Draft Submittal
(Pink Paper)

Reactor Operator Written Exam

ST. LUCIE MARCH/APRIL 2006-301 EXAM

05000335/2006301 AND 05000389/2006301

MARCH 20 - 29, 2006 AND APRIL 6, 2006

4/24/06

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	007.EK2.02	
	Importance Rating	2.6	

Knowledge of the interrelations between Reactor Trip Recovery and breakers, relays, and disconnects.

Proposed Question: Common 1

Given the following:

- Unit 2 EOP-02, Reactor Trip Recovery is in progress.
- DG-2B was started locally.
- 2-EOP-99, Appendices/Figures/Tables/Data Sheets, Appendix B, Power Restoration to a De-Energized Bus is being performed to close Emergency Diesel Generator DG-2B output breaker.

What is the required position of the 2B EDG Output Breaker NORMAL/ISOLATE switch and SYNC plug to close the EDG breaker from the Control Room?

NORMAL/ISOLATE switch in:

A. NORMAL and SYNC switch selected to 2B EDG position.

B. ISOLATE and SYNC switch selected to 2B EDG position.

C. NORMAL and SYNC switch selected to TIE 2B3 position.

D. ISOLATE and SYNC switch selected to OFF.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Plausible as local start of the EDG requires that the NORMAL/ISOLATE switch be placed in ISOLATE.

C. Incorrect. Plausible as local start with switch in ISOLATE and then placed in NORMAL may cause the EDG breaker to close, however, initial switch position is not known. This is the position for adjusting EDG frequency, however, the tie position is incorrect.

D. Incorrect. Plausible as this condition would allow the breaker to be closed locally.

Technical Reference(s): 2-EOP-99, Appendices / Figures / Tables / Data Sheets, Appendix B, Section 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: N/A

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
30	APPENDICES / FIGURES / TABLES / DATA SHEETS	7 of 155
PROCEDURE NO.: 2-EOP-99	ST. LUCIE UNIT 2	

APPENDIX B
POWER RESTORATION TO A DE-ENERGIZED BUS
(Page 3 of 11)

SECTION 2: RESTORING 4.16 KV POWER FROM AN EDG

A Train (√) B Train (√)

☐ **1.** ENSURE the associated train EDG is RUNNING.
REFER TO Appendix C, Diesel Generator Local Start. ___ ___

CAUTION
If the EDG Output Breaker NORMAL / ISOLATE switch was placed in ISOLATE for EDG local start, the output breaker may close during performance of the following step.

☐ **2.** ENSURE the associated train EDG Output Breaker NORMAL / ISOLATE switch is in NORMAL. ___ ___

☐ **3.** If the EDG Output Breaker fails to CLOSE,
Then PERFORM **ALL** of the following:

A. INSERT sync plug and PLACE in the desired DG position. DG-2A___ DG-2B___

B. CLOSE the EDG Output Breaker. 20211___ 20401___

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	009.EA1.09	
	Importance Rating	3.6	

Ability to operate and/or monitor the RCP during a small break LOCA.

Proposed Question: Common 2

Given:

- Unit 2 Reactor was tripped from full power.
- 160 gpm LOCA existed at time of trip.
- RCS cooldown and depressurization in progress, per 2-EOP-03, LOCA.
- RCS Thot is 515°F.
- RCS pressure 1700 psia.
- RVLMS Level 4-8 indicate covered.
- 2-EOP-99, Appendices/Figures/Tables/Data Sheets, Appendix J, Restoration of CCW and CBO to the RCPs has been completed.

Which ONE (1) of the following actions must be performed for the above conditions?

(Steam Tables are provided.)

A. Stop the RCS depressurization.

B. Reduce RCS pressure, regardless of subcooling.

C. Ensure one (1) RCP secured in each loop.

D. Stop ALL four (4) RCPs.

Proposed Answer: C

Explanation (Optional):

A. Incorrect.Continuous depressurization is required to place RCS on Shutdown Cooling. Plausible if candidate thinks that break flow is under control.

B. Incorrect.Approximately 100°F subcooling exists at this point, pressure could be reduced to < 1000 psia and still meet subcooling requirements based on current temperature. Plausible if candidate thinks that pressure must be reduced immediately to reduce break flow.

C. Correct. RCP trip strategy for a LOCA states 2 RCPs should be secured when RCS < 1736 psia (SIAS setpoint).

D. Incorrect. Minimum subcooling still exists to operate 2 RCPs. Plausible if candidate thinks that inadequate subcooling exists.

Technical Reference(s): EOP-03, LOCA (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: 0702824-06 (As available)

Question Source: Bank # 1023
Modified Bank # ____ (Note changes or attach parent)
New ____

Question History: Last NRC Exam ____

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7, 10
55.43 ____

Comments:

REVISION NO.: 24	PROCEDURE TITLE: LOSS OF COOLANT ACCIDENT	PAGE: 9 of 71
PROCEDURE NO.: 2-EOP-03	ST. LUCIE UNIT 2	

4.0 OPERATOR ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
[*] **7. RCP Trip Strategy**	
A. If RCS pressure is less than 1736 psia, Then ENSURE **ONE** RCP in **EACH** loop is STOPPED.	
B. If RCS subcooling is less than minimum subcooling, Then ENSURE **ALL** RCPs are STOPPED.	
C. If CCW is LOST to the RCPs for greater than 10 minutes, Then STOP **ALL** RCPs.	

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	029 EA2.09	
	Importance Rating	4.4	

Ability to determine and interpret the following as they apply to (Emergency Plant Evolution): Occurrence of a main turbine/reactor trip.

Proposed Question: Common 3

Given the following Unit 1 plant conditions:

- The crew is performing the actions of EOP-01, Standard Post Trip Actions.
- CEAs have FAILED to insert.
- Actions for Reactivity Control are being carried out.
- The RO determines that the following occurs in rapid succession:
    - RCS temperature and pressure rising
    - Pressurizer PORVs indicate open
    - Quench Tank temperature, pressure, and level are rising

Which ONE (1) of the following has occurred?

A. The reactor has tripped.

B. The turbine has tripped.

C. SIAS has actuated.

D. The Turbine Driven AFW pump has tripped.

Proposed Answer: B

Explanation (Optional):

A. Inorrect. A reactor Trip would not cause RCS pressure to cause the PORVs to lift

B. Correct. When the turbine trips, the secondary transient causes temperature and pressure to rise in the RCS. SBCS is only capable of accommodating a 45% load rejection

C. Incorrect. SIAS may actuate as a result of PORVs lifting and a sharp drop in RCS pressure, but would not be the cause of the event

D. Incorrect. TDAFW pump tripping would result in loss of heat removal and a secondary transient, but with MDAFW available, the transient would be mitigated before operation of PORVs

Technical Reference(s): Transient & Acc Anal (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	025.AK2.02	
	Importance Rating	2.6	

Knowledge of the interrelations between a Loss of RHR System and the RHR Pumps.

Proposed Question: Common 4

Given the following conditions on Unit 1:

- Mode 5.
- LPSI Pump 1A is in service providing Shutdown Cooling.
- LPSI Pump 1B is in Standby.
- RCS temp 180°F and rising slowly.
- LPSI Pump amperage has been oscillating.
- The Unit Supervisor enters ONP-1-0440030, Shutdown Cooling Off-Normal.

Which ONE (1) of the following describes the first action required?

A. Raise LPSI flow to increase pump cooling and stabilize amperage.

B. Lower LPSI Pump flow to increase NPSH and stabilize amperage.

C. Start and align LPSI Pump 1B for Shutdown Cooling and Stop LPSI Pump 1A.

D. Start and align LPSI Pump 1B to for Shutdown Cooling and equalize LPSI flow between both trains.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Raising flow would increase the cavitation already occurring
B. Correct. Lower flow. If amps do not stabilize, trip the pump
C. Incorrect. Subsequent action if pump continues to operate erratically
D. Incorrect. Would start second pump and equalize flow only if cooldown rate could not be maintained and heat load was higher than available cooling capacity

Technical Reference(s): ONP 1-0440030 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: 0702814-09 (As available)

Question Source:
- Bank # ____
- Modified Bank # ____ Changed values for time after shutdown and initial RCS temperature (see Comments).
- New X

Question History: Last NRC Exam ____

Question Cognitive Level:
- Memory or Fundamental Knowledge ____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 10
- 55.43 ____

REVISION NO.: 33A	PROCEDURE TITLE: SHUTDOWN COOLING OFF-NORMAL	PAGE: 6 of 34
PROCEDURE NO.: 1-0440030	ST. LUCIE UNIT 1	

7.0 OPERATOR ACTIONS

7.1 Immediate Operator Actions

INSTRUCTIONS	CONTINGENCY ACTIONS
1. CHECK LPSI pumps amps STABLE.	**1.** PERFORM the following: **A.** THROTTLE LPSI header valves. **B.** If pump amps do NOT stabilize, Then STOP the LPSI pump(s).
2. CHECK at least one LPSI pump operating.	**2.** If **BOTH** of the following conditions are met: • Time to core boiling is less than 30 minutes. • RCS level is less than or equal to the 33 ft. elev. Then EVACUATE the Containment and INITIATE Containment closure as follows: **A.** CLOSE penetrations in accordance with 1-M-0060. **B.** CLOSE all penetrations listed in the open penetration log.
3. §1 Verify core alterations are NOT in progress.	**3.** Secure core alterations.
4. §1 Verify dilution to the RCS is NOT in progress.	**4.** Secure dilution of the RCS.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	026.AA2.03	
	Importance Rating	2.6	

Ability to determine and interpret the following as they apply to Loss of Component Cooling Water: Valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition.

Proposed Question: Common 5

Unit 2 is at 100% power when a 'B' side CCW leak occurs.

- Low level alarms on both compartments for the CCW Surge Tank were received.
  - LA-10 – CCW SURGE TANK COMPARTMENT A LEVEL LOW
  - LB-10 - CCW SURGE TANK LEVEL HIGH/ COMPARTMENT B LEVEL LOW
- The leak was subsequently isolated and CCW Surge Tank level has returned to normal.

Which of the following describes the expected configuration of the CCW system?

NOTE: Assume no operator actions were taken other than isolating the leak.

A. Only the 'N' header valves from the 'A' side closed separating the 'A' CCW header from the 'B' side CCW header. The 'N' header valves automatically re-opened when the low level cleared.

B. Only the 'N' header valves from the 'B' side closed separating the 'A' CCW header from the 'B' side CCW header. The 'N' header valves will have to be manually re-opened.

C. All the 'N' header valves closed separating the 'A' CCW header from the 'B' CCW header. The 'N' header valves automatically re-opened when the low level cleared.

D. All the 'N' header valves closed separating the 'A' CCW header from the 'B' CCW header. The 'N' header valves will have to be manually re-opened.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Both CCW 'N' header valves close. The valves have no feature to automatically re-open. Plausible if candidate thinks only the A side N header valves close.

B. Incorrect. Surge tank will lower on both headers, closing all 'N' header valves. Plausible if candidate thinks the B side N header valves close.

C. Incorrect. The valves have no feature to automatically re-open. Plausible if candidate thinks the valves re-open automatically.

D. Correct.

Technical Reference(s): 07111209,CCW SD (Attach if not previously provided)
2-ARP-01-LA10 Alarm Response
2-ARP-01-LB10 Alarm Response

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702209-08 (As available)

Question Source: Bank # 356
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2002

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10
55.43 _____

Comments:

REVISION:	PROCEDURE TITLE:	PANEL:
0	ANNUNCIATOR RESPONSE PROCEDURE	LA
PROCEDURE NO:		WINDOW:
2-ARP-01-LA10	ST. LUCIE UNIT 2	10

ANNUNCIATOR PANEL LA

1	2	3	4	5	6
7	8	9	**10**	11	12
13	14	15	16	17	18

CCW SURGE TANK COMPARTMENT A LEVEL LOW
LA-10

DEVICE:
LS-14-1A/211

LOCATION:
RAB/64/S-RA1/W-RAI

SETPOINT:
2 feet 5 inches above tank bottom

ALARM CONFIRMATION:
1. LG-14-2A, CCW Surge Tank Level (local indication).

OPERATOR ACTIONS:

CAUTION
HCV-14-8A and HCV-14-9 automatically CLOSE when level decreases to low level setpoint.
CCW flow will be lost to **ALL** of the following components which may cause equipment damage:
- RCPs
- Letdown HX
- CEDM Coolers
- Fuel Pool HX
- Sample Hxs
- Boric Acid Concentrators
- 1A and 1B Waste Gas Compressors

REVISION:	PROCEDURE TITLE:	PANEL:
0	ANNUNCIATOR RESPONSE PROCEDURE	LB
PROCEDURE NO: 2-ARP-01-LB10	ST. LUCIE UNIT 2	WINDOW: 10

ANNUNCIATOR PANEL LB

1	2	3	4	5	6
7	8	9	**10**	11	12
13	14	15	16	17	18

CCW SURGE TANK LEVEL HIGH/ COMPARTMENT B LEVEL LOW
LB-10

DEVICE:
71X/211
LS-14-5
LS-14-1B

LOCATION:
RAB/PACB
RAB/64/S-RA1/W-RAI
RAB/64/S-RA1/W-RAI

SETPOINT:
Energized
4 feet 6 inches above tank bottom
2 feet 5 inches above tank bottom

ALARM CONFIRMATION:
1. LG-14-2A, CCW Surge Tank Level (local indication).
2. LG-14-2B, CCW Surge Tank Level (local indication).

OPERATOR ACTIONS:

CAUTION
HCV-14-8B and HCV-14-10 automatically CLOSE when level decreases to low level setpoint. CCW flow will be lost to **ALL** of the following components which may cause equipment damage:
- RCPs
- Letdown HX
- CEDM Coolers
- Fuel Pool HX
- Sample Hxs
- Boric Acid Concentrators
- 1A and 1B Waste Gas Compressors

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	027 AK3.03	
	Importance Rating	3.7	

Knowledge of the reasons for the following responses as they apply to the Pressurizer Pressure Control Malfunctions: Actions contained in EOP for Pressurizer Pressure Control malfunctions.

Proposed Question: Common 6

What is the reason for verifying that spray line temperatures are approximately equal when isolating the spray valves during a Pressurizer Pressure Control malfunction?

A. Divergence of spray line temperatures may indicate a stuck open spray valve. The stuck open valve is identified as being at the higher temperature and approaching Tcold.

B. Similar spray line temperatures could indicate that both spray valves were open. The open valves are identified as being between Pressurizer temperature and Tcold.

C. Divergence of spray line temperatures may indicate a stuck open spray valve. The stuck open valve is identified by a lowering spray line temperature approaching Tcold.

D. Similar spray line temperatures could indicate that both spray valves were closed. The closed valves are identified as being between Pressurizer temperature and Tcold.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. First part of distractor is true, however, spray line temperature will approach Tcold.

C. Incorrect. Consistent with caution in the procedure, however, spray line temperature will approach Tcold.

D. Incorrect. First part of distractor is true, however, if the valves were closed you would expect temperature to be between Tcold and ambient.

