. Enter 40OP-9RC01, Reactor Coolant Pump Operation; Stop RCP 1B and maintain seal bleedoff in service.
- B. Enter 40AO-9ZZ04, Reactor Coolant Pump emergencies; Stop RCP 1B and maintain seal bleedoff in service.
- C. Enter 40OP-9RC01, Reactor Coolant Pump Operation; Stop RCP 1B and close RCN-HV-431, RCP 1B Controlled Bleedoff valve.
- D. Enter 40AO-9ZZ04, Reactor Coolant Pump emergencies; Stop RCP 1B and close RCN-HV-431, RCP 1B Controlled Bleedoff valve.

Answer: D

<b>Justification:</b>		
A	Wrong	This would be the correct response for Seal 2 outlet pressure > 1700 psig. If controlled BO flow is > 9.5 gpm then Seal/Controlled BO must be isolated.
B	Wrong	Going to the AOP is correct due to the high SBO flowrate but the AOP directs isolating Seal Bleedoff but whereas the OP has SBO remaining in service. If controlled BO flow is > 9.5 gpm then Seal/Controlled BO must be isolated.
C	Wrong	Both the first and second parts are wrong for the conditions given but part 1 would be correct for the outlet pressure of the Seal 2.
D	<b>Correct</b>	<b>&gt;9.5 gpm requires entry into ZZ04 and isolation of Seal Bleedoff.</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40OP-9RC01, RCP Operations / 40AO-9RC04 RCP Emergencies 40AL-9RK4A, B04 ARP</p> <p><b>K&amp;A:</b> Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Conditions which exist for an abnormal shutdown of an RCP in comparison to a normal shutdown of an RCP</p>		

<b>Question 89 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44068
User-Defined ID:	Q44068
Topic:	Q44068 Normal vs. Abnormal RCP trip requirements
RO:	3.7
SRO:	3.9
KA #:	3.4 003 A2.02
<b>Revision:</b>	<b>05/14/2013 rev: 0</b> <b>09/27/2013 added clarification to the justification of distracters A and B</b>

### **Question 89 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 2 Group 1

#### **Associated objective(s):**

determine whether the RCP can continue to operate and, if not, what actions are required



Given the following conditions:

- Unit 1 is operating at 100% power.
- The upper half of window 5B03A "LEG 1 -3 CIAS LEG 2 - 4" is alarming.
- The CIAS annunciator on B05 is alarming.
- The RO reports that there are no abnormal trends in Containment parameters.

Which ONE of the following is the required action(s) per LCO 3.4.16, RCS Leakage Detection Instrumentation?

- A. Both the Containment Sump and Atmosphere monitors are Inoperable. Enter LCO 3.0.3 immediately.
- B. Only the Containment Sump monitor is Inoperable. Perform an RCS water inventory balance once per 24 hours.
- C. Only the Containment Atmosphere radioactivity monitor is Inoperable. Analyze grab samples of the containment atmosphere, once per 24 hours.
- D. Both the Containment Sump and Atmosphere monitors are Inoperable. Be in Mode 3 within 6 hours and mode 5 within 36 hours, entry into LCO 3.0.3 is NOT required at this time.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<p><b>Per 3.4.16 action D - with both the atmosphere and sump monitors inoperable enter LCO 3.0.3 immediately.</b></p> <p><b>When an "A" train CIAS is actuated RU-1 is isolated and therefore Inoperable due 2 of 4 CI valves going closed, HCA-UV-45/46.</b></p> <p><b>On the "A" train CIAS the containment sump isolation valve RDA-HV-23 will go closed making the containment sump monitoring system Inoperable..</b></p>
B	Wrong	Both are inoperable. Plausible because this is an action in the LCO. Refer to A.
C	Wrong	Both are inoperable. Plausible because this is an action in the LCO. Refer to A.
D	Wrong	Both are inoperable but this action is required in the conditions of actions A or B or not met. This would be applicable if the mode change time requirements had not been met. Condition D overrides this requirement. Plausible because this is an action in the LCO
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> LCO 3.4.16, RCS Leakage Detection Instrumentation</p> <p><b>K&amp;A:</b> Ability to (a) predict the impacts of the following malfunctions or operations on the containment system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Phase A and B isolation</p>		

<b>Question 90 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	44151
User-Defined ID:	Q44151
Topic:	Q44151 Effects of an Inadvertent CIAS on the cntmt system
RO:	3.5
SRO:	3.8
KA #:	3.5 103 A2.03
<b>Revision:</b>	<b>09/16/2013 rev: 2</b> <b>Rev 1 - Replaced Q44055</b> <b>Rev 2 – Strengthen the justification</b>

### **Question 90 Table-Item Links**

Q - 10CFR Sections

55.43 (2) Facility operating limitations in the technical specifications and their bases.

Q - Cognitive Level

Comprehension / Anal

Q - Question Source

New

Q - SRO Exam

SRO Exam 2013

O - SRO Tier Group Designation

Tier 2 Group 1

**Associated objective(s):**

determine the plant impact of an inadvertent CIAS acutation and the actions needed to restore plant stability

Given the following conditions:

- A reactor startup is in progress.
- The core is at 225 EFPD (U1C18).
- The Estimated Critical Condition (ECC) is group 5 at 45 inches.
- Hold Point 1 is gp 1 at 80 inches.
- Hold Point 2 is gp 2 at 36 inches.
- Hold Point 3 is gp 2 at 95 inches.
- Hold Point 4 is gp 3 at 60 inches.

During the CEA withdrawal process the following data was observed.

- Countrate has doubled 4 times during the startup.
- At hold point 2 the Anticipated Critical Position (ACP) is gp 4 at 75 inches.
- At hold point 3 the Anticipated Critical Position (ACP) is gp 4 at 90 inches.

Using the provided Core Data Book curves determine which ONE of the following is the required actions per 40OP-9ZZ03, Reactor Startup?

- Fully insert all Regulating Group CEAs.
- Continue with the startup; withdraw CEAs to group 3 at 60 inches.
- Stop the CEA withdrawal, stabilize countrate and direct Reactor Engineering to re-evaluate the 1/M plot.
- Trip the reactor, ensure adequate SDM, verify countrate is lowering and direct Reactor Engineering to investigate.

Answer: B

Justification:		
A	Wrong	Guidance for a dropped CEA in Mode 3 from 40AO-9ZZ11.
B	<b>Correct</b>	<b>2 ACPs within the minus 500 position means that a withdraw to the less of ½ distance to critical position or HP 4 is permitted. HP 4 is 550 pcm away, ACP is &gt; 1300 pcm away</b>
C	Wrong	This would be correct with 3 or fewer doublings and the ACPs had been outside the minus 500 pcm position
D	Wrong	2 ACP < (-) 500 pcm position and 4 doublings then a reactor trip is required.
<p><b>Proposed reference to be provided:</b> Core Data Book curves 2.8.2</p> <p><b>Technical Reference:</b> 40OP-9ZZ02, Reactor Startup (appendix G)</p> <p><b>K&amp;A:</b> Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.</p>		

<b>Question 91 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	3.00
System ID:	44133
User-Defined ID:	Q44133
Topic:	Q44133 evaluate NI response during a reactor startup
RO:	4.4
SRO:	4.7
KA #:	2.1.7
<b>Revision:</b>	<b>05/14/2013 rev: 0</b>

### **Question 91 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 2 Group 2

#### **Associated objective(s):**

evaluate the 1/M plot using Appendix G

Given the following conditions:

- Unit 1 automatically tripped from 100% power.
- HPSI pump "A", SIA-P02 is under clearance and unavailable.
- PBB-S04, 4160 kV class bus faulted and is de-energized.
- SPTAs are in progress.
- Pressurizer level is off scale low.
- RVLMS indicates 21% in the outlet plenum.
- RCS pressure is 900 psia and lowering.

Subsequently

- Core Exit Thermocouples (CET) temperatures are 650°F and rising.
- RCS pressure is 700 psia and slowly lowering.
- RVLMS level indicates 0% in the outlet plenum.

(1) Which EOP should the CRS implement?

(2) What is the CET temperature that corresponds to significant superheating of the coolant resulting in a LOSS of the clad barrier?

- A. (1) 40EP-9EO09 (FRP) (2) 700°F
- B. (1) 40EP-9EO03 (LOCA) (2) 700°F
- C. (1) 40EP-9EO09 (FRP) (2) 1200°F
- D. (1) 40EP-9EO03 (LOCA) (2) 1200°F

Answer: C

<b>Justification:</b>		
A	Wrong	CET temperatures greater than 700°F represents the "potential" loss on the fuel clad barrier. The question asks for the "onset" of clad damage.
B	Wrong	
C	<b>Correct</b>	<b>1200°F is the onset on clad damage and no HPSI flow requires entry into the FRP</b>
D	Wrong	No HPSI flow is a loss safety function and the FRP must be entered.

**Proposed reference to be provided:** None

**Technical Reference:** 40EP-9EO03, LOCA / EP-0901 Classifications

**K&A:** Ability to (a) predict the impacts of the following malfunctions or operations on the ITM system; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Core Damage

<b>Question 92 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	3.00
System ID:	44057
User-Defined ID:	Q44057
Topic:	Q44057 Use CETs to access possible core damage
RO:	3.6
SRO:	4.1
KA #:	3.7 017 A2.02
<b>Revision:</b>	<b>07/19/2013 rev: 1</b>

### **Question 92 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 2 Group 2

#### **Associated objective(s):**

Describe how QSPDS is used to detect Inadequate Core Cooling (ICC).

Given the following conditions:

- Unit 1 is in a Refueling outage.
- Refueling pool level is at 138 ft 2 inches.

Per LCO 3.9.1 the minimum refueling pool boron concentration is (1) ppm, which is designed to maintain  $K_{eff} \leq$  (2) during fuel movement.

- A. (1) 2150 (2) .95
- B. (1) 2150 (2) .99
- C. (1) 3000 (2) .95
- D. (1) 3000 (2) .99

Answer: C

<b>Justification:</b>		
A	Wrong	2150 is the Spent Fuel Pool Boron concentration requirement
B	Wrong	$K_{eff}$ .99 can be found in the U1R18 COLR figure 3.1.1-1 SDM vs. Cold Leg Temperature and 2150 is the SFP TS limit
C	<b>Correct</b>	Per COLR and TS 3.9.1 bases
D	Wrong	3000 ppm is correct but .99 can be found in the U1R18 COLR figure 3.1.1-1 SDM vs. Cold Leg Temperature
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> LCO 3.9.1 and Bases / U1R18, COLR</p> <p><b>K&amp;A:</b> Knowledge of design feature(s) and/or interlock(s) which provide for the following: Fuel movement</p>		

<b>Question 93 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44071
User-Defined ID:	Q44071
Topic:	Q44071 SDM and Boron limits during refueling
RO:	2.5
SRO:	3.3
KA #:	3.8 033 K4.05
<b>Revision:</b>	<b>05/16/2013 rev: 0</b>

### **Question 93 Table-Item Links**

#### Q - 10CFR Sections

55.43 (2) Facility operating limitations in the technical specifications and their bases.

55.43 (6) Procedures and limitations involved in initial core loading, alterations in core configuration, control rod programming, and determination of various internal and external effects on core reactivity.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 2 Group 2

#### **Associated objective(s):**

Tech Specs associated with refueling operations



Given the following conditions:

- Unit 2 is operating at 100% power.
- The unit is staffed as follows:

UNIT 1	UNIT 2	UNIT 3
1 Shift Manager	1 Shift Manager	1 Shift Manager
1 STA (Unlicensed)	1 STA (Unlicensed)	1 STA (Unlicensed)
1 CRS	1 CRS	1 CRS
2 ROs	2 ROs	3 ROs
<ul style="list-style-type: none"> <li>• 4 Auxiliary Operators (Unlicensed)</li> </ul>	<ul style="list-style-type: none"> <li>• 4 Auxiliary Operators (Unlicensed)</li> <li>• One AO has left the protected area to attend required training</li> </ul>	<ul style="list-style-type: none"> <li>• 4 Auxiliary Operators (Unlicensed)</li> </ul>

In accordance with **BOTH** Technical Specifications and PVNGS administrative procedures: Unit 2 staffing requirements are currently...

- NOT met, 4 AOs are required to be within the unit at all times per ODP-2, Operations Shift Coverage.
- met, all of the Technical Specifications and PVNGS administrative requirements are satisfied by the current manning.
- NOT met, each unit is required to have their own licensed individual designated as the FTA per TS 5.2.2, Organization; Unit Staff.
- met, provided the 3rd RO in Unit 3 satisfies all requirements and has been designated the FTA per 40DP-9OP02, Conduct of Shift Operations.

Answer: D

Justification:		
A	Wrong	The 4 <sup>th</sup> AO is allowed outside the unit provided they are in contact and can return within 10 minutes.
B	Wrong	The Tech Spec requirements are met but the FTA position is designated by U2 manning
C	Wrong	There can be a "SITE" FTA
D	<b>Correct</b>	<b>Staffing requirements would be met if either of the other units have a third RO who is designated as the Site FTA</b>
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> Conduct of Shift Operations, 40DP-9OP02</p> <p><b>K&amp;A:</b> Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.</p>		

<b>Question 94 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44058
User-Defined ID:	Q44058
Topic:	Q44058 Shift staffing requirements for FTA
RO:	2.9
SRO:	3.9
KA#:	2.1.5
<b>Revision</b>	<b>07/05/2013 rev: 0</b> <b>09/27/2013 rev 1: added units 1 and 3 staffing levels to the stem</b>

### **Question 94 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 3

#### **Associated objective(s):**

State the minimum requirements for shift crew manning.

Given that Unit 1 is operating at 100% power:

1. Per LCO 3.4.17, what is the limit for Dose Equivalent I-131 in the RCS?
2. What is the required action if Dose Equivalent I-131 is currently 100  $\mu\text{Ci/gm}$  in the RCS?
  - A. (1)  $< 0.1 \mu\text{Ci/gm}$   
(2) Be in Mode 5 in 37 hours.
  - B. (1)  $< 1.0 \mu\text{Ci/gm}$   
(2) Be in Mode 5 in 37 hours.
  - C. (1)  $< 0.1 \mu\text{Ci/gm}$   
(2) Be in Mode 3 with RCS cold leg temperature  $< 500^\circ \text{F}$  within 6 hours.
  - D. (1)  $< 1.0 \mu\text{Ci/gm}$   
(2) Be in Mode 3 with RCS cold leg temperature  $< 500^\circ \text{F}$  within 6 hours.

Answer: D

<b>Justification:</b>		
A	Wrong	$> 0.1 \mu\text{Ci/gm}$ is the limit for secondary specific activity (LCO 3.7.16)
B	Wrong	1 <sup>st</sup> part is correct but the second is based on LCO 3.0.3 if the examinee is not aware of the applicable condition they may think that entry into LCO 3.0.3 is required
C	Wrong	$> 0.1 \mu\text{Ci/gm}$ is the limit for secondary specific activity (LCO 3.7.16)
D	<b>Correct</b>	Proper RCS limit and application of Condition B: be in Mode 3 with Tcold $< 500^\circ \text{ w/l 6 hours}$
<p><b>Proposed reference to be provided:</b> Figure 3.4.17.-1</p> <p><b>Technical Reference:</b> LCO 3.4.17 / LCO 3.7.16</p> <p><b>K&amp;A:</b> Knowledge of primary and secondary plant chemistry limits.</p>		

<b>Question 95 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	4.00
System ID:	44113
User-Defined ID:	Q44113
Topic:	Q44113 3.4.17 (RCS Specific Activity)
RO:	2.7
SRO:	3.5
KA #:	2.1.34
<b>Revision:</b>	<b>07/05/2013</b>

### **Question 95 Table-Item Links**

#### Q - 10CFR Sections

55.43 (1) Conditions and limitations in the facility license.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 3

#### **Associated objective(s):**

Section 3.4.17 (RCS Specific Activity)

Given the following information from Tech Specs:

- Tech Spec 3.7.7 states ...with one EW train inoperable, restore the EW train to OPERABLE status within 72 hours.
- Tech Spec 3.6.6 states ...with one Containment Spray train inoperable, restore the Containment Spray train to OPERABLE status within 72 hours.
- An evaluation has been performed per the Safety Function Determination Program and found that NO loss of safety function exists.

Given the following conditions:

1200 10/05/13 EW 'A' is declared inoperable due to a breaker problem.  
 1200 10/07/13 CS 'A' is declared inoperable due to failed room cooler.  
 1100 10/08/13 EW 'A' is restored to service.