Technical Reference(s): 2-0120035, PZR Pressure and Level Off Normal (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 5, 10
- 55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
24A	PRESSURIZER PRESSURE AND LEVEL	6 of 15
PROCEDURE NO.: 2-0120035	ST. LUCIE UNIT 2	

7.2 Subsequent Operator Actions (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
1. A. (continued)	1. A. (continued)
	3. If both pressure channels are failed or automatic pressure control does NOT operate properly, Then operate spray controller in manual and energize or deenergize heaters as necessary.

NOTE
Divergence of Spray Line Temperatures between 2B1 and 2B2 Spray lines may indicate a stuck open spray valve. The stuck open spray valve would have the spray line with the higher temperature approaching cold leg temperature.

B. Verify PCV 1100E, Spray Valve 2B2, and PCV 1100F, Spray Valve 2B1, CLOSED by observing BOTH of the following:	B. If either spray valve is OPEN, Then perform the following:
1. CLOSED valve position indication	1. If PCV 1100E, Spray Valve 2B2 is OPEN, Then

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	029 EK1.02	
	Importance Rating	2.6	

Knowledge of the operational implications of the following concepts as they apply to ATWS: Definition of reactivity

Proposed Question: Common 7

During the performance of EOP-15, Functional Recovery, Reactivity Control, Success Path 2, boration flow should...

A. NOT be stopped until adequate shutdown margin is verified during subsequent actions.

B. be stopped when Wide Range Channels are less than 5×10^{-4}% and lowering.

C. NOT be stopped to prevent RCS heatup during subsequent actions.

D. be stopped when the amount of boron equal to the stuck rods has been added.

Proposed Answer: A

Explanation (Optional):

A. Correct. Boration must continue until adequate SDM is verified.

B. Incorrect. Plausible considering this is one of the conditions for meeting the Reactivity Control Success Path; however, emergency boration flow is continued until adequate SDM is verified.

C. Incorrect. Plausible condition as candidate may think that this will insert negative reactivity, however, RCS heatup is not a condition for meeting the Reactivity Control Success Path.

D. Incorrect. Plausible condition as candidate may think that this is adequate to verify SDM.

Technical Reference(s): 1-EOP-15, Functional Recovery, Reactivity Control (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702828-03 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 8, 10
55.43 _____

Comments:

REVISION NO.: 26	PROCEDURE TITLE: FUNCTIONAL RECOVERY	PAGE: 14 of 205
PROCEDURE NO.: 1-EOP-15	ST. LUCIE UNIT 1	

4.1 REACTIVITY CONTROL; RC-2 **Success Path 2 – Boration via CVCS**

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ 1. **Control RCS Temperature and Emergency Borate** If **ANY** of the following conditions exist, • Rx power is NOT less than 5×10^{-4}% • Rx power is NOT stable or lowering Then PERFORM **ALL** of the following: **A.** STOP the RCS cooldown. **B.** STABILIZE RCS temperature. **C.** INITIATE Emergency Boration to achieve adequate Shutdown Margin. **REFER TO** 1-ONP-02.02, Emergency Boration.	

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	038 EA1.04	
	Importance Rating	4.3	

Ability to operate and monitor the following as they apply to a SGTR: PZR spray, to reduce coolant system pressure.

Proposed Question: Common 8

Unit 2 conditions:

- A SGTR in 2A Steam Generator resulted in a SIAS.
- During the bus transfer a loss of off-site power occurred.
- All vital equipment is being powered from their respective Emergency Diesel Generators.
- RCS cooldown is in progress. Temperatures are as follows:
  - REP CET is 450°F; Loop 2A Thot is 440°F; Loop 2B Thot is 445°F.
- 2A Steam Generator pressure is 750 psia.

Which ONE (1) of the choices completes the following statement regarding RCS depressurization?

Depressurize the RCS to no less than _____ psia using _____ Spray.

(2-EOP-99, Appendices/Figures/Tables/Data Sheets, Figure 1A, RCS Pressure Temperature is provided.)

A. 700; Main

B. 700; Auxiliary

C. 930; Main

D. 930; Auxiliary

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Correct value but no RCP's are running for Main Spray.
B. Correct. First choice after Main Spray and within 50 psi of affected SG pressure.
C. Incorrect. Pressure below MSSV basis value in EOP-04 but not within 50 psi of affected SG pressure and no RCP's running.
D. Incorrect. First choice after Main Spray and pressure below MSSV basis value but not within 50 psi of affected SG pressure.

Technical Reference(s): 2-EOP-04, pg. 11 (Step 11.A) (Attach if not previously provided)
2-EOP-99, Appendices /Figures/Tables/Data Sheets, Figure 1A

Proposed references to be provided to applicants during examination: 2-EOP-99, Appendices /Figures/Tables/Data Sheets, Figure 1A

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10
55.43 _____

Comments:

REVISION NO.: 23	PROCEDURE TITLE: STEAM GENERATOR TUBE RUPTURE	PAGE: 11 of 46
PROCEDURE NO.: 2-EOP-04	ST. LUCIE UNIT 2	

4.0 OPERATOR ACTIONS (continued)

INSTRUCTIONS **CONTINGENCY ACTIONS**

NOTE

RCP operation is desirable while depressurizing the RCS during a SGTR event.

- RCP operation takes precedence over equalizing primary and secondary pressures.
- Monitor RCPs for cavitation as the NPSH curve is approached and exceeded.
- Maintain minimum subcooling within the limits of Figure 1A.

[*] **11. Depressurize the RCS**

PERFORM a controlled RCS depressurization as follows:

A. MAINTAIN RCS pressure within **ALL** the following criteria (listed in order of priority):

- Within the limits of Figure 1A, RCS Pressure Temperature
- Less than 930 psia
- Above the minimum pressure for RCP operation
- Approximately equal to the most affected S/G pressure (within 50 psia)

11.1 If RCS pressure can NOT be LOWERED and MAINTAINED within the specified criteria, Then OPERATE the PORVs or RCGVS to reduce pressure.

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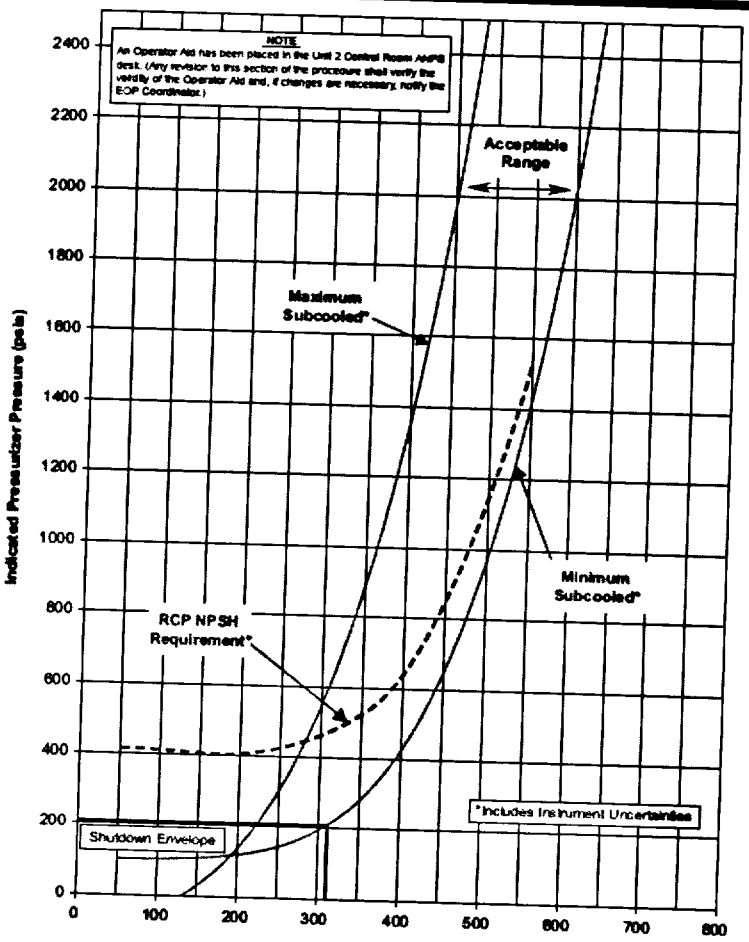
PROCEDURE NO.: 2-EOP-99		

FIGURE 1A
RCS PRESSURE TEMPERATURE
(Page 1 of 1)

(Containment Temperature Less Than or Equal to 200°F)

CAUTION
The RCP NPSH curve assumes one pump is operating in each loop. RCP instrumentation should be monitored for seal and pump performance in accordance with 2-EOP-99, Table 13.



Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	054 AK3.04	
	Importance Rating	4.4	

Knowledge of the reasons for the following responses as they apply to the loss of Main Feedwater: Actions contained in EOPs for loss of MFW.

Proposed Question: Common 9

The following conditions exist during performance of 1-EOP-01, Standard Post Trip Actions:

- 1B AFW Pump is OOS.
- Unit 1 tripped from 100% power.
- Two minutes after the trip the 1AB 125 VDC bus de-energized due to an electrical fault.
- Both Main Feedwater pumps tripped on low flow and will not restart.

Which ONE (1) of the following are steps that must be taken and why?

A. Close the PORV valves to preserve RCS inventory.

B. Secure one RCP in each loop to minimize heat input into the RCS.

C. Manually control Pressurizer heaters and spray to establish adequate subcooling.

D. Secure all RCPs within 10 minutes of the electrical fault due to loss of CCW flow.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Would be correct for loss of A or B DC bus. Plausible if candidate thinks PORVs are powered from Bus 1AB.

B. Correct. Due to loss of C AFW pump and B AFW pump OOS.

C. Incorrect. Would be correct if PORVs were open then re-closed as a result of the loss of A or B DC bus.

D. Incorrect. Correct for loss of CCW. Plausible if candidate thinks a total loss of CCW occurred.

Technical Reference(s): 1-EOP-01, SPTA (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 879
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 10
55.43 _____

Comments:

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21	STANDARD POST TRIP ACTIONS	11 of 18
PROCEDURE NO.: 1-EOP-01	ST. LUCIE UNIT 1	

4.0 OPERATOR ACTIONS (continued)

RCS HEAT REMOVAL

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **6.** DETERMINE RCS Heat Removal acceptance criteria are met:	
A. VERIFY at least **ONE** S/G has **BOTH** of the following conditions: • S/G level is between 20 and 90% NR • Feedwater is available and level is being restored to between 60 and 70% NR	**A.1** PERFORM **BOTH** of the following: **1.** ENSURE Main Feedwater flow is available. **2.** CONTROL Main Feedwater flow to restore S/G level to between 60 and 70% NR.
	A.2 PERFORM **BOTH** of the following: **1.** ENSURE Auxiliary Feedwater flow after AFAS actuation. **2.** CONTROL AFW flow to restore S/G level to between 60 and 70% NR.
B. If **EITHER** of the following conditions exist, • 1A or 1B AFW Pump is the **ONLY** source of Feedwater • Main or Auxiliary Feedwater flow can NOT be re-established Then STOP **ONE** RCP in **EACH** loop.	
(Continued on next page)	**(Continued on next page)**

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	055 EA1.05	
	Importance Rating	3.3	

Ability to operate and monitor the following as they apply to a Station Blackout: Battery, when approaching fully discharged.

Proposed Question: Common 10

Unit 2 is in a station blackout condition. DC loads have been minimized.

Which ONE (1) of the choices correctly completes the following statement regarding SIAS if the blackout lasts for several hours?

As 125 VDC battery voltage lowers, SIAS will _____.

A. initiate automatically.

B. fail "as-is."

C. isolate on undervoltage to prevent spurious actuations.

D. isolate to prevent damage to the logic matrix circuitry.

Proposed Answer: A

Explanation (Optional):
A. Correct. SIAS is a "fail safe system" that will initiate on loss of power.
B. Incorrect. SIAS will not fail "as-is".
C. Incorrect. Some components may isolate on UV but SIAS will not.
D. Incorrect. The relays are powered by 125 VDC, not the electronic circuits.

Technical Reference(s): 2-ARP-01-B50 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:

REVISION NO: 0A	PROCEDURE TITLE: ANNUNCIATOR RESPONSE PROCEDURE	PANEL: B
PROCEDURE NO: 2-ARP-01-B50	ST. LUCIE UNIT 2	WINDOW: 50

ANNUNCIATOR PANEL B

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	**50**
51	52	53	54	55	56	57	58	59	60

125V DC BATT 2A DISCH HIGH/ BKR OPEN
B-50

DEVICE:
74TDPU/1801
52b/1801

LOCATION:
RTGB-201
125V Bus 2AA, Bkr 2-61107

SETPOINT:
High discharge on battery 2A ≥ 2 seconds
Breaker open

ALARM CONFIRMATION:
1. Discharge indication on AM-1801, 2A DC Bus, Battery Amperes.
2. Loss of voltage indication on VM-1001, 2A DC Bus.
3. Local indication that Bkr 2-61107, Incoming Main, is OPEN.

CAUTION
High load on the battery will result in a continuous drop of bus voltage. As voltage drops relays (such as SIAS) will actuate. Eventually all DC control power will be lost. Reducing the time the battery is carrying the bus load will minimize this effect.

OPERATOR ACTIONS:
1. **If 125V DC Bus 2A Voltage has been lost, Then GO TO ONOP-2-0030136, Loss of a Safety Related DC Bus.**
2. Locally ENSURE Bkr 2-61107, Incoming Main, is CLOSED.
3. If amps are high, Then CONTACT the EM department for troubleshooting and repairs.
4. Locally ENSURE both Battery Chargers 2A and 2AA are operating with DC Output Breakers CLOSED.
5. REFER TO 2-ADM-03.01, Unit 2 Power Distribution Breaker List, for specific loads.
6. LIMIT operation of plant equipment fed from 125V Battery 2A.
7. MONITOR the battery voltage and amps as directed by the US.

CAUSES: Bkr 2-61107, Incoming Main, being OPEN or failure of battery chargers resulting is high current flow out of 125V DC Battery 2A.

REFERENCES: 1. CWD 2998-B-327 sheet 1801

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	056 AK3.02	
	Importance Rating	4.4	

Knowledge of the reasons for the following responses as they apply to Loss of Offsite Power: Actions contained in EOP for loss of offsite power.

Proposed Question: Common 11

A Loss of Off-Site Power has occurred on Unit 1.

Which ONE (1) of the following describes the minimum action required and reason for the action to ensure the Maintenance of Vital Auxiliaries safety function is satisfied?

A. Verify both vital 4.16 KV buses and both vital DC buses are energized to allow control and monitoring of all other safety functions.

B. Verify at least one vital 4.16 KV bus AND one vital DC bus energized to ensure RCP seal cooling is maintained to prevent loss of RCS inventory.

C. Verify at least one vital 4.16 KV bus AND one vital DC bus energized to allow control and monitoring of all other safety functions.