Assuming that LCO 3.0.6 was implemented when does CS 'A' have to be restored to service?  
 (LCO 3.0.6 provided)

- A. 1200 10/08/13  
 B. 1100 10/09/13  
 C. 1200 10/10/13  
 D. 1200 10/11/13

Answer: C

<b>Justification:</b>		
A	Wrong	72 hours from EW INOP, if 3.0.6 is not used then this would be correct
B	Wrong	SR 3.0.3 has provisions for a 24 delay if a surveillance is missed
C	<b>Correct</b>	<b>72 hours from CS inoperability, with LCO 3.0.6 invoked.</b>
D	Wrong	72 hours after EW is restored to service.
<p><b>Proposed reference to be provided:</b> LCO 3.0.6</p> <p><b>Technical Reference:</b> LCO 3.0.6 / LCO 3.0.3</p> <p><b>K&amp;A:</b> Ability to track Technical Specification limiting conditions for operations.</p>		

<b>Question 96 Info</b>	
Points:	1.00
Time to Complete:	4
Difficulty:	3.00
System ID:	1235
User-Defined ID:	Q10107
Topic:	Q10107 Idb SFDP MOST application
RO:	3.1
SRO:	4.6
KA #:	2.2.23
<b>Revision:</b>	<b>05/15/2013 rev: 0</b>

### **Question 96 Table-Item Links**

#### Q - 10CFR Sections

55.43 (2) Facility operating limitations in the technical specifications and their bases.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

PV Bank Not Modified

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 3

#### **Associated objective(s):**

Given plant conditions and completion times for various components, determine the MOST for supported features.

describe a "modified time zero" completion time, and state whether or not the associated time can be extended

Given the following conditions:

- Unit 1 is in a Refueling Outage.
- The crew is establishing conditions for Core Offload per 40OP-9ZZ23, Outage GOP.
- Refueling Pool level has been raised to 127 ft 7 inches and stabilized.
- The CEA support plate has been lowered and is on the Guide Plate.
- The L-SRO has verified that all CEA extension shafts have latched.
- The SM has given permission to raise the UGS Lift Rig CEA Support Plate.

Subsequently

- The Effluent tech reports that due to a procedural error both RU-29/30, Control Room Ventilation Intake monitors, are INOPERABLE.

Which ONE of the statements is correct?

Raising the CEA support plate (1) considered a core alteration and (2)

- (1) **IS** (2) movement of the CEA Support Plate must be suspended immediately.
- (1) **IS** (2) movement of the CEA Support Plate must be suspended within 1 hour.
- (1) **IS NOT** (2) no Core Alterations are permitted until at least one CREFS train is in operation.
- (1) **IS NOT** (2) no Core Alterations are permitted until both monitors are declared OPERABLE.

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<b>This is considered a core alteration by TS, 40OP-9ZZ23 and the Core Reloading procedure. TS requires Core Alts to be suspended immediately.</b>
B	Wrong	One hour relates to the condition time required to place a train of CREFS in operation in Modes 1-4.
C	Wrong	This is considered a core alteration by TS, 40OP-9ZZ23 and the Core Reloading procedure. Part (2) CREFS would allow Core Alts to continue.
D	Wrong	This is considered a core alteration by TS, 40OP-9ZZ23 and the Core Reloading procedure. TS would allow Core Alts to continue with only one of the monitors OPERABLE but examinee may think that both trains are required.
<p><b>PVNGS OE</b></p> <p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40OP-9ZZ20, Outage GOP / Tech Specs</p> <p><b>K&amp;A:</b> Knowledge of procedures and limitations involved in core alterations.</p>		

<b>Question 97 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44061
User-Defined ID:	Q44061
Topic:	Q44061 knowledge of what is a core alterations and related Tech Specs
RO:	3.0
SRO:	4.1
KA #:	2.2.40
<b>Revision:</b>	<b>05/02/2013 rev: 0</b>

### **Question 97 Table-Item Links**

#### Q - 10CFR Sections

55.41 (2) General design features of the core, including core structure, fuel elements, control rods, core instrumentation and coolant flow.

#### Q - Cognitive Level

Memory

#### Q - Question Source

New

#### O - SRO Tier Group Designations

Tier 3

#### Q - RO Exam

RO Exam 2013

#### **Associated objective(s):**

Define a "core alteration", and describe the position that PVNGS has taken on core alterations.



Given the following conditions:

- Unit 1 was manually tripped due to a tube rupture in SG 1
- Offsite power was lost on the trip
- SG 1 has been isolated per 40EP-9EO04 (SGTR)
- SG 1 pressure is 1100 psia
- SG 1 narrow range level is 65% and rising
- RCS pressure is 1400 psia
- RCS cooldown rate is currently 12°F/hr

Which of the following are the preferred methods to maintain SG level and control the spread of contamination?

- A. Lower RCS pressure below SG 1 pressure **or** Drain SG 1 to the condenser.
- B. Increase the RCS cooldown rate to 100°F **or** Lower RCS pressure below SG 1 pressure.
- C. Open the affected MSIVs and steam SG 1 to the condenser **or** Drain SG 1 to the condenser
- D. Increase the RCS cooldown rate to 100°F **or** open the affected MSIVs and steam SG 1 to the condenser

Answer: A

<b>Justification:</b>		
A	<b>Correct</b>	<b>step 32 of SGTR directs either one of these actions</b>
B	Wrong	Due to the loss of offsite power CD rate is limited to 30°F per SGTR. But increasing the CD rate would get to SDC quicker limiting secondary contamination
C	Wrong	Steaming to condenser is correct but not thru the MSIVs. MSIV bypasses should be used to limit secondary water hammer
D	Wrong	both of these are wrong as stated above
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO04 (SGTR), 40DP-9AP09 (SGTR Tech Guide)</p> <p><b>K&amp;A:</b> Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.</p>		

<b>Question 98 Info</b>	
Points:	1.00
Time to Complete:	2
Difficulty:	3.00
System ID:	22476
User-Defined ID:	Q22476
Topic:	Q22476 prevent contamination spread
RO:	3.4
SRO:	3.8
KA #:	2.3.14
<b>Revision:</b>	<b>05/02/2013 rev: 0</b>

### **Question 98 Table-Item Links**

#### Q - 10CFR Sections

55.43 (4) Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.

#### Q - Cognitive Level

Memory

#### Q - Question Source

PV Bank Not Modified

#### Q - SRO Exam

SRO Exam 2008

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 3

#### **Associated objective(s):**

outline the strategy by which water management is established and releases to the environment are minimized

Given the following conditions:

- Unit 1 is in a refueling outage.
- Tcold is 180°F.
- RCS pressure is 150 psia
- LPSI A is providing Shutdown Cooling flow at 3780 gpm.

Subsequently:

- RCS level is lowering.
- Containment sump alarms are annunciating.
- Shutdown Cooling Lo Flow alarms are annunciating.
- An operator reports that the "A" train LTOP is partially open.

The CRS should implement the \_(1)\_ procedure, Isolate the LTOP and restore Shutdown Cooling flow by placing \_(2)\_ .

- A. (1) Loss of Coolant Accident (2) Shutdown Cooling train "B" in service.
- B. (1) Loss of Coolant Accident (2) Containment Spray pump "A" in service.
- C. (1) Lower Mode Functional Recovery (2) Shutdown Cooling train "B" in service.
- D. (1) Lower Mode Functional Recovery (2) Containment Spray pump "A" in service.

Answer: C

Justification:		
A	Wrong	With LTOPs in service LOCA entry conditions are not met even though the event in progress is a Loss of Coolant accident
B	Wrong	
C	Correct	<b>with LTOPs open the LMFRP is the correct procedure to enter and the other train of SDC should be placed in service because the to isolate the LTOP the SDC suction valves are closed so CS A is not available.</b>
D	Wrong	Isolating the LTOP require that the SDC suction valves are closed so CS A is not available.
<p><b>Proposed reference to be provided:</b> None</p> <p><b>Technical Reference:</b> 40EP-9EO11, Lower Mode Functional Recovery Procedure / 40EP-9EO03, LOCA</p> <p><b>K&amp;A:</b> Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.</p>		

<b>Question 99 Info</b>	
Points:	1.00
Time to Complete:	5
Difficulty:	4.00
System ID:	44132
User-Defined ID:	Q44132
Topic:	Q44132 enter LMFRP and shift SDC trains (IC problem)
RO:	3.8
SRO:	4.2
KA #:	2.4.9
<b>Revision:</b>	<b>08/15/2013 rev: 0</b>

### **Question 99 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 3

#### **Associated objective(s):**

determine the correct safety function set to use to maintain safety functions or to recover jeopardized safety functions

Given the following conditions:

- Unit 1 is in Mode 4 exiting a 29 day refueling outage.
- Armed intruders have entered the B-Safe building and taken hostages.
- No injuries have been reported.
- The SM has implemented the Emergency Preparedness (EP) procedures.
- The CRS has implemented 40AO-9ZZ24, Deliberate Acts Against PVNGS.