D. Verify both vital 4.16 KV buses and both vital DC buses are energized to ensure RCP seal cooling is maintained to prevent loss of RCS inventory.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Only 1 train of AC and DC vital power are required to met minimum safety function

B. Incorrect. Reason is for maintenance of all other safety functions. Isolation of RCP seal cooling is a priority of station blackout, not LOOP

C. Correct. .

D. Incorrect. Number of buses and reason for performing the action are incorrect

Technical Reference(s): EOP-9, LOOP/LOFC Basis (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702835-04 (As available)

Question Source: Bank # _____ Added reason to Stem & Distractors.

Modified Bank # _____ (Note changes or attach parent)

New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5, 10

55.43 _____

Comments:

EOP DEVIATIONS AND JUSTIFICATIONS

EOP Title: Loss of Offsite Power/Loss of Forced Circulation

EOP Procedure No.: 2 - EOP – 09 **Revision No.** 15

Corresponding EPG Title: LOOP/LOFC

EPG Revision No.: 5.3

EOP Step/Attachment No.: Maintenance of Vital Auxiliaries

Vital 4.16 KV Buses (2A3 or 2B3)	At least ONE Energized

AND

Vital DC Buses (2A or 2B)	At least ONE Energized

AND

120V AC Instrument Bus	At least ONE Energized

Corresponding EPG Step/Attachment No.: SFSC 2 Maintenance of Vital Auxiliaries

EOP Deviations from EPG:

1. None

Technical Justifications for Deviations:

1. None

Amplifying Bases Information:

CEN-152, EPG Bases, SFSC-2 Maintenance of Vital Auxiliaries.

Unit 2 Technical Specification Section 8, Electrical Power Systems.

FSAR Section 8.2, Offsite Power System.

FSAR Section 8.3, Onsite Power System.

a) A D/G

Gravity feed-Chg. PP

VCT outlet breaker must be opened while holding CS in CLOSE

Must close VCT outlet

2. Maintenance of Vital Auxiliaries

   a. Discuss the maintenance of auxiliaries safety function:

   b. Acceptance criteria

   c. Bases

      1) Ensures that all other safety functions can be monitored and controlled.

EO-9

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	057 AA2.15	
	Importance Rating	3.8	

Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: that a loss of AC has occurred.

Proposed Question: Common 12

Unit 2 was at 100% power, all systems in normal configuration when the following events occurred:

- Numerous secondary annunciators in alarm.
- Generator megawatts decreasing.
- Steam Generator levels decreasing.
- DEH operator auto light OFF.

Which of the following describes the failure that has caused the current plant condition?

Loss of:

A. Instrument air.

B. the SUPS 120 VAC Vital bus.

C. the 120 VAC Instrument Bus 2MB.

D. 2B Heater Drain Pump.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Would cause all indications except DEH malfunction.
B. Correct.
C. Incorrect. Would cause secondary alarms, but not loss of megawatts.
D. Incorrect. Would cause all alarms/indications except DEH.

Technical Reference(s): 2-ONP-49.01, SUPS Non-Safety Vital AC or Fire and Security Inverter Malfunction (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source:
- Bank # 1956
- Modified Bank # _____ (Note changes or attach parent)
- New _____

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7, 10
- 55.43 _____

Comments:

REVISION NO.: 3A	PROCEDURE TITLE: SUPS – NON-SAFETY VITAL AC OR FIRE AND SECURITY INVERTER MALFUNCTION ST. LUCIE UNIT 2	PAGE: 4 of 19
PROCEDURE NO.: 2-ONP-49.01		

4.0 ENTRY CONDITIONS

4.1 Annunciator (B-33), VTL Non-Safety 120V AC SUPS / Security SUPS Trouble, on RTGB-201.

4.2 Observed smoke or flames coming from the inverter cabinets.

4.3 Loss of the alternate power source (SYNC light NOT LIT while on the inverter).

4.4 Loss of Fire Detection and access to vital areas.

4.5 Loss of PC-11 indications or loss of Fire and Security Inverter.

4.6 Failure of **ONE** or more of the following:

- Feedwater Regulating Systems
- Turbine Generator Control System
- Heater level control

4.7 For additional loads see Appendix A.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	058 AK1.01	
	Importance Rating	2.8	

Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation.

Proposed Question: Common 13

How can an operator tell if a Unit 2 vital battery bus is powered from the battery instead of the battery charger?

A. An ammeter on RTGB 201 shows a discharge rate when on the battery.

B. A white light on RTGB 201 is lit only when the battery charger is in service.

C. Bus load shedding occurs whenever the bus is not supplied from a battery charger.

D. By observing the battery charger output breaker status annunciator on RTGB 201.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Plausible if candidate thinks that the light is potential supplied from the battery charger. This is a DC bus potential light.

C. Incorrect. Plausible if candidate confuses actuations that cause load shedding with a low DC bus voltage.

D. Incorrect. Plausible as this condition could be indicative of a loss of DC on that bus.

Technical Reference(s): 0711503, 125 VDC System (Attach if not previously provided)
2-ONP-0030136, Loss of Safety Related DC Bus

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702503-02 (As available)

Question Source:	Bank #	783	Made question Unit specific.
	Modified Bank #		(Note changes or attach parent)
	New		
Question History:	Last NRC Exam		
Question Cognitive Level:	Memory or Fundamental Knowledge	X	
	Comprehension or Analysis		
10 CFR Part 55 Content:	55.41	7	
	55.43		

Comments:
From 0711503, 125 VDC System

- High Voltage Shutdown
- No Charge (Charges 1AA, 1BB, 1D, 2AA, and 2BB only)

CONTROL ROOM INDICATIONS

- Voltmeters - 125 VDC buses A, B, C and D
- Ammeters - 125 VDC buses 2A and 2B
- 125 VDC AB bus - No indications other than annunciators
- 2C/AB and 2D/AB cross-tie - Blue status light

REVISION NO.:	PROCEDURE TITLE:	PAGE:
16A	LOSS OF A SAFETY RELATED D.C. BUS	4 of 22
PROCEDURE NO.: 2-0030136	ST. LUCIE UNIT 2	

4.0 RECORDS REQUIRED

4.1 Normal log entries.

5.0 ENTRY CONDITIONS

5.1 Loss of A or B side breaker open / close indicating lights (RTGB 201).

5.2 Annunciator B-30 (A-30), 125V DC Bus 2A (2B) UV.

5.3 Annunciator B-20 (A-20), 125V DC Batt Chgr 2A/2AA Trouble (Batt Chgr 2B/2BB trouble).

5.4 Loss of 2A or 2B D.C. Bus potential indicating light (RTGB-201).

5.5 Loss of voltage on 2B (2A) 125V DC bus voltmeter VM-1001 (VM-1002).

5.6 Reactor and Turbine Trip with Generator Lockout.

5.7 SIAS, CIAS and MSIS actuation.

5.8 PORV actuation.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	067 AA2.13	
	Importance Rating	3.3	

Ability to determine and interpret the following as they apply to the Plant Fire on Site: Need for emergency plant shutdown.

Proposed Question: Common 14

Unit 1 is at 100% power when a major fire has been reported to the Control Room.

In accordance with 1-ONP-100.01 Response to Fire, which of the following situations would require the Unit to be shutdown?

A. The Unit is being severely affected by spurious operation of equipment and all safe shutdown equipment on the protected train is OPERABLE.

B. The Unit is being severely affected by loss of equipment and safe shutdown equipment on the protected train is INOPERABLE and unrecoverable.

C. The fire may potentially affect any safety related systems, components, or structures without affecting continued operation.

D. A fire lasting greater than 10 minutes in the Protected Area.

Proposed Answer: A

Explanation (Optional):

A. Correct.
B. Incorrect. Do not shutdown if supporting equipment is not available.
C. Incorrect. If continued operation is affected, then a shutdown would be required
D. Incorrect. Would classify event if fire lasted greater than 10 minutes

Technical Reference(s): 1-ONP-100.01 Response to Fire (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 0702856-08 (As available)

Question Source:
- Bank # 2062
- Modified Bank # _____ (Note changes or attach parent)
- New _____

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

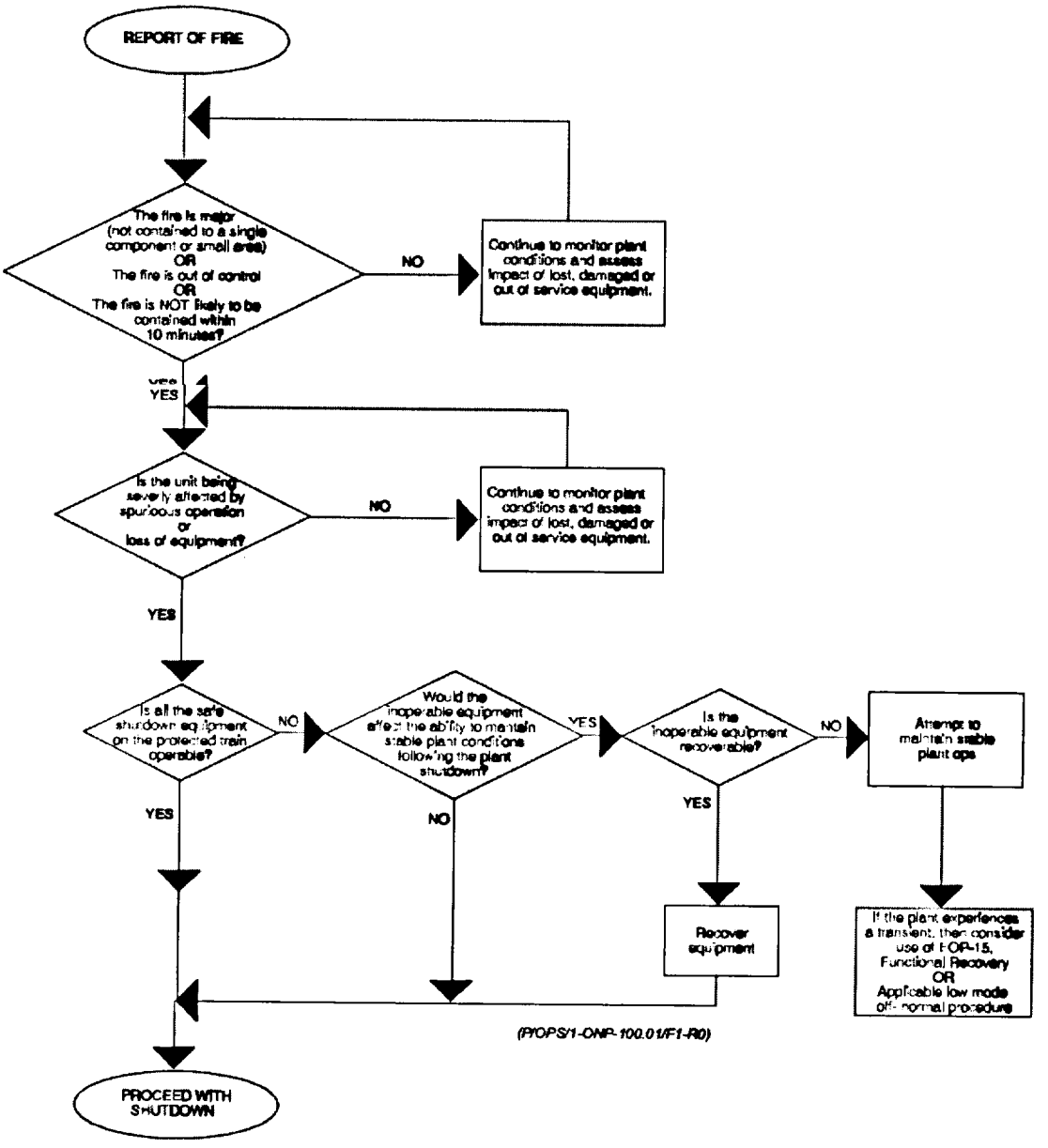
10 CFR Part 55 Content:
- 55.41 10
- 55.43 _____

Editorial Mods: Changed distractors C and D

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
18	RESPONSE TO FIRE	22 of 207
PROCEDURE NO.: 1-ONP-100.01	ST. LUCIE UNIT 1	

FIGURE 1
SAFE SHUTDOWN FIRE IMPACT ASSESSMENT
(Page 1 of 1)



(PIOPS/1-ONP-100.01/F1-R0)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	065 AK3.08	
	Importance Rating	3.3	

Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Actions contained in EOP for loss of instrument air

Proposed Question: Common 15

Unit 2 is at 100% power when a loss of Instrument Air occurs. Instrument air pressure is currently 60 psig and lowering.

Which of the following is the required operator action and why?

A. Trip the Reactor and Turbine due to inability to maintain Steam Generator levels.

B. Commence a controlled unit downpower due to VCT diverting to Radwaste.

C. Open the Service Air to Instrument Air cross-tie valve to maintain Main Feed Isolation Valve position.

D. Close the Unit 1 to Unit 2 Instrument Air cross-tie valve to preserve Unit 1 air receivers.

Proposed Answer: A

Explanation (Optional):

A. Correct. ONP directs plant trip at 60# and decreasing. With pressure < 75# the SG levels may not be maintained as the valves fail as is.

B. Incorrect. At 75 psig a downpower should be considered. Plausible if candidate thinks that VCT diverts to Radwaste.

C. Incorrect. This valve should have already been opened. Plausible if candidate thinks that the valves fail closed as they fail as is.

D. Incorrect. Valve closes automatically at 85 psig. Plausible if candidate thinks that valve will remain open

Technical Reference(s): 2-1010030, Loss of Instrument Air (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702860-06 (As available)

Question Source: Bank # 1772
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5, 10
55.43 _____

Comments:

REVISION NO.: 21	PROCEDURE TITLE: LOSS OF INSTRUMENT AIR	PAGE: 5 of 18
PROCEDURE NO.: 2-1010030	ST. LUCIE UNIT 2	

7.0 OPERATOR ACTIONS

7.1 Immediate Operator Actions

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE
A Instrument Air header high pressure condition will lock out the standby instrument air compressor (2C or 2D) from automatic start. Manual actions to reset the standby compressor (2C or 2D) must be taken after the high pressure condition is clear. The following indicators in the local panel are available for diagnosing the compressor status:
- A red light indicates the unit has tripped.
- An amber light indicates that the tripping condition has cleared.

1. If the Instrument Air header pressure indicates less than 60 psig and is still lowering, Then PERFORM the following:

A. TRIP the Reactor and Turbine.

B. **GO TO 2-EOP-01, Standard Post Trip Actions.**

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	CEA02 EA1.2	
	Importance Rating	3.3	

Ability to operate and / or monitor the following as they apply to Reactor Trip Recovery: Operating behavior characteristics of the facility.

Proposed Question: Common 16

During the performance of Standard Post Trip actions and EOP-02, Reactor Trip Recovery, which ONE (1) of the following describes the expected response of reactor power from the time the reactor trip is initiated and CEAs begin to drop until power enters the Source Range?

(Assume initial power was stable at 100% for the last 30 days.)

A. Prompt drop of approximately 3 decades, followed by a -1/3 DPM startup rate for approximately 20 minutes

B. Prompt drop to approximately 7% power, followed by a -1/3 DPM startup rate for approximately 20 minutes

C. Prompt drop of approximately 3 decades, followed by a -1/3 DPM startup rate for approximately 3-4 hours

D. Prompt drop to approximately 7% power, followed by a -1/3 DPM startup rate for approximately 3-4 hours

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Prompt drop of 3 decades would place power in the middle of the IR

B. Correct. Decay heat is instantaneously approximately 7%. Decay of delayed neutron precursors results in a -1/3 DPM SUR, until entering the source range in approximately 20 minutes

C. Incorrect. Power actually decays for about 3 – 4 hours, but the -1/3 DPM SUR to the source range takes 20 minutes

D. Incorrect. Prompt drop is correct, but 3-4 hours at -1/3 DPM is incorrect.

Technical Reference(s): Reactor Theory (Attach if not previously provided)

T & AA

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X INPO
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 1
55.43 _____

Comments:
WTSI Bank

For reference, see GFES disc in reference material on reactor behavior (Fund 0702108, Rev 5)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	CE05 EG2.4.31	
	Importance Rating	3.3	

Knowledge of annunciator alarms and indications and use of the response instructions (Excess Steam Demand).

Proposed Question: Common 17

The following temperatures exist after an Excess Steam Demand Event in which the 2B Steam Generator has blown dry:

- Loop 2A Tcold: 452°F
- Loop 2A Thot: 454°F
- Loop 2B Tcold: 424°F
- Loop 2B Thot: 456°F

The Unit Supervisor has directed the RCO to stabilize RCS pressure and temperature. In order to stabilize RCS temperature, to what approximate pressure should the RCO adjust the 2A Atmospheric Dump Valve setpoint?

(Steam Tables are provided.)

A. 322 psia

B. 431 psia

C. 440 psia

D. 449 psia

Check to see if there are other Questions that are testing the use of Steam Tables.

Proposed Answer: A

Explanation (Optional):

A. Correct. This is the saturation pressure for the lowest Tcold attained.

B. Incorrect. Procedural requirement to adjust to the lowest Tc attained. This is Psat for 452°F.

C. Incorrect. Procedural requirement to adjust to the lowest Tc attained. This is Psat for 454°F.

D. Incorrect. Procedural requirement to adjust to the lowest Tc attained. This is Psat for 456°F.

Technical Reference(s): 2-EOP-05, ESDE (Attach if not previously provided)
LP 0702826, ESDE

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: _____ (As available)

Question Source: Bank # 1068
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
20	EXCESS STEAM DEMAND	12 of 39
PROCEDURE NO.: 2-EOP-05	ST. LUCIE UNIT 2	

4.0 OPERATOR ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
☐ **14. Verify Correct S/G was Isolated** VERIFY the **MOST** affected S/G is isolated by observing **ALL** of the following: • S/G pressures • S/G levels • RCS cold leg temperatures	**14.1** If the wrong S/G was isolated, Then RESTORE feeding and steaming capability to the isolated S/G. **14.2** When RCS heat removal has been re-established on the least affected S/G, Then ISOLATE the most affected S/G. **REFER TO** Appendix R, Steam Generator Isolation.
☒ **15. Stabilize RCS Temperature** **A.** STEAM the **LEAST** affected S/G using the ADV. **B.** CONTROL feedwater to the **LEAST** affected S/G. **C.** ENSURE the RCS is within the limits of Figure 1A or 1B, RCS Pressure Temperature.	**A.1** STEAM using 2C AFW Pump and alternate steaming flowpaths. **REFER TO** Table 12, Alternate S/G Heat Removal Paths.

(Continued on Next Page)

From LP 0702826, ESDE

- Strategy for major mitigating actions:
  - Stop the uncontrolled cooldown; verify proper safeguards actions.
    - If MSIS does not isolate the leak, then cooldown continues until SG dryout occurs. Isolate feedwater to prevent feeding the break.
  - Stabilize RCS conditions and avoid PTS, regain temperature, inventory, and pressure control.
    - Unaffected SG should be used to stabilize heat removal as early as possible in the event.
  - Maintain stable Mode 3 or 4 conditions. Evaluate need for further actions.

Isolate the most affected SG. Stabilize temperature via ADVs by steaming the least affected SG.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	1	
	K/A #	CE06 EK2.2	
	Importance Rating	3.5	

Knowledge of the interrelations between the (Loss of Feedwater) and Facility*s heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Proposed Question: Common 18

Immediately following a complete loss of main feedwater from 50% power but before the Reactor and Turbine trip on low Steam Generator level, Pressurizer pressure will:

A. increase, because the RCS ΔT power increases until the reactor trip occurs.

B. increase, because the RCS temperature increases due to elevated Steam Generator temperatures.

C. decrease, because the increased boiling rate in the Steam Generator tube bundle region decreases Tavg.

D. decrease, because the Steam Generator level initially increases, causing a contraction of the RCS inventory.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible if candidate thinks that the differential temperature across the SG rises which equates to a higher ΔT power.

B. Correct.

C. Incorrect. Plausible if candidate thinks less feedwater implies greater boiling in tube bundle.

D. Incorrect. Plausible if candidate associates increase in SG level due to heatup implies a greater heat transfer area exists in the SG with a subsequent contraction of the RCS.

Technical Reference(s): EOP-06, Loss of Feedwater (Attach if not previously provided)
LP 0702827, Loss of Feedwater Event

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702827-02 (As available)

Question Source: Bank # 1074
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments:
From LP 0702827, Loss of Feedwater Event

1. RCS Temperatures — Figure 5
   a. Prior to the trip T_{cold} increases as subcooled mass is lost in the steam generator.
   b. If reactor power remains constant, this increase in T_{cold} will reflect in an increase in T_{hot} also.
   c. After the trip with forced circulation still in effect the core ΔT will decrease.
   d. The temperatures do not drop lower than 525°F because Steam generator pressure is being maintained by the SBCS (900 psia). — (NOT our setpoints)
2. Pressurizer Level — Figure 6
   a. Pressurizer level

increases prior to the reactor trip as a result of the heatup.

b. Pressurizer level then decreases sharply as a result of the post trip cooldown.

c. The CVCS (charging pumps) restore pressurizer level.

3. Pressurizer Pressure

Figure 7

a. Pressurizer pressure increases prior to the reactor trip due to the insurge.

b. Pressurizer pressure drops ≈300 – 400 psi after the reactor trip due to the decrease in PZR water volume caused by RCS contraction.

c. Slight increase in pressurizer pressure due to level control system refill.

d. The heaters add sensible heat until the liquid volume reaches saturated conditions.

e. Bulk boiling now occurs and the heaters become effective in regaining pressure.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	001 AK2.06	
	Importance Rating	3.0	

Knowledge of the interrelations between the Continuous Rod Withdrawal and the following: Tave / Tref deviation meter.

Proposed Question: Common 19

During a Unit 1 reactor startup, power has been stable for one hour at 15%.

- CEAs are at 110" on group 7.
- The turbine is on line.
- The CEDS control is placed in Manual Individual mode to withdraw one CEA that is 4" below the group.

If a continuous rod withdrawal were to occur when the RCO initially withdraws the rod, which of the following will occur?

A. Tave and Tref will increase as power rises; the CEA withdrawal will stop when steam bypass demand begins.

B. Tave and Tref will increase as power rises; the CEA withdrawal will stop when any of the cold leg temperatures exceed 549°F.

C. Tave will increase as power rises; Tref will remain approximately the same; the CEA withdrawal will stop when Tave is 6.6°F greater than Tref.

D. Tave will increase as power rises; Tref will remain approximately the same; the CEA withdrawal will stop when a group deviation occurs.

Look at again

N/O Auto Rod withdrawal

Proposed Answer: D

Explanation (Optional):

A. Incorrect. The Turbine is normally operated in the IMP OUT mode. Plausible if candidate thinks that an Automatic Withdrawal Prohibit has occurred.

B. Incorrect. The Turbine is normally operated in the IMP OUT mode. Plausible if candidate thinks that an Automatic Withdrawal Prohibit has occurred, however, this occurs at 552°F.

C. Incorrect. Plausible if candidate thinks that an Automatic Withdrawal Prohibit has occurred.

D. Correct. The turbine is operated in the IMP OUT mode, therefore, changes in Tave will make minor changes in steam pressure which has a minor effect on Tref (Turbine impulse pressure). CEA Motion Inhibit Circuitry stops the withdrawal on group deviation.

Technical Reference(s): 1-ONP-0110030, CEA Off-Normal Operation and Realignment (Attach if not previously provided)

0711405, CEDS SD

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702405-09 (As available)

Question Source: Bank # 2222

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 1, 5

55.43 _____

Comments:

From 0711405, CEDS System Description

AUTOMATIC WITHDRAWAL PROHIBIT (AWP) - Prevents regulating groups from being withdrawn in the automatic sequential (AS) mode if any of the following conditions exist:

- Any CEA is dropped as sensed by the reed switches at the zero inch position. Energizes DROPPED CEA (CEDS) annunciator.
- T_{AVG}-T_{REF} deviation as sensed by the reactor regulating system exceeds 6.6°F.
- Cold leg temperature (T_c) is greater than 552°F.
- A demand signal is generated by the Steam Bypass Control System.

An AWP condition will also energize the AUTO WITHDRAWAL PROHIBIT annunciator, K-14 [18].

CEA Motion Inhibit Circuitry

A Motion Inhibit signal shall be generated based on the information from the following **Alarms**:

- CEA Deviation (Shutdown and Regulating Groups)
- CEA Regulating Group Out-Of-Sequence
- CEA Regulating Group Overlap
- CEA Regulating Group Insertion to the Power Dependent Insertion Limit
- CEA Regulating CEA greater than IRG
- CEA Shutdown CEA is less than ISH

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	005 AK1.02	
	Importance Rating	3.1	

Knowledge of the operational implications of the following concepts as they apply to Inoperable / Stuck Control Rod: Flux tilt.

Proposed Question: Common 20

Unit 1 is conducting a downpower from 80% to 60% when CEA #41 becomes stuck during insertion of Group 7.

If Group 7 rod insertion continues, which of the following will be adversely affected?

(Assume CEA #47 is trippable.)

A. Core power distribution and shutdown margin.

B. Shutdown margin and power defect.

C. Power defect and critical heat flux.

D. Critical heat flux and Core power distribution.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Because the CEA is trippable, SDM is not affected, however, core power distribution is correct.

B. Incorrect. Because the CEA is trippable, SDM is not affected and power defect is a function of fuel and moderator temperature.

C. Incorrect. Power defect is a function of fuel and moderator temperature however, critical heat flux is correct.

D. Correct. Core power distribution is affected by axial and radial flux redistribution and CHF is affected by the axial flux peak adjacent to the inserted rod.

Technical Reference(s): From LP 0702405, CEDS (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702405-09 (As available)

Question Source: Bank # _____
Modified Bank # 561 (See comments)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 1
55.43 _____

Comments:
Which of the following events would have the most significant effect on reactivity and core power distribution?

A. Unit 1 shutdown CEA drops fully into the core at 100% power BOC.
B. Unit 1 shutdown CEA drops fully into the core at 100% power EOC.
C. Unit 2 four fingered CEA drops fully into the core at 100% power EOC.
D. Unit 2 four fingered CEA drops fully into the core at 100% power BOC.

From LP 0702405, CEDS

B. FUNCTIONS — **EO-1**

1. Control the power level of the reactor by the withdrawal or insertion of control element assemblies (CEAs).
2. Maintain shutdown margin under all operating conditions for a rapid reactivity insertion (i.e., reactor trip) when called for by the Reactor Protection System.
3. Help control axial power distribution in the core.

C. Technical Specifications

1. Movable Control Assemblies: — Review Section 3/4.1.3 of TSs

   a. Limits on rod deviation within groups and verification of the circuitry that detects and — Q: What would be the reason for

prevents deviations – Modes 1 and 2.	this TS? A: Most TS somehow tie back to the accident analyses assumptions. TSs such as these ensure acceptable power distribution limits and SDMs are maintained and CEA misalignment effects are within assumptions.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	024 AA1.26	
	Importance Rating	3.3	

Ability to operate and / or monitor the following as they apply to Emergency Boration: Boric acid storage tank.

Proposed Question: Common 21

Given the following Unit 2 conditions:

- An ATWS has occurred.
- CEDM MG sets were de-energized by opening their Load Center supply breakers.
- The RCO has started an emergency boration using V2514, emergency boration valve.
- SIAS has NOT actuated.
- RCS pressure is 2210 psia and trending DOWN.
- Tcold is 555°F and slowly trending DOWN.

Which ONE (1) of the following correctly describes conditions resulting from emergency boration?

A. Boric Acid Makeup Tank level will drop at a rate approximately equal to charging flow.

B. Volume Control Tank level will drop at a rate approximately equal to charging flow.

C. Refueling Water Tank level will drop at a rate approximately equal to charging flow.

D. Pressurizer level will rise at a rate approximately equal to charging flow.

Proposed Answer: A

Explanation (Optional):

A. Correct. The Boric Acid Makeup Tank will be supplying borated water.
B. Incorrect. VCT level may actually rise because there is no outflow, and letdown may still be flowing.
C. Incorrect. Charging flow can have an effect on RWT level, however, the valve opened is not in this alignment.
D. Incorrect. In an ATWS, Pressurizer level is also in a transient state due to RCS volume changing from temperature changing.

Technical Reference(s): 2-ONP-02.02, Emergency Boration (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702205-07 (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments: WTSI Bank

REVISION NO.:	PROCEDURE TITLE:	PAGE:
4	EMERGENCY BORATION	5 of 9
PROCEDURE NO.: 2-ONP-02.02	ST. LUCIE UNIT 2	

6.0 OPERATOR ACTIONS

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE
This Procedure may contain steps that could adversely affect reactivity. ENSURE that proper consideration and appropriate briefings occur prior to performance of steps that could challenge reactivity.

1. ¶1 PLACE the Makeup Mode Selector switch in MANUAL.
2. ENSURE V2525, Boron Load Control Valve, is CLOSED.
3. START 2A or 2B BA Pump.
4. CLOSE V2650, Tank 2A Recirc. Valve
5. CLOSE V2651, Tank 2B Recirc Valve.
6. OPEN V2514, Emergency Borate.

6.

A. If V2514 fails to open, PERFORM the following:
   1. OPEN V2508, BA Gravity Feed B.
   2. OPEN V2509, BA Gravity Feed A.
   3. CLOSE V2501 VCT Outlet Valve.
   4. If VCT level is greater than 5%, Then PLACE and hold V2501 in the CLOSE position.
   5. OPEN Bkr 2-42118, V2501, at MCC-2B6

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	028 AK1.01	
	Importance Rating	2.8	

Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions: PZR reference leak abnormalities

Proposed Question: Common 22

Given:

- Unit 2 is performing an up power from 50%.
- Two Charging Pumps are operating, with Pressurizer pressure and Level control in automatic.
- A leak has developed in the reference leg for Pressurizer level transmitter LT-1110X, the selected level transmitter.

Which of the following describes the response of the Chemical and Volume Control System?

A. First backup Charging Pump start signal.

B. Second backup Charging Pump starts.

C. Letdown increases to maximum.

D. Letdown decreases to minimum.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible if candidate thinks that a start signal would be generated based on response of the level control system.