(EAL Table is provided)

The SM will classify this event as a(n) \_(1)\_ Emergency Response Personnel will be directed to \_(2)\_.

- A. (1) Alert (2) Report to their Emergency Response Facility IAW EP-0902, Notifications.
- B. (1) Alert (2) Take immediate cover in the nearest building IAW 40AO-9ZZ24, Deliberate Acts Against PVNGS.
- C. (1) Site Area Emergency (2) Report to their Emergency Response Facility IAW EP-0902, Notifications.
- D. (1) Site Area Emergency (2) Take immediate cover in the nearest building IAW 40AO-9ZZ24, Deliberate Acts Against PVNGS.

Answer: B

<b>Justification:</b>		
A	Wrong	Note in EP 0901 directs the EC to use ZZ24 to make announcements and the associated appendix directs <b>ALL</b> personnel to seek shelter.*
B	Correct	<b>B-Safe building is outside the PA therefore this event is an Alert and ZZ24 directs ALL personnel to seek shelter.*</b>
C	Wrong	Would be SAE in the intruders were within the PA
D	Wrong	Would be SAE in the intruders were within the PA
<p><b>Proposed reference to be provided:</b> EAL Cold Tables</p> <p><b>Technical Reference:</b> EP 0901, Notifications / 40AO-9ZZ24, Deliberate Acts Against PVNGS</p> <p><b>K&amp;A:</b> Knowledge of procedures relating to a security event (non-safeguards information).</p> <p><b>*Appendix K of ZZ24 is confidential, we can provide documentation if needed</b></p>		

<b>Question 100 Info</b>	
Points:	1.00
Time to Complete:	3
Difficulty:	3.00
System ID:	44119
User-Defined ID:	Q44119
Topic:	Q44119 classify the security event and direct on-site personnel
RO:	3.2
SRO:	4.1
KA#:	2.4.28
<b>Revision:</b>	<b>07/18/13 rev: 0</b>

### **Question 100 Table-Item Links**

#### Q - 10CFR Sections

55.43 (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

#### Q - Cognitive Level

Comprehension / Anal

#### Q - Question Source

New

#### Q - SRO Exam

SRO Exam 2013

#### O - SRO Tier Group Designation

Tier 3

#### **Associated objective(s):**

classify the security event

References provided to RO applicants for written exam



PBB S04

4.16KV BUS S04 ALT SPLY  
PBB-HS-S04L  
PBB-II-S04L EI-S04L

4.16KV BUS S04  
ALTERNATE SUPPLY  
PBB-SS-S04L

TRIP CLOSE

OFF ON

4.16KV BUS S04 NORM SPLY  
PBB-HS-S04K  
PBB-II-S04K EI-S04K

4.16KV BUS S04  
NORMAL SUPPLY  
PBB-SS-S04K

TRIP CLOSE

OFF ON

4.16KV BUS S04  
PBB-EI-S04

480V LC-L36 4.16KV BKR  
PGB-HS-S04N  
PGB-II-S04N

TRIP CLOSE

480V LC-L34 4.16KV BKR  
PGB-HS-S04H  
PGB-II-S04H

TRIP CLOSE

480V LC-L33 4.16KV BKR  
PGB-HS-S04J  
PGB-II-S04J

TRIP CLOSE

DIESEL GENERATOR B  
4.16KV BREAKER  
PEB-HS-S04B

TRIP CLOSE

DIESEL GENERATOR B  
PEB-SS-S04B

OFF ON



480V LC-L36 MAIN BKR  
PGB-HS-L36B2  
PGB-EI-L36

TRIP CLOSE



CLASS SWG RM B

480V LC-L34 MAIN BKR  
PGB-HS-L34B2  
PGB-EI-L34

TRIP CLOSE



CLASS SWG RM B

480V LC-L32 MAIN BKR  
PGB-HS-L32B2  
PGB-EI-L32

TRIP CLOSE



CLASS SWG RM B



DIESEL GENERATOR B  
PEB-G02

LOAD GROUP 2 MCC  
SUPPLY BREAKER STATUS

6 red indicator lights in a 2x3 grid.

4.16KV BUS S04  
POTENTIAL INDICATION

6 yellow indicator lights in a 2x3 grid.

DIESEL GENERATOR B  
SPEED  
PEB-SC-G02

LOWER RAISE

DIESEL GENERATOR B  
VOLTAGE  
PEB-EC-G02

LOWER RAISE

DIESEL GENERATOR B  
START/STOP  
DGB-HS-2

STOP START

TRIP

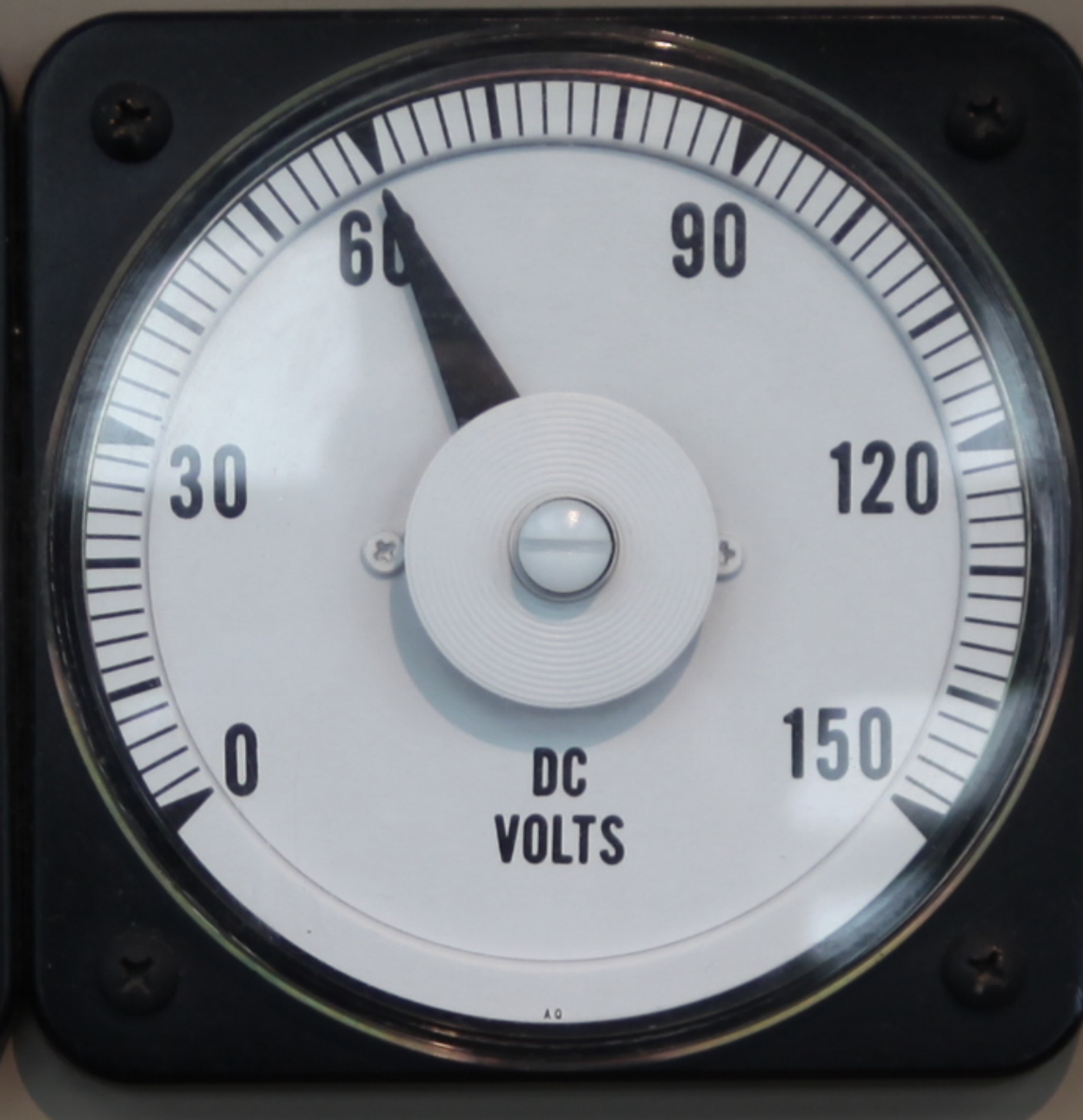
VERRIDE



DIESEL GENERATOR B  
FIELD  
PEB-II-G02F



DIESEL GENERATOR B  
FIELD  
PEB-EI-G02F



SYNCHROSCOPE  
MAN-SI-004

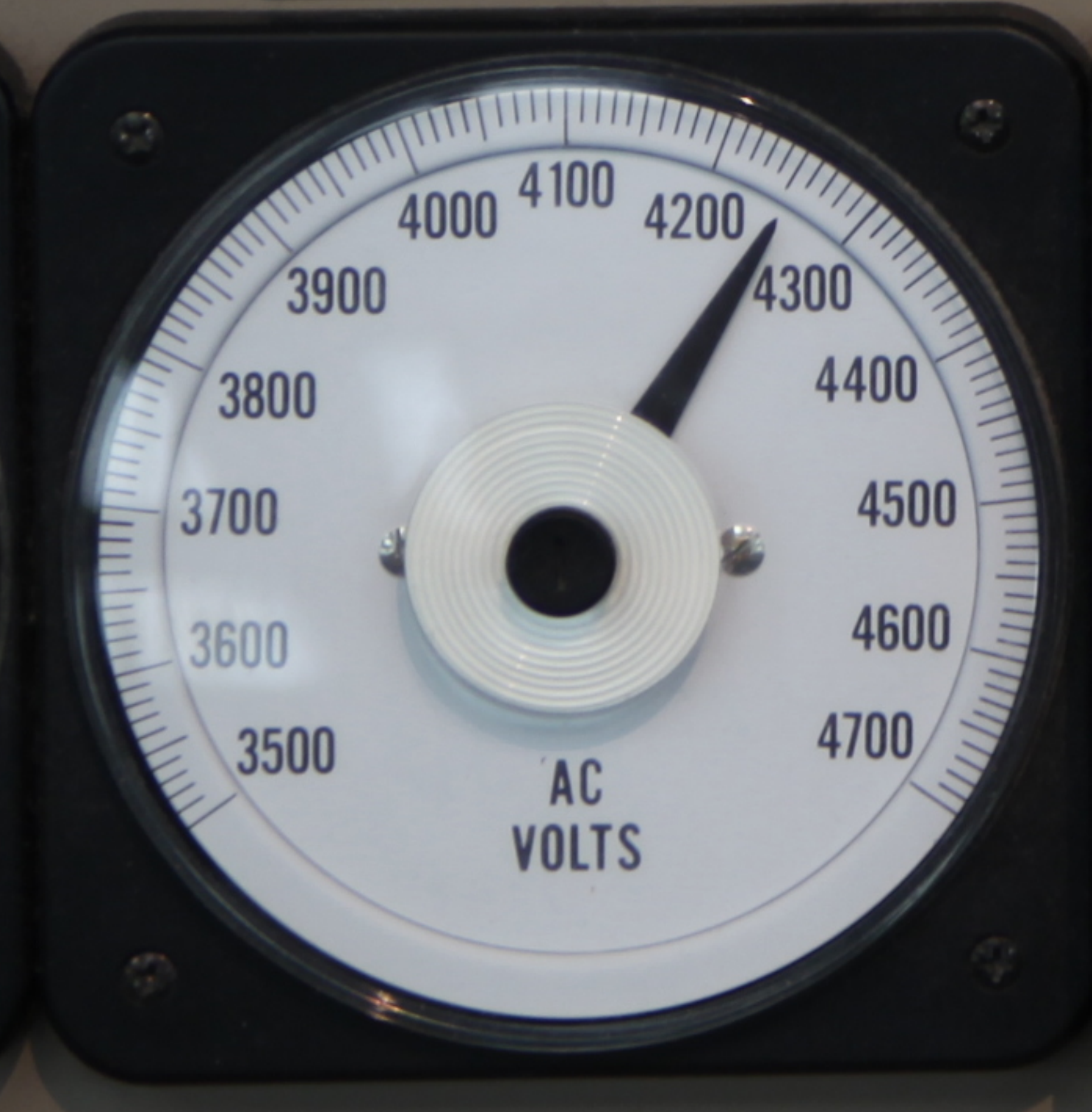


Control Room Discrepancy / Note  
No. 17 Date 2-18-13  
Description: DG 'B' SYNCHROSCOPE MAN-SI-004  
LAGS THE OTHER SYNCHROSCOPES BY APPROX 7  
MINUTES. DO NOT USE FOR SYNCHRONIZING.

DIESEL GENERATOR B  
G02  
PEN-II-G02



DIESEL GENERATOR B  
G02  
PEN-EI-G02



DIESEL GENERATOR B  
G02  
PEN-SI-G02



DIESEL GENERATOR B  
G02  
PEN-JIW-G02



DIESEL GENERATOR B  
G02  
PEN-JIV-G02



12 FINGER CEA SUBGROUPS

4 FINGER SUBGROUP

SUB GROUP 2 3 19 20 23 24 6 7 9 10 16 14 15 17 18 1 11 21 5 22 4 8 12 13 SUB GROUP

GRP A	GRP A	GRP A	GRP A			GRP B	GRP B	GRP B	GRP B	GRP B	GRP 1	GRP 1	GRP 2	GRP 2	GRP 3	GRP 3	GRP 3	GRP 3	GRP 4	GRP 4	GRP 5	GRP P1	GRP P2	GRP P2
6	7	74	75			22	23	34	35	55	54	56	66	67	2	42	82	18	86	14	38	46	47	
8	9	76	77			24	25	36	37	58	57	59	68	69	3	43	83	19	87	15	31	48	49	
10	11	78	79			26	27	38	39	61	60	62	70	71	4	44	84	20	88	16	32	50	51	
12	13	80	81			28	29	40	41	64	63	65	72	73	5	45	85	21	89	17	33	52	53	
																						1		

D  
B  
A  
C

D  
B  
A  
C

STUDY MANUAL INDIVIDUAL MANUAL GROUP MANUAL SEQUENTIAL AUTO SEQUENTIAL

LAMP TEST

CWFB  
CWFB

GROUP SELECT

2 3 4  
1 5  
B 6  
A 7  
P 8

PS GROUP SELECT

P2 P  
P1

MODE SELECT

MG MS AS  
MI  
SB

INDIVIDUAL CEA SELECTION

TENS UNITS

0 1 2  
9 3 8  
8 4 7  
7 6 5

WITHDRAW



INSERT

References provided to SRO applicants for written exam

## LOSS OF COOLANT ACCIDENT

INSTRUCTIONS

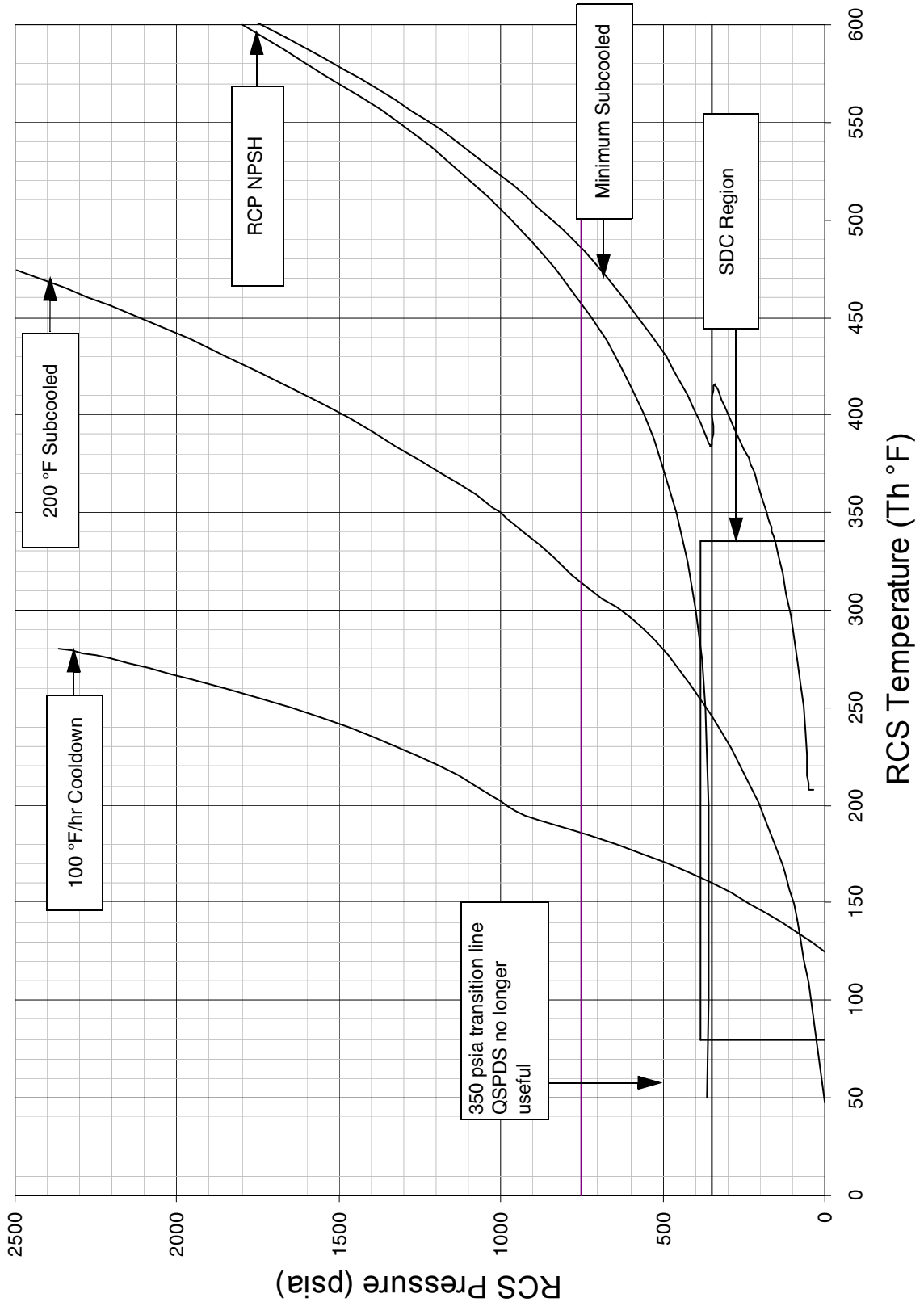
- \* 37. Maintain RCS pressure within the P/T limits by performing the following: REFER TO Appendix 2, Figures
- Control the cooldown rate.
  - Control pressurizer heaters and main or auxiliary spray.
  - IF** SI throttle criteria are met, **THEN** control charging, letdown, and HPSI flow.