B. Incorrect. Plausible if candidate thinks that a charging pump would be start based on response of the level control system.

C. Correct.

D. Incorrect. Plausible if candidate thinks that reference leg leak causes indicated level to decrease.

Technical Reference(s): 0711205, PZR Level and Pressure SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702206-11 (As available)

Question Source: Bank # 1584
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 8, 10
55.43 _____

Comments:

UNIT 2 SUMMARY OF PRESSURIZER LEVEL CONTROL ACTIONS

PZR. LEVEL (ROUNDED)	AUTOMATIC ACTION
67% INDICATED LEVEL	HIGH PZR LEVEL ALARM (INCREASING) PACB ALARM
+9% DEVIATION	MAXIMUM LETDOWN (128 GPM) (INCREASING)
+5% DEVIATION	HIGH PZR LEVEL ALARM (INCREASING) RTGB 103
+4% DEVIATION	• ALL HEATERS "ON" SIGNAL • B/U CHG. "STOP" SIGNAL (INCREASING)
0% DEVIATION	NORMAL LEVEL (SETPOINT FROM RRS)
-1% DEVIATION	• MINIMUM LETDOWN (29 GPM) (DECREASING) • B/U CHG. PUMP "STOP" SIGNAL (INCREASING)
-3% DEVIATION	• B/U CHG. PUMP "START" SIGNAL (DECREASING)
-5% DEVIATION	LOW PRESSURIZER LEVEL ALARM, B/U CHG. PUMP GETS BACKUP "START" SIGNAL (DECREASING)
27 % INDICATED LEVEL	WITH CHANNEL X <27%; "A" SIDE 4160V PZR HEATER X-FORMER FEEDER BKR TRIPS AND "B" SIDE HEATER POWER SUPPLY CONTACTORS OPEN. WITH CHANNEL Y <27%; "B" SIDE 4160V PZR HEATER X-FORMER FEEDER BKR TRIPS AND "A" SIDE HEATER POWER SUPPLY CONTACTORS OPEN.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	032 AA2.05	
	Importance Rating	2.9	

Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: Nature of abnormality, from rapid survey of control room data

Proposed Question: Common 23

A Unit 2 startup is in progress.

Which of the following group of indications can be used to determine a loss of Wide Range Channel instrumentation?

A. Count per second and % power meters drop to zero
Loss of audible countrate in the Control Room
LOG LED is extinguished; LOG TROUBLE LED is lit

B. % power meter drops to zero
Zero Power Mode Bypass LED is illuminated
LOG LED is extinguished; LOG TROUBLE LED is lit

C. Count per second and % power meters drop to zero
Zero Power Mode Bypass LED is illuminated
LOG LED is illuminated; LOG TROUBLE LED is extinguished

D. % power meter drops to zero
Loss of audible countrate in the Control Room
LOG LED is illuminated; LOG TROUBLE LED is extinguished

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Unit 2 does not have CPS indication and udible countrate is provided by the Startup Channels.

B. Correct. These are Unit 2 loss of Wide Range Channel indications.

C. Incorrect. LOG TROUBLE LED would be lit and LOG LED extinguished and Unit 2 does not have CPS indication.

D. Incorrect. Audible countrate is provided by the Startup Channels and the LOG TROUBLE LED would be lit and LOG LED extinguished.

Technical Reference(s): 0711403, NIS SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 6
55.43 _____

Comments:

TABLE 2, Nuclear Instrumentation Unit Differences

WIDE RANGE SAFETY CHANNELS

Unit 1	Unit 2
Audio Count Rate from WR Log	[Audio Count rate from BF_3]
Remote Meters Indication in CPS and %	[% only]
$>10^3$ CPS, remote lamp swaps to % Log Power, CPS light off (1 Fission Chamber operation)	[No extended/source range monitoring] (uses BF_3 for source)
ZPMB LED B/S @ < 0.1%	[< 0.5%]
PDIL on CEAPDS	[PDIL On ADS]
2 Fission Chambers/Channel	1 Fission Chamber/Channel, with one installed spare.
1 Recorder, w/channel select pushbutton on RTGB	1 Recorder/Channel on RTGB
Power Supply: 120Vac Instrument Buses 1MA,1MB, 1MC, & 1MD	Power Supply: 120Vac Instrument Buses 2MA, 2MB, 2MC, & 2MD

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	037 AA2.12	
	Importance Rating	3.3	

Ability to determine and interpret the following as they apply to a steam generator tube leak: Flow rate of Leak

Proposed Question: Common 24

Given the following conditions on Unit 2:

- A steam generator tube leak has occurred.
- Charging Pump 2B is in service. Indicated flow is 44 GPM.
- Charging Pumps 2A and 2C are in standby.
- Letdown flow has lowered and is currently stable at 35 GPM.
- RCS temperature is stable.
- Controlled Bleedoff flow is 1.5 GPM from each RCP.

Which ONE (1) of the following describes the size of the steam generator tube leak?

A. 3.0 GPM

B. 4.5 GPM

C. 6.0 GPM

D. 9.0 GPM

Proposed Answer: A

Explanation (Optional):

A. Correct. 1 Charging Pump in operation provides a flow rate of 44 GPM. If Letdown flow has stabilized at 35 GPM, there is a 9 GPM difference. With CBO from 4 RCPs at 1.5 GPM each, total CBO is 6 GPM. Therefore, 44 – (35+6) = 3 GPM

B. Incorrect.

C. Incorrect.

D. Incorrect

Technical Reference(s): CVCS SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 10
- 55.43 _____

Comments:
A device known as the "letdown limiter" (LY-1110) limits the position of the LCVs in order to maintain flows between 29 and 128 GPM. The flow rate of 29 GPM corresponds to a –1.0% pressurizer level deviation and the 128 GPM flow rate corresponds to a +9.0% pressurizer level deviation. Hence, when level is decreasing and reaches –1.0%, the control system will limit flow from the pressurizer to 29 GPM, and when pressurizer level is increasing and reaches +9.0%, the control system will open the LCV to allow a maximum of 128 GPM outflow from the pressurizer. 29 GPM was established as the minimum flow necessary to prevent excessive thermal stresses on the regenerative and letdown heat exchangers during anticipated transients. 128 GPM is closely associated with the maximum charging flow of 132 GPM minus the 4 GPM leakage flow from the RCP seals.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	059 AA2.03	
	Importance Rating	3.1	

Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: Failure modes, their symptoms, and the causes of misleading indications on a radioactive-liquid monitor.

Proposed Question: Common 25

Each of the following Unit 1 conditions could cause R-6627X, Radiation Monitor Channel #43 to read higher than expected during the liquid release **except**...

A. Circulating and Intake Cooling Water dilution flow is less than required by permit.

B. The Waste Monitor Tank was not removed from service tank prior to releasing.

C. Air trapped in the sensing lines for FCV-6627X is causing indicated flow to be less than actual flow.

D. Chemistry sampled the Waste Monitor Tank before the recirculation time was complete.

Proposed Answer: A

Explanation (Optional):

A. Correct. The release flow is monitored prior to dilution.

B. Incorrect. Input to WMT could cause R-6627X to read lower or higher. Plausible if candidate does not understand impact of removing tank from service.

C. Incorrect. This condition at the flow control valve (downstream of R-6627X) will cause more flow through R-6627X. Plausible if candidate does not understand that flow through R-6627X is impacted by the differential pressure across an orifice in the discharge line.

D. Incorrect. This condition could cause a reading lower or higher than expected if a representative sample is not obtained. Plausible if candidate does not understand impact of adequately recirulating the WMT.

Technical Reference(s): 1-NOP-0601, Controlled Release to the CW Discharge (Attach if not previously provided)

1-ARP-01-N37, Liquid Waste

Rad High alarm.

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

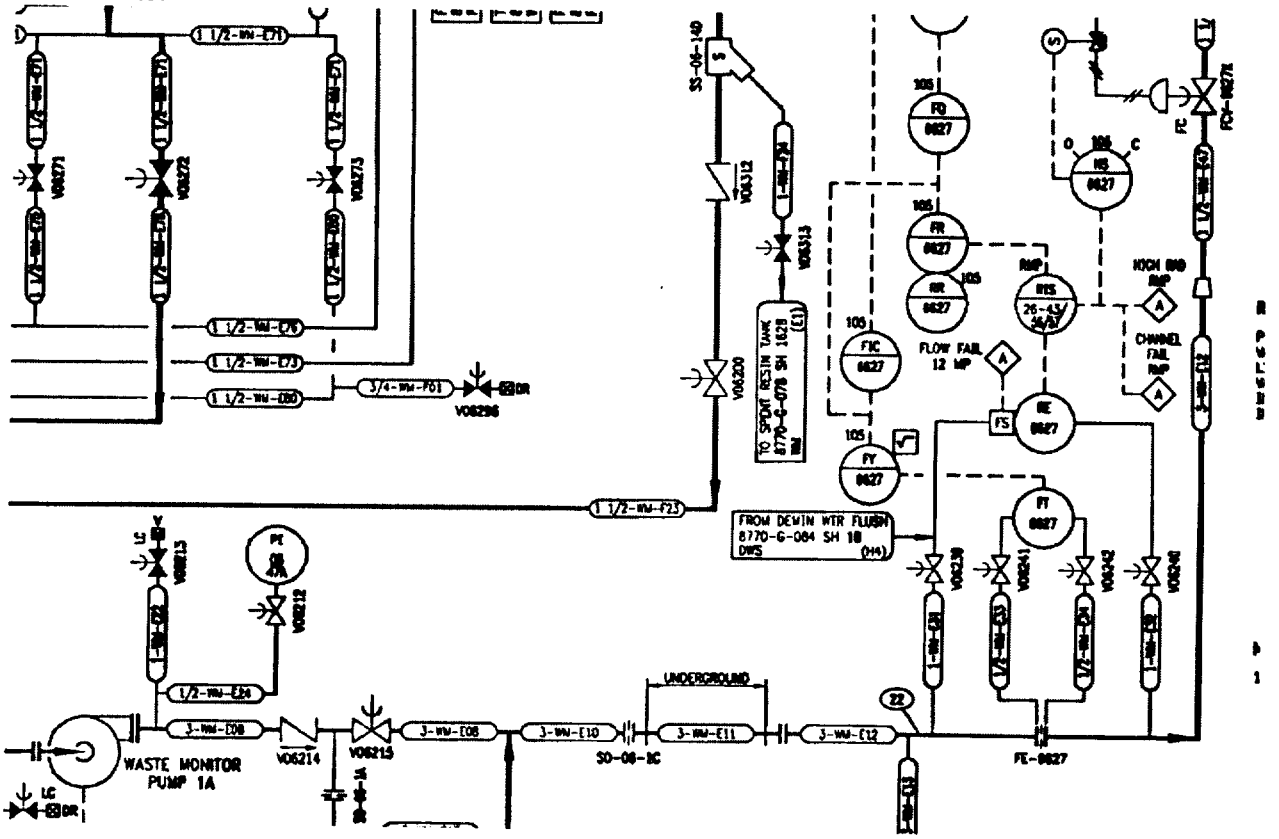
Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 13
55.43 _____

Comments:


1 1/2-WW-E71
1 1/2-WW-E76
1 1/2-WW-E73
1 1/2-WW-E80
3/4-WW-F01
V06296
V06271
V06272
V06273
V06312
V06313
V06200
TO SPENT RESIN TANK 8770-G-078 SH 1&2B (1)
FROM DEMIN WTR FLUSH 8770-G-084 SH 1B DWS (H4)
1 1/2-WW-F23
FIC 8627
FR 8627
FI 8627
FY 8627
FT 8627
FE 8627
HS 8627
HIC 8627
FS
FLOW FAIL 12 MP
HIGH RAD
CHANNEL FAIL
V06239
V06241
V06242
V06243
V06213
V06212
1/2-WW-E24
3-WW-E08
3-WW-E09
3-WW-E10
3-WW-E11
3-WW-E12
UNDERGROUND
SD-08-1C
WASTE MONITOR PUMP 1A
V06214
V06215
LC
PE

REVISION:	PROCEDURE TITLE:	PANEL:
0A	ANNUNCIATOR RESPONSE PROCEDURE	N
PROCEDURE NO:		WINDOW:
1-ARP-01-N37	ST. LUCIE UNIT 1	37

ANNUNCIATOR PANEL N

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	**37**	38	39	40
41	42	43	44	45	46	47	48

LIQUID WASTE
RAD
HIGH

N-37

DEVICE:
63X/RT-6627
K11
K9

LOCATION:
RTGB-105
Rad Monitor Cabinet E
Rad Monitor Cabinet E

SETPOINT:
De-energized
Variable
No Flow

ALARM CONFIRMATION:
1. FCV-6627X, Liquid Waste, indicates CLOSED on RTGB-105.
2. FR/RR-6627, Liquid Monitor Channel 43, indicates in excess of Liquid Release Permit setpoint on RTGB-105.
3. FIC-6627, Liquid Monitor Channel 43, indicates discharge flow STOPPED on RTGB-105.
4. Annunciator X-3, MULTIPLE INPUT RADIATION HIGH, is ALARMED.
5. Annunciator X-5, LIQUID RADWASTE FLOW FAIL, is ALARMED.

OPERATOR ACTIONS:
1. ENSURE FCV-6627X, Liquid Waste, indicates CLOSED on RTGB-105.
2. VERIFY FR-6627, Liquid Monitor Channel 43 Recorder, indicates 0 gpm flow on RTGB-105.
3. **GO TO 1-NOP-26.01, Process Radiation Monitors.**

CAUSES: This annunciator may be caused by a high radiation detected in the liquid waste monitor or by a monitor malfunction (low flow or monitor failure). The high radiation trip setpoint is based on the limits of the Liquid Release Permit.

REFERENCES
1. CWD 8770-B-327 sheets 456, 565, 573 and 590
2. P&ID 8770-G-078 sheet 165
3. TEDB

REVISION NO.: 9	PROCEDURE TITLE: CONTROLLED LIQUID RELEASE TO THE CIRCULATING WATER DISCHARGE ST. LUCIE UNIT 1	PAGE: 5 of 15
PROCEDURE NO.: 1-NOP-06.01		

4.6 The ODCM limits for liquid releases are the following:

1. The concentration of radioactive material released from the site shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2×10^{-4} microcuries / ml total activity.

2. To ensure that the sum of radioactive releases from multiple release points on site do not exceed the site limits:

A. No more than one batch release shall be made on site at the same time.

B. Administrative limits of 80% of the site limits shall be used for a batch release liquid release permit.

C. Chemistry Department shall ensure as per COP-01.05 that the sum of all continuous and any batch release shall not exceed the site limit. A continuous release is Steam Generator Blowdown to the discharge canal with primary-to-secondary leakage. A batch release is from a tank identified in the respective reactor unit's operating procedure for controlled liquid release to the circulating water discharge i.e., this procedure.

4.7 Applicable radiation protection, precautions and procedures shall be observed.

4.8 If excessive fluctuation of liquid waste flow is observed on FR-6627 prior to or during the release, this may be indicative of air trapped in the sensing lines of FE-6627. In this case, consideration should be given to stopping the release and contacting I&C to vent the sensing lines of FE-6627.