- \* 38. Ensure at least one Steam Generator has level being maintained within or being restored to 45 - 60% NR [45 - 60% NR].

CONTINGENCY ACTIONS

- 37.1 **IF** the RCS exceeds the P/T limits, **THEN** perform the following to restore pressure and temperature to within the P/T limits: REFER TO Appendix 2, Figures
- IF** a cooldown is in progress, **THEN** stop the cooldown.
  - Depressurize the RCS using main or auxiliary pressurizer spray.
  - IF** SI throttle criteria are met, **THEN** control charging, letdown, and HPSI flow.
- 37.2 **IF** the cooldown rate is greater than 100°F/hr, **THEN** perform the following to restore the cooldown rate to within its limit:
- Stop the cooldown as necessary.
  - Maintain the plant in a stable pressure-temperature configuration.
  - Continue the plant cooldown within 100°F/hr.

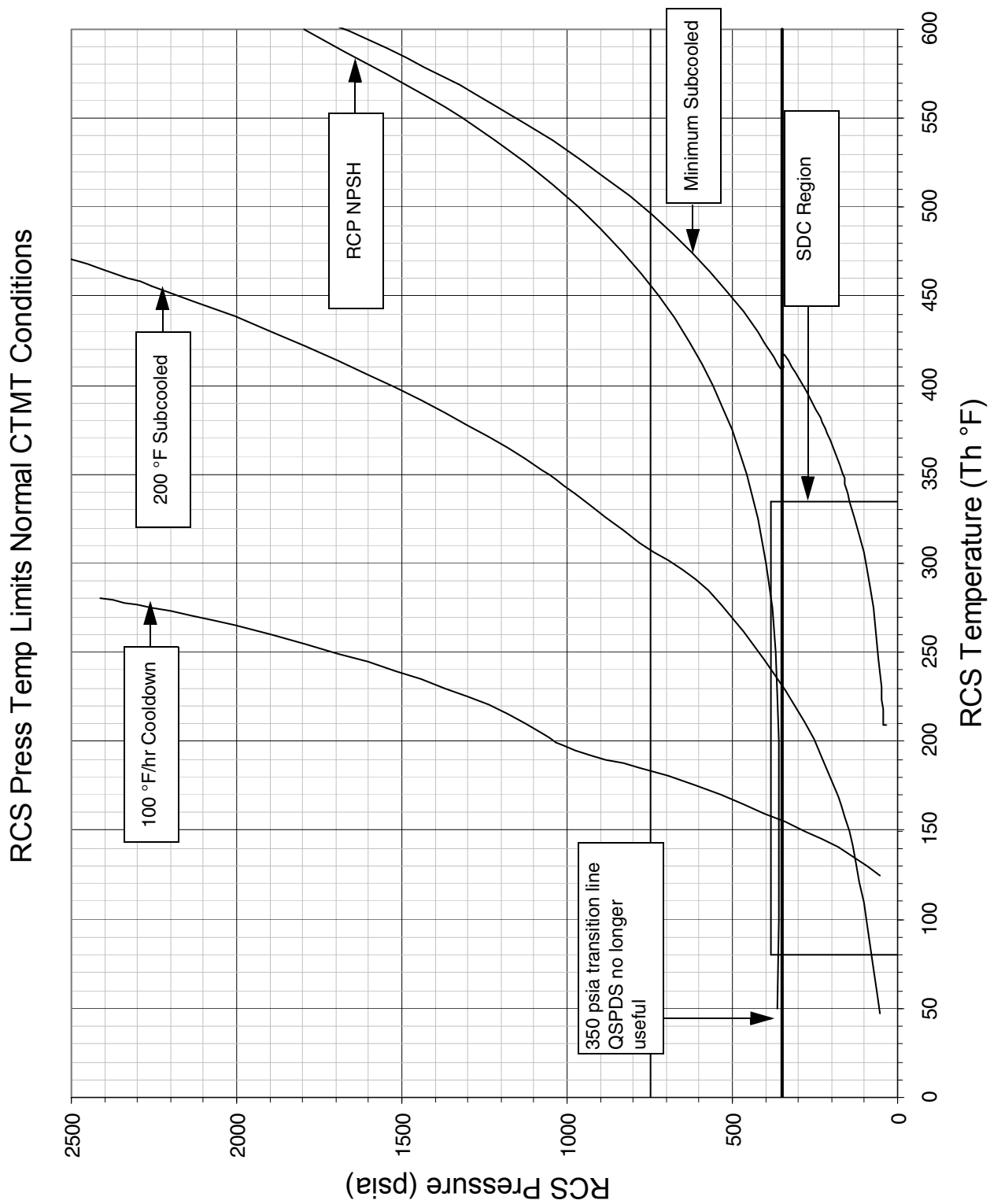
RCS Press Temp Limits Harsh CTMT Conditions



Natural Circulation - REP CET used

Forced Circulation - Th indication used

Appendix 2,  
Figures



RCS Press Temp Limits Normal CTMT Conditions

Natural Circulation - REP CET used

Forced Circulation - Th indication used

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources – Operating

- LCO 3.8.1 The following AC electrical sources shall be OPERABLE:
- a. Two circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System;
  - b. Two diesel generators (DGs) each capable of supplying one train of the onsite Class 1E AC Electrical Power Distribution System; and
  - c. Automatic load sequencers for Train A and Train B.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

-----NOTE-----  
LCO 3.0.4.b is not applicable to DGs.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for required OPERABLE offsite circuit.	1 hour
	<u>AND</u>	<u>AND</u> Once per 8 hours thereafter
	A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
	<u>AND</u>	(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore required offsite circuit to OPERABLE status.	72 hours <u>AND</u> 13 days from discovery of failure to meet LCO
B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for the OPERABLE required offsite circuit(s).  <u>AND</u> B.2 Declare required feature(s) supported by the inoperable DG inoperable when its redundant required feature(s) is inoperable.  <u>AND</u> B.3.1 Determine OPERABLE DG is not inoperable due to common cause failure.  <u>OR</u> B.3.2 Perform SR 3.8.1.2 for OPERABLE DG.  <u>AND</u>	1 hour  <u>AND</u> Once per 8 hours thereafter  4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)  24 hours  24 hours  (continued)



ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.4 Restore DG to OPERABLE status.	10 days <u>AND</u> 13 days from discovery of failure to meet LCO
C. Two required offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.  <u>AND</u> C.2 Restore one required offsite circuit to OPERABLE status.	12 hours from discovery of Condition C concurrent with inoperability of redundant required feature(s)  24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. One required offsite circuit inoperable. <u>AND</u> One DG inoperable.</p>	<p>-----NOTE----- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems – Operating," when Condition D is entered with no AC power source to a train. -----</p> <p>D.1 Restore required offsite circuits to OPERABLE status.</p> <p><u>OR</u></p> <p>D.2 Restore DG to OPERABLE status.</p>	<p>12 hours</p> <p>12 hours</p>
<p>E. Two DGs inoperable.</p>	<p>E.1 Restore one DG to OPERABLE status.</p>	<p>2 hours</p>
<p>F. One automatic load sequencer inoperable.</p>	<p>F.1 Restore automatic load sequencer to OPERABLE status.</p> <p><u>AND</u></p> <p>F.2 Declare required feature(s) supported by the inoperable sequencer inoperable when its redundant required feature(s) is inoperable.</p>	<p>24 hours</p> <p>4 hours from discovery of Condition F concurrent with inoperability of redundant required feature(s)</p>

(continued)





# CHANNEL A

## REACTOR PROTECTION

VAR OVER PWR		HI LOG POWER		HI LOCAL POWER		LOW DNBR		HI PZR PRESS		LO PZR PRESS		LO SG-1 LEVEL		LO SG-2 LEVEL		HI SG-1 LEVEL	
P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T
BYPASS		BYPASS		BYPASS		BYPASS		BYPASS		BYPASS		BYPASS		BYPASS		BYPASS	

HI SG-2 LEVEL		LO SG-1 PRESS		LO SG-2 PRESS		HI CONT PRESS		SG-1 LO FLOW		SG-2 LO FLOW		INDICATOR			
P	T	P	T	P	T	P	T	P	T	P	T	P	T	RESET	TEST
BYPASS		BYPASS		BYPASS		BYPASS		BYPASS		BYPASS		BYPASS			

PERMISSIVE

OFF

BYPASS

OFF

PERMISSIVE

BYPASS

LO PZR PRESS BYPASS

HI LOG POWER BYPASS

LO PZR PRESS SETPOINT RESET

LO SG PRESS SETPOINT RESET

EXCORE LINEAR POWER CALIBRATE

## ENGINEERED SAFETY FEATURES

HI CONT PRESS		LO SG-1 LEVEL		LO SG-2 LEVEL		LO RWT LEVEL		HI SG-1 ΔP		HI SG-2 ΔP	
P	T	P	T	P	T	P	T	P	T	P	T
BYPASS		BYPASS		BYPASS		BYPASS		BYPASS		BYPASS	

RPS

SAS

CAS

INITIATION RELAY CSAS

RAS

MSIS

EPAS-1

EPAS-2

3.3 INSTRUMENTATION

3.3.5 Engineered Safety Features Actuation System (ESFAS) Instrumentation

LC0 3.3.5 Four ESFAS trip and bypass removal channels for each Function in Table 3.3.5-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5-1.

ACTIONS

-----NOTE-----  
Separate Condition entry is allowed for each ESFAS Function.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one automatic ESFAS trip channel inoperable.	A.1 Place channel in bypass or trip. <u>AND</u> A.2 Restore channel to OPERABLE status.	1 hour  Prior to entering MODE 2 following next MODE 5 entry
B. One or more Functions with two automatic ESFAS trip channels inoperable.	B.1 Place one channel in bypass and the other in trip.	1 hour

(continued)

3.3 INSTRUMENTATION

3.3.6 Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip

LC0 3.3.6 Six channels of ESFAS Matrix Logic, four channels of ESFAS Initiation Logic, two channels of Actuation Logic, and four channels of Manual Trip shall be OPERABLE for each Function in Table 3.3.6-1.

APPLICABILITY: According to Table 3.3.6-1.

ACTIONS

-----NOTE-----  
Separate Condition entry is allowed for each Function.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One or more Functions with one Matrix Logic channel inoperable. <u>OR</u> Three Matrix Logic channels are inoperable due to a common power source failure de-energizing three matrix power supplies.</p>	<p>A.1 Restore channel to OPERABLE status.</p>	<p>48 hours</p>
<p>B. One or more Functions with one Manual Trip or Initiation Logic channel inoperable.</p>	<p>B.1 Restore channel to OPERABLE status.</p>	<p>48 hours</p>

(continued)

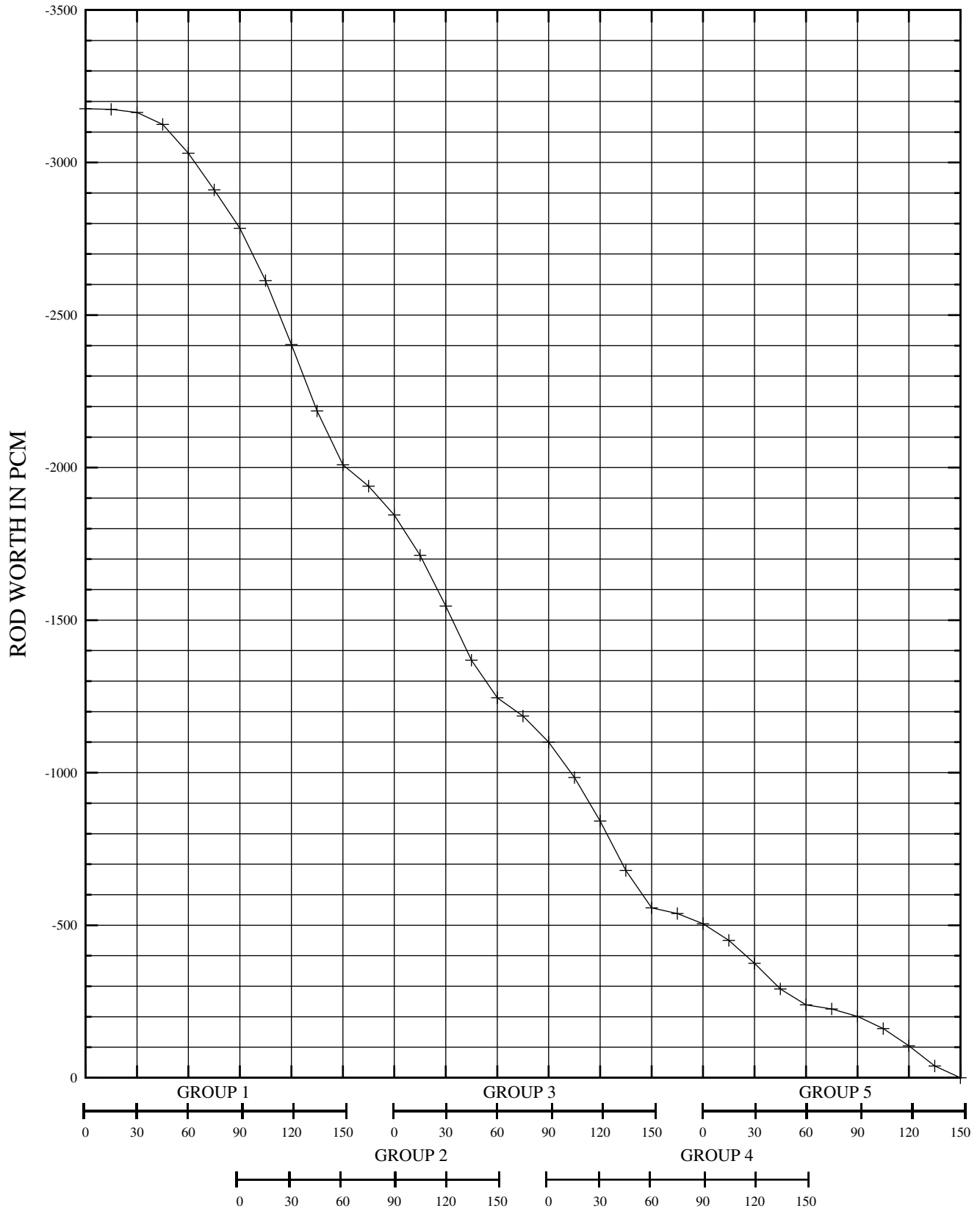
ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with two Initiation Logic channels or Manual Trip channels affecting the same trip leg inoperable.	C.1 Open at least one contact in the affected trip leg of both ESFAS Actuation Logics.	Immediately
	<u>AND</u>	
	C.2 Restore channels to OPERABLE status.	48 hours
D. One or more Functions with one Actuation Logic channel inoperable.	D.1 -----NOTE----- One channel of Actuation Logic may be bypassed for up to 1 hour for Surveillances, provided the other channel is OPERABLE. -----  Restore inoperable channel to OPERABLE status.	48 hours
E. Required Action and associated Completion Time of Conditions for Containment Spray Actuation Signal, Main Steam Isolation Signal or Auxiliary Feedwater Actuation Signal not met.	E.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	E.2 Be in MODE 4.	12 hours

(continued)



REG GROUPS 1-5 WORTH (OVERLAP) VS WITHDRAWAL (INCHES)  
(HZP, 250.0 EFPD)



REFERENCE SOURCE OF DATA

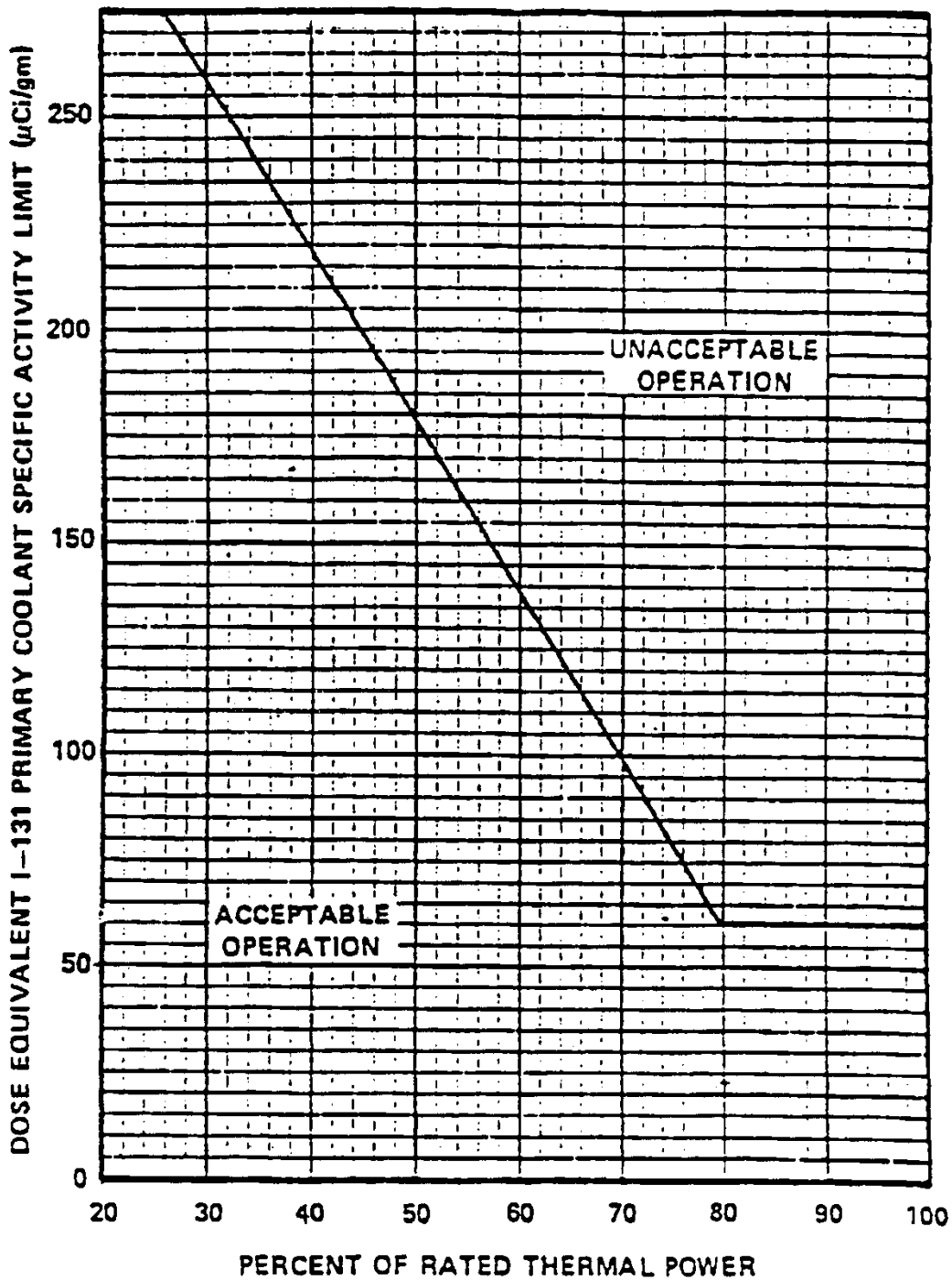
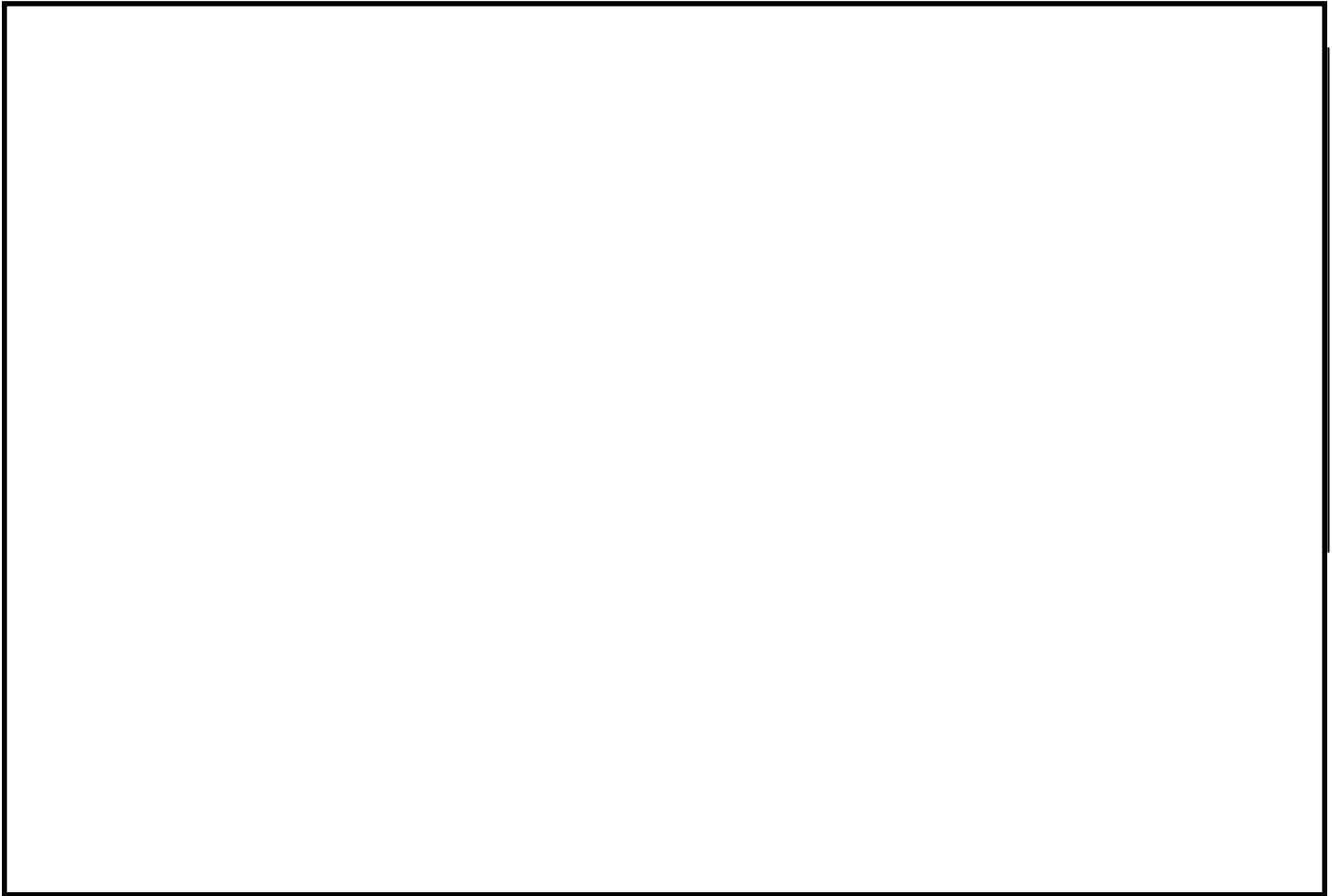


Figure 3.4.17-1 (page 1 of 1)  
Reactor Coolant DOSE EQUIVALENT I-131 Specific Activity Limit  
Versus Percent of RATED THERMAL [REDACTED]

### 3.0 LCO APPLICABILITY

---



LCO 3.0.6            When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. Only the support system LCO ACTIONS are required to be entered. This is an exception to LCO 3.0.2 for the supported system. In this event, an evaluation shall be performed in accordance with Specification 5.5.15, "Safety Function Determination Program (SFDP)." If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

(continued)