5.0 RECORDS REQUIRED

5.1 A completed Liquid Release Permit with the final activity page attachment and this procedure with signed off steps shall be maintained in the plant files in accordance with QI-17-PSL-1, Quality Assurance Records.

5.2 Normal Log Entries

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	068 AK2.07	
	Importance Rating	3.3	

Knowledge of the interrelations between the Control Room Evacuation and the Emergency Diesel Generator.

Proposed Question: Common 26

2-ONP-100.02, Control Room Inaccessibility is being performed.

The following conditions exist:

- Appendix A, RCO A Subsequent Actions are complete.
- Appendix B, RCO B Subsequent Actions are complete.
- Appendix C, Unit Supervisor Subsequent Actions are complete.
- Appendix D, SNPO Subsequent Actions are complete.
- The 2A EDG overspeed trip levers have **not** been placed in TRIP.
- Offsite power is available.

Which ONE (1) of the following describes the condition of Emergency Diesel Generator 2A and Bus 2A3 when offsite power is lost?

A. EDG 2A is running. Bus 2A3 is de-energized.

B. EDG 2A is started prior to Control Room evacuation. Bus 2A3 is de-energized.

C. EDG 2A is secured. Bus 2A3 is de-energized.

D. EDG 2A is running. Bus 2A3 is energized.

Proposed Answer: A

Explanation (Optional):

A. Correct. Bus 2A3 remains de-energized because of the position of the NORMAL/ISOLATE switches.
B. Incorrect. The EDG is not started until the outside stations are manned.
C. Incorrect. The EDG is started once the outside stations are manned
D. Incorrect. Bus 2A3 is de-energized because of the position of the NORMAL/ISOLATE switches.

Technical Reference(s): 2-ONP-100.02, Control Room Inaccessibility (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
15	CONTROL ROOM INACCESSIBILITY	35 of 86
PROCEDURE NO.: 2-ONP-100.02	ST. LUCIE UNIT 2	

APPENDIX C
US SUBSEQUENT ACTIONS
(Page 4 of 8)

2. G. (continued) INITIAL

CAUTION
BOTH of the following isolation switches:
- Emergency Diesel Generator No 2A
- 4.16KV Bus 2A3 PTS / DG 2A PTS

must be placed in ISOLATE before positioning Incoming Feeder from 4.16 KV Bus No 2A2 isolation switch.

CUBICLE	COMPONENT NAME	POSITION	PERF INITIAL
2-20211	Emergency Diesel Generator No 2A	ISOLATE	
2-20211	4.16KV Bus 2A3 PTS / DG 2A PTS	ISOLATE	
2-20209	Incoming feeder from 4.16KV Bus No 2A2	ISOLATE	
2-20210	Feed to 480V SS Transformer 2A5	ISOLATE	
Bkr 2-20210	Feed to 480V SS Transformer 2A5	CLOSED	
2-20212	Auxiliary Feed Water Pump No 2A	ISOLATE	

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	CE13AG2.1.28	
	Importance Rating	3.2	

Knowledge of the purpose and function of major system components and controls used for natural circulation.

Proposed Question: Common 27

Unit 1 is performing a natural circulation cooldown with the following conditions:

- RCS pressure 1250 psia.
- CET: 555°F.
- Reactor Vessel Head temperature (QSPDS Pg. 211): 572°F.
- Reactor Vessel Level indicates 2 segments voided.
- Pressurizer level is rising rapidly

Which ONE (1) of the following actions will stabilize pressurizer level?

A. Stop the Backup Charging Pumps to minimize Charging flow.

B. Operate additional Pressurizer heaters to increase RCS pressure.

C. Initiate Auxiliary Spray flow to reduce RCS pressure.

D. Increase Letdown flow to maximum.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. If Charging flow is minimized, the void will be allowed to grow
B. Correct. Increasing pressure will collapse the void, level will go down.
C. Inorrect. Reactor head void will increase causing level to go up because PZR pressure will be lowering.
D. Incorrect. Same effect as starting additional charging pumps.

Technical Reference(s): 1-0120039 Natural Circulation Cooldown, (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 3, 14
55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
33	NATURAL CIRCULATION COOLDOWN	25 of 35
PROCEDURE NO.: 1-0120039	ST. LUCIE UNIT 1	

APPENDIX B
RCS FILL AND DRAIN METHOD OF VOID ELIMINATION
(Page 1 of 1)

CAUTION
While performing this evolution, pressurizer level is not a valid indicator of RCS inventory. Care should be exercised to observe other parameters which would indicate any loss of RCS inventory.

NOTE
This method of RCS cooldown should only be employed in the event that a rapid depressurization of the RCS is required, or condensate storage tank level approaches minimum required technical specifications with makeup NOT available.

1. Take manual control of the charging and letdown system.
2. Lower RCS pressure by using auxiliary spray into the pressurizer.
3. As voiding occurs in the upper reactor vessel head, a surge of water from the RCS will cause pressurizer level to increase rapidly. Terminate auxiliary spray prior to pressurizer level reaching 70% indicated level.
4. Cool the upper reactor vessel head region by charging with a charging pump to the RCS loop(s). Continue charging until either of the following conditions occur.

   A. Pressurizer level decreases to 30% indicated level.

   OR

   B. The upper reactor vessel head is charged solid.

   NOTE
   A solid upper head condition will be evident by an increasing pressurizer level as charging to the loops is continued.

5. Repeat steps 1 through 4 above until SDC entry conditions are established.

END OF APPENDIX B

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	003.K6.02	
	Importance Rating	2.7	

Knowledge of the effect of a loss or malfunction of the RCP seals and seal water supply will have on the RCPs.

Proposed Question: Common 28

Which of the following Unit 1 conditions requires tripping the reactor and the affected Reactor Coolant Pump?

A. CBO temperature > 200 deg F.

B. Low DP across 3 seals.

C. High DP across 3 seals.

D. Upper Thrust bearing temperature increases to 186°F.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. 200 is below the temperature requiring trip of the RCP

B. Correct Failure of three seals requires a reactor and RCP trip. Low DP is indication of failure

C. Incorrect. High DP is indication of proper seal operation

D. Incorrect. RCP trip is required if RCP guide bearings on Unit 1 are > 185°F. Upper thrust bearing trip temperature is 200°F.

Technical Reference(s): 1-ONP-0120034, RCP (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702859-08 (As available)

Question Source:	Bank #	911	
	Modified Bank #		(Note changes or attach parent)
	New		
Question History:	Last NRC Exam		
Question Cognitive Level:	Memory or Fundamental Knowledge		
	Comprehension or Analysis	X	
10 CFR Part 55 Content:	55.41	10	
	55.43		

Comments: Changed Answer and distractors A and C to raise discrim value or item

REVISION NO.:	PROCEDURE TITLE:	PAGE:
53	REACTOR COOLANT PUMP	16 of 28
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6.3 RCP Seal Problems/Anomalies (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
G. If any seal has failed, indicated by a loss of differential pressure across the seal, Then take 30 minute readings on controlled bleedoff flow and cavity pressures, using Data Sheet 1, until it is determined that additional seal degradation is NOT occurring.	
H. If two seals have failed or controlled bleedoff flow is lost, Then: **1.** Notify the system dispatcher. **2.** Begin a unit shutdown. **3.** When CEA TCBs are open, Then stop the affected RCP.	
I. If three seals have failed, Then: **1.** TRIP the reactor. **2.** TRIP the turbine. **3.** STOP the affected RCP(s). **4.** Implement 1-EOP-01, Standard Post Trip Actions. **5.** If an immediate RCS cooldown is NOT to be performed, Then depressurize the RCS to approximately 1850 PSIA to maintain RCP lower seal cavity temperature less than 250°F.	

END OF SECTION 6.3

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	004.K6.07	
	Importance Rating	2.7	

Knowledge of the effect of a loss or malfunction of the heat exchangers and condensers will have on CVCS.

Proposed Question: Common 29

Unit 1 is operating at 100% power when the Component Cooling water temperature control valve on the Letdown Heat exchanger fails closed.

Which of the following describes the automatic response of the CVCS system?

Letdown:

A. isolates on high VCT temperature.

B. isolation valve V2515 closes on high temperature.

C. diverts to the Waste management system on high temperature.

D. bypasses the Purification ion exchangers on high temperature.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Only an annunciator associated with VCT high temperature.
B. Incorrect. V2515 closes at 470°F outlet of Regen Heat exchanger.
C. Incorrect. Letdown diverts on high VCT level, not temperature.
D. Correct. The Ion Exchangers are bypassed to protect the resin.

Technical Reference(s): 0711205, CVCS SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 1991
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments: CVCS SD page 13 of 99

Letdown Heat Exchanger

The letdown heat exchanger, located in the RAB, is a shell and tube type heat exchanger with letdown flowing through the tubes. The cooling media is Component Cooling Water and flows through the shell. This heat exchanger is sized to maintain outlet temperature < 145°F with minimum charging flow to protect the resins in the purification ion exchangers. Letdown heat exchanger outlet temperature is measured by TE-2223 to control component cooling water outlet flow. The system data section lists the design parameters, instruments and controls associated with the letdown heat exchanger.

The outlet temperature is normally ~100°F. At 135°F an alarm is actuated on RTGB-105 annunciator M-10. If the temperature increases to 140°F, the purification ion exchangers are bypassed via the air operated 3-way valve V2520. Additionally, flow to the Radiation Monitor is isolated by valve V2521.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	005 K3.06	
	Importance Rating	3.1	

Knowledge of the effect that a loss or malfunction of the Residual Heat Removal System will have on the Containment Spray System.

Proposed Question: Common 30

Unit 1 has been in EOP-03, Loss of Coolant Accident for 5 hours. Shutdown cooling can not be established and the following line-up is being performed:

- Both Containment Spray Pumps are running.
- 1A SDC HX outlet valve V3456 is open.
- Both LPSI pumps off with 1A LPSI suction and discharge valves closed.
- SDC warm-up valve MV-03-1A is open.
- HCV-3480 and HCV-3481 SDC Loop 1A are open.
- LPSI Injection valves on 1A2, 1A1, 1B1, and 1B2 are closed.
- SDC HCV-3657 temperature control throttled to 280 gpm flow.
- Auxiliary HPSI header 1A1, 1A2, 1B1, 1B2, throttled to 500 total flow.

Which of the following explains the above line-up?

A. Primary line-up for Hot and Cold Leg Injection.

B. Second alternate line-up for Hot and Cold Leg Injection.

C. Alignment for cooling ECCS water post RAS.

D. Alignment to reduce Containment temperature and pressure.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Conditions are only partially correct to meet the primary alignment.
B. Correct. Due to a loss of SDC, Containment Spray is being used to cool the core.
C. Incorrect. Plausible condition due to RAS water cooled by SDC HX.
D. Incorrect. Containment spray flow is cooling the core.

Technical Reference(s): 1-EOP-15 Functional Recovery (Attach if not previously provided)
1-EOP-99, Appendices / Figures / Tables / Data Sheets, Appendix O

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 1996
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 10
55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
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APPENDIX O
SIMULTANEOUS HOT AND COLD LEG INJECTION
(Page 7 of 8)

Section 4: Aligning Containment Spray for Hot Leg Injection

CAUTION
This section can ONLY be used if **ANY** of the following conditions are met:

- RAS actuation has occurred
- LPSI Pumps meet STOP criteria

☐ **1.** VERIFY **ALL** of the following conditions exist:
- ☐ RCS pressure is less than 200 psia.
- ☐ RCS to Containment differential pressure is less than 100 psid.
- ☐ The selected Containment Spray train has been terminated.

☐ **2.** PLACE **BOTH** LPSI Pumps in STOP.
- ☐ 1A LPSI Pump

NOTE
If a HPSI Pump has been stopped due to pump low flow considerations post RAS then the preferred Containment Spray Pump to use for Hot Leg Injection is the one NOT being used to provide HPSI Pump subcooling.

☐ **3.** If the 1A Containment Spray Pump is being used, Then OPEN V3456, A SDC Hx Outlet Isol Vlv.

☐ **4.** If the 1B Containment Spray Pump is being used, Then OPEN V3457, B SDC Hx Outlet Isol Vlv.

☐ **5.** CLOSE V3206, 1A LPSI Pump Discharge Valve (CRAC).

☐ **6.** CLOSE V3207, 1B LPSI Pump Discharge Valve (CRAC).

☐ **7.** ENSURE CLOSED V3452, A SDC HX Inlet Isolation Valve (CRAC).

☐ **8.** ENSURE CLOSED V3453, B SDC HX Inlet Isolation Valve (CRAC).

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APPENDIX O
SIMULTANEOUS HOT AND COLD LEG INJECTION
(Page 8 of 8)

Section 4: Aligning Containment Spray for Hot Leg Injection (continued)

☐ 9. If injection to the 1A Hot Leg is desired,
Then OPEN **ALL** of the following:
- ☐ MV-03-1A, A SDC Warm-up Va (CRAC)
- ☐ V-3480, SDC Loop 1A
- ☐ V-3481, SDC Loop 1A

☐ 10. If injection to the 1B Hot Leg is desired,
Then OPEN **ALL** of the following:
- ☐ MV-03-1B, B SDC Warm-up Va (CRAC)
- ☐ V-3651, SDC Loop 1B
- ☐ V-3652, SDC Loop 1B

☐ 11. ENSURE LPSI Header Injection Valves are CLOSED.
- ☐ HCV-3615, LPSI Header to Loop 1A1 Valve
- ☐ HCV-3625, LPSI Header to Loop 1A2 Valve
- ☐ HCV-3635, LPSI Header to Loop 1B1 Valve
- ☐ HCV-3645, LPSI Header to Loop 1B2 Valve

☐ 12. START the Containment Spray Pump aligned for Hot Leg Injection.

☐ 13. PLACE HCV-3657, SDC Temp Control, keyswitch to MAN.

☐ 14. ADJUST HIC-3657, SDC Temp Control, controller to the full open position.

☐ 15. ENSURE HCV-3657, SDC Temp Control Valve, is OPEN.

☐ 16. VERIFY Hot Leg Injection flow is greater than 250 gpm on **ANY** of the following instruments:
- ☐ FI-3322 (1A Containment Spray Pump)
- ☐ FI-3332 (1B Containment Spray Pump)

End of Section 4

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	006.K5.01	
	Importance Rating	2.8	

Knowledge of the operational implications of the following concepts as they apply to ECCS: Effects of temperatures on water level indications.

Proposed Question: Common 31

Given:

- A small break LOCA has occurred inside Containment on Unit 2
- SIAS has actuated.
- Containment pressure increased from 0 to 3.5 psig.
- Pressurizer Level indicates 32% and rising slowly.
- RCS subcooling is 102 degrees F.
- Secondary Heat Sink is being maintained.
- The RO has determined HPSI Throttle Criteria has been met.

Which ONE of the following describes the relationship between indicated and actual pressurizer level and the effect on HPSI Throttle Criteria?

Actual Pressurizer level is...

A. LOWER than indicated level because of the elevated containment pressure. The indicated level for throttle criteria was chosen in consideration of level error.

B. LOWER than indicated level because the reference leg fluid density decreases. The indicated level for throttle criteria was chosen in consideration of level error.

C. HIGHER than indicated level because of the elevated containment pressure, ensuring adequate RCS inventory prior to throttling HPSI.

D. HIGHER than indicated level because the reference leg fluid density decreases, ensuring adequate RCS inventory prior to throttling HPSI.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Containment Presure effect is negligible because the reference leg is not open to containment, although level indication is correct

B. Correct. Level is lower than indicated because DP will show higher indicated level. EOP analysis takes this indication error into account, requiring PZR level >30% indicated for throttle criteria.

C. Incorrect. Actual level will be lower than indicated, not because of containment pressure, although reason (adequate inventory) is correct.

D. Incorrect. Actual level lower than indicated, but for correct reasons

Technical Reference(s): EOP-03, LOCA (Attach if not previously provided)
PSL-ENG-SEIS-01-046, EOP Setpoint Basis Document

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702824-07 (As available)

Question Source: Bank # 1024
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5
55.43 _____

Significant editorial changes to bank item

Comments:

Setpoint Descriptor:	**[containment temperature for onset of harsh environment effects]**
Measured Parameter:	Containment temperature
St. Lucie Setpoint:	200°F

Use:

This value is used to determine when harsh containment conditions may start to significantly affect instrument inaccuracies, and as a back up for the maximum expected normal containment pressure or high containment pressure alarm setpoint.

Technical Basis:

CE NPSD-1009 states that this engineering limit is based on the plant-specific temperature at which pressure transmitters located in containment may start to be significantly affected by harsh containment conditions. CE NPSD-1009 also indicates that this value should be less than the saturated vapor temperature corresponding to the high containment pressure alarm setpoint. At St. Lucie Unit-1, the high containment pressure alarm setpoint is 2 psig, and the corresponding saturated vapor temperature is 218°F. Rosemount transmitters are used exclusively for the designated Post Accident Monitoring pressure channels located inside containment. As shown in Reference 5, Rosemount uses a standard normal operating design temperature limit of 200°F. For Rosemount transmitters this is the temperature breakpoint above which DBA temperature & pressure environmental effects are applicable. Below 200°F a much smaller normal temperature effect can be calculated and applied, where the magnitude of this uncertainty effect is based on the difference between the calibration temperature and the operating temperature.

Application of Uncertainties:

Per CE NPSD-1009 this value is classified as Category 3 and instrument uncertainties do not need to be applied to the engineering limit when determining the appropriate operational limit.

References:

1. EPG Basis for FRG CTPC-1 Step 3
2. Steam Tables
3. TEDB for setpoint of Unit-1 containment pressure instruments PIS-07-2A,B,C & D
4. CE NPSD-1009, I&C Engineering Limits and Bases in EOPs Including Evaluations of Instrument Uncertainties, Module 2-Document 4-Application 2
5. Vendor Technical Manual for Rosemount Transmitters 8770-9834 Rev 15

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4.0 OPERATOR ACTIONS

INSTRUCTIONS **CONTINGENCY ACTIONS**

CAUTION

A harsh containment condition exists if containment temperature is greater than 200°F. Figure 1A should be used for determination of subcooling when indicated containment temperature is less than or equal to 200°F. Figure 1B should be used when indicated containment temperature is greater than 200°F. Figure 1A should also be used if containment temperature had exceeded 200°F during event progression but was lowered to 200°F or less by containment cooling systems.

NOTE

- Instruments should be channel checked when one or more confirmatory indications are available. Reg Guide 1.97 designated instruments should be used for diagnosis of events and confirmation of safety functions.
- Steps designated with an * may be performed non-sequentially or are to be performed continuously.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	007 K1.03	
	Importance Rating	3.0	

Knowledge of the physical connections and/or cause effect relationships between the PRTS and the following systems: RCS

Proposed Question: Common 32

Unit 2 Quench Tank pressure has been lowering. Which of the following is a possible result of the dropping pressure?

Pressures less than 1 psig could...

A. increase the possibility of PORV and Pressurizer Safety Valve leakage.

B. cause Quench Tank level indication to read higher than expected.

C. draw Quench Tank liquid into the Pressurizer Safety Valve tailpipe header.

D. cause Quench Tank level indication to read lower than expected.

Proposed Answer: A

Explanation (Optional):

A. Correct. Low pressure can unseat either the PORV or safety valves.
B. Incorrect. Both sides of the differential pressure cell are impacted by the pressure in the QT.
C. Incorrect. This can occur when QT level is > 80%.
D. Incorrect. Both sides of the differential pressure cell are impacted by the pressure in the QT.

Technical Reference(s): 2-NOP-01.07, Quench Tank Operation (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 3
55.43 _____

Comments:

REVISION NO.: 3B	PROCEDURE TITLE: QUENCH TANK OPERATION	PAGE: 4 of 13
PROCEDURE NO.: 2-NOP-01.07	ST. LUCIE UNIT 2	

3.0 PREREQUISITES INITIAL

3.1 The Nitrogen Supply System is aligned and available to the extent that Nitrogen can be supplied to the Quench Tank. _____ US

3.2 The Waste Gas System is aligned and available to the extent that the Quench Tank can be vented to the Containment Surge Header. _____ US

3.3 The Primary Water System is aligned and available to the extent that Primary Water can be supplied to the Quench Tank. _____ US

3.4 The Liquid Waste Management System is aligned and available to the extent that the Quench Tank can be drained to the Reactor Drain Tank. _____ US

3.5 The Quench Tank has been aligned in accordance with 2-NOP-01.01, Reactor Coolant System Initial Alignment. _____ US

4.0 PRECAUTIONS / LIMITATIONS

4.1 The Quench Tank rupture disc blow out pressure is 85 psig.

4.2 V1242, Quench Tank Relief Valve, setpoint is 70 psig. This relief valve discharges to the Containment atmosphere.

4.3 The Quench Tank temperature should be maintained less than 120° F to ensure design limits for the Quench Tank are not exceeded.

4.4 V7310, Quench Tank for N2 Press Reg, is normally set to maintain 3 psig (2 to 4 psig) pressure in the Quench Tank.

4.5 Quench Tank pressures of less than 1 psig could increase the possibility of PORV and Pressurizer Safety Valve leakage.

4.6 Cooling the Quench Tank to less than 115° F could increase the possibility of PORV and Pressurizer Safety Valve leakage.

4.7 Normal Quench Tank level is 60% to 70%. If normal level is not maintained, the rupture disc blow out pressure could be exceeded during a Quench Tank design event.

4.8 If the Quench Tank water level is less than 40%, the inlet sparger will be uncovered.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	008 G2.1.303.9	
	Importance Rating		

Ability to locate and operate components including local controls for Component Cooling Water.

Proposed Question: Common 33

Given:

- Unit 2 is operating at 100% power.
- CCW Pumps 2B and 2C are running.
- CCW Pump 2A is tagged out for maintenance.
- Annunciator S-32, 2B CCW PUMP OVRLD/TRIP is in alarm.

Attempts to restart CCW Pump 2B are NOT successful.

What action is required to be performed per 2-ONP-0310030, Component Cooling Water Off-Normal?

A. Close all "B" Train N Header isolation valves.

B. Increase ICW cooling to the operating CCW HX to maximum.

C. Align the 2C CCW Pump suction and discharge headers to the 2B header.

D. Ensure all N Header isolation valves are open and then isolate unnecessary loads.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. The cooling for the B Train is being supplied from the A train through the N header isolation. Plausible if candidate thinks that they want to isolate to protect the operable train.

B. Incorrect. Only going to the operable train. Plausible if candidate thinks that now everything is being supplied from a single train. Not an off-normal action. Cooling is automatically controlled.

C. Incorrect. Plausible if candidate thinks if the valves were opened you would be able to supply both HXs.

D. Correct.

Technical Reference(s): 2-ONP-0310030, CCW (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 934

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10

55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
29A	COMPONENT COOLING WATER - OFF NORMAL OPERATION ST. LUCIE UNIT 2	4 of 21
PROCEDURE NO.: 2-0310030		

5.0 INSTRUCTIONS

5.1 Immediate Automatic Actions

1. CCW Surge Tank vent (RCV-14-1) diverts from atmosphere to the Chemical Drain Tank on high radioactivity in the CCW system.
2. Low level in the B side of the CCW Surge Tank will isolate the N header from the B header by closing HCV-14-8B and HCV-14-10.
3. Low level in the A side of the CCW Surge Tank will isolate the N header from the A header by closing HCV-14-8A and HCV-14-9.
4. A reactor trip will occur, on 2/4 logic, on low CCW flow from the Reactor Coolant Pump return header, after a ten minute time delay.

END OF SECTION 5.1

REVISION NO.:	PROCEDURE TITLE:	PAGE:
29A	COMPONENT COOLING WATER - OFF NORMAL OPERATION	8 of 21
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5.3 Subsequent Action (continued)

3. (continued)

C. Loss of two (2) CCW Pumps

CAUTION

- Refer to off-normal operating procedure 2-ONP-25.01, Loss of RCB Cooling Fans, for appropriate direction.
- §1,2 Sufficient Containment Fan Coolers (HVS-1A, HVS-1B, HVS-1C or HVE-1D) are required to be in operation to maintain Containment air temperature less than or equal to 120°F. This is necessary to maintain the reactor vessel support structure within design basis. Operator action is required within 45 minutes, to restore air temperature to less than or equal to 120°F or initiate reactor trip cooldown to at least Hot Shutdown.

1. If a CCW pump has tripped OFF, Then attempt only one restart.

2. If only one CCW pump is available and running, Then perform the following:

a. Ensure all non-essential header valves are open:

- HCV-14-8A, 2A CCW Header Supply to the N Header
- HCV-14-9, N Header Return to the 2A CCW Header
- HCV-14-8B, 2B CCW Header Supply to the N Header
- HCV-14-10, N Header Return to the 2B CCW Header

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	010 A3.01	
	Importance Rating	3.0	

Ability to monitor automatic operation of the PZR PCS including PRT temperature and pressure during PORV testing.

Proposed Question: Common 34

Given the following Unit 1 conditions:

- Plant is in Mode 3 when the PORV inadvertently lifts during I&C testing.
- Pressurizer pressure is 2000 psia.
- RCS temperature is 500°F.
- PORV tailpipe temperature is 230°F.
- Containment pressure is 1 psig.

What is the expected pressure in the Quench Tank?

(Steam Tables are provided.)

A. ~1 psig

B. ~5 psig

C. ~20 psig

D. ~35 psig

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible if candidate thinks the QT pressure will match Containment pressure.

B. Correct. Saturation pressure for 250°F is 20.5 psia or 5 psig.

C. Incorrect. Plausible if candidate uses gage pressure instead of absolute pressure when reading the Steam Tables.

D. Incorrect. Plausible if candidate adds atmospheric pressure to value from Steam Tables.

Technical Reference(s): ABB Steam Tables (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: _____ (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 5, 14
- 55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	012 K3.04	
	Importance Rating	3.6	

Knowledge of the effect that a loss or malfunction of the RPS will have on the following: ESFAS.

Proposed Question: Common 35

Given the following:

- Unit 1 is at 100% power.
- PT-07-2A, Containment pressure transmitter fails high.
- NO action has been taken to bypass PT-07-2A.
- A loss of the MD instrument bus occurs.

Which of the following Engineered Safety Features Actuation signals will actuate?

A. SIAS, CSAS, MSIS and CIAS.

B. CSAS and SIAS.

C. SIAS, MSIS and CIAS.

D. SIAS and CIAS.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. CSAS energized to actuate.
B. Incorrect. CSAS energized to actuate.
C. Incorrect. MSIS does not actuate on high Containment pressure on Unit 1, only on Unit 2. Plausible if candidate confuses the Unit configuration.
D. Correct.

Technical Reference(s): 0711401, ESFAS LP (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702401-08 (As available)

Question Source: Bank # 2004
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments: 0711401, ESFAS LP; page 29 of 57

Other ESFAS Anomalies

A failed ESFAS input would not hamper actuation because of the 2/4 logic where the design is that a failed channel can neither cause nor prevent an actuation. System logic would either result in1/3 or 2/3 depending on the type of failure.
A failed ESFAS component can not prevent fulfilling the design safety function of ESFAS assuming T.S. adherence at the time of actuation (single failure criteria). System logic, as was the case for a failed ESFAS input, would either result in1/3 or 2/3 depending on the type of failure.

Loss of a single 120VAC instrument power supply would not cause an actuation unless one ESFAS channel was in "Trip" at the time of actuation (here system logic would be 1/3) nor would it prevent a valid actuation (in this case system logic 2/3). Loss of multiple 120VAC instrument power supplies would cause both a reactor trip and every ESFAS actuation except RAS and CSAS (also DSS). Energize to trip ESFAS systems like CSAS and RAS (also DSS) will auto bypass and system logic will depend on the number of remaining energized channels.

Loss of a single vital DC bus would have the same effect as the loss of two or more 120VAC instrument power buses for those ESFAS systems that deenergize to trip. Energize to trip ESFAS systems like CSAS and RAS (also DSS) will auto bypass and system logic will be 2/2 on the remaining two energized channels.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	013 A4.03	
	Importance Rating	4.5	

Ability to manually operate and/or monitor in the control room: ESFAS initiation.

Proposed Question: Common 36

Given the following conditions on Unit 2:

- A large break LOCA is in progress.
- All ESF actuations have occurred as required.
- RCS pressure is 200 psig.
- Containment pressure is 16 psig.
- Refueling Water Tank level is 3.5 feet.

Which ONE of the following describes the equipment alignment for the current plant conditions?

A. HPSI Pumps running with Mini-Flow isolation valves open.

B. HPSI Pumps off with Mini-Flow isolation valves closed.

C. LPSI pumps running with Mini-Flow isolation open

D. LPSI pumps off with Mini-Flow isolation valves closed.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. RAS is actuated. Mini-Flows closed
B. Incorrect. HPSI will still be running. LPSI will be tripped
C. Incorrect. After RAS, LPSI off with HPSI running
D. Correct. Pumps and valves aligned correctly for conditions given in the stem

Technical Reference(s): 2-EOP-99, Appendices / (Attach if not previously provided)

Figures / Tables/Data Sheets, Table 4

2-EOP-04, LOCA

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source:
Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 7
55.43 _____

Comments:

REVISION NO.: 30	PROCEDURE TITLE: APPENDICES / FIGURES / TABLES / DATA SHEETS ST. LUCIE UNIT 2	PAGE: 141 of 155
PROCEDURE NO.: 2-EOP-99		

TABLE 4
RECIRCULATION ACTUATION SIGNAL
(Page 1 of 1)

	A Train (√)	B Train (√)
☐ **1.** ENSURE Suction from Containment Sump A/B Valves OPEN.		
• MV-07-2A	___	
• MV-07-2B		___
☐ **2.** ENSURE Suction from RWT A/B Valves CLOSED.		
• MV-07-1A	___	
• MV-07-1B		___
☐ **3.** ENSURE LPSI Pumps STOPPED.		
• 2A LPSI Pump	___	
• 2B LPSI Pump		___
☐ **4.** ENSURE Minimum Flow Header A/B Isolation Valves CLOSED.		
• V3495	___	
• V3659	___	
• V3496		___
• V3660		___

END OF TABLE 4

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	022 A1.02	
	Importance Rating	3.6	

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment Cooling System controls including: Containment pressure.

Proposed Question: Common 37

Unit 2 was operating in MODE 1 with all system alignments normal when a Main Steam leak occurred inside Containment.

The following conditions are noted:

- The reactor has tripped
- RCS pressure is 1650 psia and lowering slowly.
- Containment Pressure is 2.2 psig and rising slowly.
- 2A and 2B Containment Fan Coolers (CFCs) are operating in FAST speed.

Which ONE (1) of the following actions, if any, is required?

A. Start 2C and 2D CFCs in FAST speed.

B. Stop 2A and 2B CFCs. Start 2C and 2D CFCs in SLOW speed.

C. Shift 2A and 2B CFCs to SLOW speed. Ensure 2C and 2D CFCs remain in Standby.

D. Shift 2A and 2B CFCs to SLOW speed. Start 2C and 2D CFCs in SLOW speed.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Indications available to have SIAS actuation. All 4 fan coolers should be in SLOW

B. Incorrect. Although 2 A and 2B should be in SLOW, shutting them down would not allow the unit to meet containment cooling requirements. They should be shifted to slow speed.

C. Incorrect. Shifting 2 coolers to slow is correct. However, based on indications, the other 2 should also be in slow speed

D. Correct. Place all CFCs in SLOW for SIAS condition

Technical Reference(s): 0711602, Containment System SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702602-01 (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 5, 7
55.43 _____

Comments: From 0711602, Containment System SD; page 7 of 83

CONTAINMENT COOLING SYSTEM

GENERAL DESCRIPTION

RCS heat losses to ambient in the containment requires an air cooling system to operate during normal power operations. The Containment Cooling System also functions as an ESF system to remove heat released during a postulated LOCA and is actuated on a Safety Injection Actuation Signal (SIAS). The system consists of four fan coolers HVS-1A, 1B, 1C, and 1D, which are cooled by Component Cooling Water (CCW). All four units are connected to a ring shaped duct. Each fan cooler unit consists of a cooling coil assembly, dampers, and a fan. Refer to Figures 1-6

During normal plant operation, three of the four containment fan coolers are in operation with component cooling water flowing through all four cooling coils. The fourth fan is automatically started [in slow speed] upon receipt of an SIAS. The fans can also be manually started from RTGB 106 [HVCB] in the control room. During normal plant operation, if one fan trips the standby fan is started by the operator manually at RTGB 106 [HVCB]. Operator action is required within 45 minutes to restore containment temperature to less than 120°F or initiate a manual reactor and turbine trip.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	026.A1.02	
	Importance Rating	3.6	

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Containment Spray System controls including: Containment temperature.

Proposed Question: Common 38

Given the following conditions:

- A LOCA has occurred.
- CSAS did NOT actuate automatically or manually.
- All other required actions have occurred.
- Bus 2B3 is locked out.
- RCS pressure is 600 psig.
- Containment pressure is 26 psig and rising.
- Containment temperature is 220°F.

Which ONE (1) of the following describes the MINIMUM actions required to reduce containment parameters?

A. Start Containment Spray Pump 2A.

B. Open Containment Spray Pump 2A Spray Header Valve.

C. Start Containment Spray Pump 2A and open its Spray Header Valve.

D. Open Containment Spray Pump RWST suction isolation valve, start Containment Spray Pump 2A, and open its Spray Header Valve.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. CSAS did not actuate, so the Spray discharge is still closed

B. Incorrect. CSAS did not actuate, so the Spray Pump is not running. Plausible because standard CE design starts Spray Pump on SIAS

C. Correct. CSAS requires Spray Pump and Discharge Valve to be religned.

D. Incorrect. RWST suction is aligned to RWST already. Alignment changes take place during RAS

Technical Reference(s): 2-EOP-03, LOCA (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702207-10 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 5, 7
- 55.43 _____

Comments:

D. OFF-NORMAL OPERATION AND EMERGENCY RESPONSE

Effects of ESFAS Actuation on Plant Components

The ESFAS is designed to protect the reactor during various credible accident conditions. The following details the actuation signal(s) that are expected for the listed accidents.

- Loss of Coolant Accident (LOCA) - SIAS, CIS [CIAS], CSAS
- Main Steam Line Break (MSLB) outside cntmt – MSIS
- MSLB inside cntmt – MSIS, SIAS, CIS [CIAS], CSAS

SIAS Effects on Plant Components

- CCW 'N' header isolates
- Four containment fan coolers run [4 run in slow speed]
- HPSI/LPSI pumps start and safety injection headers unisolate
- RAB emergency exhaust fans start; normal exhaust fans secure
- SIAS signal generates CIS [CIAS]
- Isolates main feedwater by closing MFW pump discharge valves (Unit 1 only),and, 2[4] MFIVs
- Isolates CCW to/from RCPs
- BAM pumps start, gravity feed and emergency borate valves open
- Isolates VCT
- Isolates letdown
- 3 [2] charging pumps start
- Isolates ICW to TCW and the OBCS heat exchanger (MV-21-2 and MV-21-3 close)
- EDGs start
- [Trips MG set output breaker]

CIS [CIAS] Effects on Plant Components

- Isolates cntmt penetrations
- Isolates BD & BD sample isolation valves
- Station Air isolation valve
- CR isolation & Emergency Filtration Systems

CSAS Effects on Plant Components

- Cntmt spray pumps start
- Unisolates cntmt spray header
- Unisolates the Iodine Removal System by opening NaOH injection valves on Unit 1 [Hydrazine pumps start and discharge valves open due to CSP start ckt.]

RAS Effects on Plant Components

- Unisolates ECCS pump suction path from cntmt sump
- Isolates ECCS pump suction path from RWT
- LPSI pumps stop
- Isolates safeguards pump recirc path (Unit 1 requires RTGB 106 key-switch positioning)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	039 K1.02	
	Importance Rating	3.3	

Knowledge of the physical connections and/or cause/effect relationships between the MRSS and the following systems: Atmospheric dump valves.

Proposed Question: Common 39

Given the following:

- Unit 2 is at 2% power.
- ADV controls for BOTH Steam Generators are in AUTO/AUTO, set at 900 psia.
- A Loss of offsite power (LOOP) occurs resulting in a reactor trip.
- Both EDGs start and re-energize their respective buses.

How will the Atmospheric Dump Valves for the 2A Steam Generator respond?

One ADV will _____(1)_____ and the other ADV will _____(2)_____.

A. (1) throttle closed and then re-open to control pressure at 900 psia
(2) throttle closed and then re-open to control pressure at 900 psia

B. (1) continue to control pressure at 900 psia.
(2) throttle closed and then re-open upon EDGs loading

C. (1) fail as is and then throttle to control pressure at 900 psia upon EDG loading
(2) fail as is and then throttle to control pressure at 900 psia upon EDG loading

D. (1) fully close then re-open to control pressure at 900 psia upon EDG loading
(2) fully close then re-open to control pressure at 900 psia upon EDG loading

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Correct for Unit 1 valves
B. Incorrect. Combination of Unit 1 actions for a different failure.
C. Correct
D. Incorrect. Valves will not change position unless operating switch is manipulated.

Technical Reference(s): 0711304, Mains Steam SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702304-04 (As available)

Question Source:
Bank # 2621
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 4
55.43 _____

Comments: From 0711304, Mains Steam SD; page 11 of 81

AUTO-MAN and AUTO-AUTO Modes - With the AUTO/MAN selector switch in AUTO, ADV position is controlled from the respective PIC that sends an electrical signal to the modutronic unit (see Figure 9). A rheostat monitoring ADV position provides a feedback signal that stops valve movement when actual position matches desired position based on the input signal to the modutronic unit. Normally the PICs are maintained in manual control with the automatic actuation pressure setpoint at 900 psia.

AUTO-MAN Mode – With the PIC set to manual operation, the ADV can be positioned by pushing the up-arrow or down-arrow pushbuttons on the PIC.

AUTO-AUTO Mode - With the PIC in the automatic mode, valve control is based on the setpoint on the PIC. For example, as S/G pressure increases above setpoint, the controller output increases to the modutronic unit, which in turn repositions the ADV to open it more, limiting S/G pressure.
On the PACB in the Unit 2 Control Room, controls are provided for MV-08-19A for S/G 2A and MV-08-18B for S/G 2B, as illustrated on Figure 8. Note that S/G 2A ADV isolation valve, MV-08-15, control switch is next to S/G 2B ADV control switches, and the S/G 2B ADV isolation valve, MV-08-16, control switch is next to the S/G 2A ADV switches. Steam trains are color coded to aid in train identification. Control is functionally the same as at RTGB-202, except the power supply trains are reversed. The arrangement of the switches is a function of control power considerations.

If DC power is lost to the ADV, the valve cannot be repositioned electrically in any mode of control due to loss of power to the DC motor field.

Response of an ADV following restoration of electrical power (e.g., EDG loading following a LOOP) is determined by the mode of control.

If DC power is lost and then regained while in the MAN-MAN mode, the valve will not move because there is no signal being generated to move it.

If AC power is lost to the modutronic unit and ADV controller and then regained while in the AUTO-MAN mode, the ADV will remain at the current valve position. The controller output is restored to its previous value, which is the input to the modutronic unit. Since the ADV fails as-is, the feedback signal from the rheostat should still match the demand position.

Note that if the ADV controller fails to zero with AC power still available to the modutronic unit, the ADV will close (if open) to match the input signal.

If AC power is lost to the modutronic unit and/or ADV controller and then regained while in the AUTO-AUTO mode, the ADV will go to the position dictated by the pressure setpoint on the PIC.

As actual pressure deviates from setpoint, the valve will open or close to control S/G pressure at the setpoint.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	059 K4.18	
	Importance Rating	2.8	

Knowledge of MFW design feature(s) and/or interlock(s) which provide for automatic feedwater reduction on plant trip.

Proposed Question: Common 40

2-GOP-201, Reactor Plant Startup – Mode 2 to Mode 1 is being performed with Main Feedwater in service maintaining Steam Generator levels. In preparation for Unit start up, the Main Turbine is latched and then manually tripped.

Which ONE (1) of the following describes the expected response of the feedwater system and Steam Generator level?

Assume NO operator actions are taken after the turbine trip.

The 2A 15% feedwater bypass valve will position to its:

A. 5% flow post-trip feed position and Steam Generator A level will rise.

B. 5% flow post-trip feed position and Steam Generator A level will lower.

C. 15% flow post-trip feed position and Steam Generator A level will rise.

D. 15% flow post-trip feed position and Steam Generator A level will lower.

Proposed Answer: A

Explanation (Optional):

A. Correct. More feedwater available than steaming requirements dictate, therefore, SG levels will rise.

B. Incorrect. More feedwater available than steaming requirements dictate. Plausible if candidate does not recognize power level or that main feed is still in operation.

C. Incorrect. Valve goes to the 5% position post-trip.

D. Incorrect. More feedwater available than steaming requirements dictate. Valve goes to the 5% position post-trip.

Technical Reference(s): 2-GOP-201, Reactor Plant Startup – Mode 2 to Mode 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702801-01 (As available)

Question Source: Bank # 1758
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
42	REACTOR PLANT STARTUP – MODE 2 TO MODE 1	27 of 66
PROCEDURE NO.: 2-GOP-201	ST. LUCIE UNIT 2	

INITIAL

CAUTION

- During turbine latching activities, if Emergency Trip Header pressure increases above 1000 psig and then decreases below this value, the Feed Reg System will sense a turbine trip. This will cause the 15% feedwater bypass valves to open to the 5% post trip position and the main feed reg valves to close.
- When the turbine is latched (Emergency Trip Header pressure increases above 1000 psig) the main feed reg valves transfer to the Manual mode and close.

NOTE

Problems latching the Main Turbine may require I&C personnel assistance. To minimize the delay in latching the Main Turbine, if problems are encountered, ensure I&C personnel are available to offer assistance if required.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	061.A3.01	
	Importance Rating	4.2	

Ability to monitor automatic operation of the AFW, including: AFW startup and flows.

Proposed Question: Common 41

The following conditions exist on Unit 2:

- Unit tripped from 80% power.
- 2A and 2B Steam Generator levels decreased to 10% narrow range and have recovered to 30% narrow range on all channels.

Assuming NO operator action, which of the following describes the status of the Auxiliary Feedwater system?

A. The 2A, 2B and 2C Auxiliary Feedwater pumps are feeding at full flow.

B. The 2A and 2B Auxiliary Feedwater pumps are feeding at 150 gpm each.

C. The 2A, 2B and 2C Auxiliary Feedwater pumps have stopped and their discharge valves closed.

D. The 2A, 2B and 2C Auxiliary Feedwater pumps are running and their discharge valves closed.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Plausible if candidate does not recognize that reset criteria is met.
B. Incorrect. Valves are throttled to 220 gpm. Plausible if candidate thinks they are in the post-trip configuration and that reset criteria is met.
C. Incorrect. Plausible if candidate think that AFAS reset performs all of these functions.
D. Correct.

Technical Reference(s): 0711412, AFW and AFAS SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 2664

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 7

55.43 _____

Comments: From 0711412, AFW and AFAS SD; page 47/48 of 101

UNCOMPLICATED TRIP

Following a reactor trip from high power, it is expected that the level in both S/Gs will decrease to below the AFAS setpoint. If level is not recovered before the time delay times out, a full actuation of the AFAS-1 and 2 would be expected.

With no intervening actions, the S/Gs would be receiving feedwater from the main feedwater system via the biased 15% Bypass Valves [Unit 2 isolates MFW on AFAS] and all three AFW pumps, with excessive RCS cooling a likely result. Post trip actions allow cutting back on AFW flow once proper S/G levels have been established thereby preventing unnecessary RCS cooldown.

As S/G levels are increased to above the AFAS reset point (29%), the cycling AFW flow control valves go closed. If level decreased again to the AFAS setpoint, the flow control valves would reopen following the initiation time delay and this cycle would continue to repeat until interrupted by an operator.

Manual S/G Level control during the presence of an AFAS-1(2) can be accomplished by throttling the motor operated valves (MV-09-09 through -12) after they have traveled to their full open position. If level is allowed to go above the AFAS-1(2) reset point, you must wait until the valves have closed and press the four (4) ACTUATION RESET PUSHBUTTONS before throttling capability is restored.

To review the indications provided by the AFAS Cabinet Status Lights for automatic actuation, refer to Figure 29.

The normally-off **BISTABLE RELAY STATUS** indicators should be **ON** when that channel's AFAS-1 or AFAS-2 bistables have tripped. The corresponding matrices should be in the tripped state and their normally-on **MATRIX RELAY STATUS** indicators should be **OFF**. The normally-on **SYSTEM STATUS** indicators will extinguish in the following order: **INT** indicator should be **OFF** when any matrix is in the tripped state; the

1-3, 2-4 and **ACT** indicators should extinguish upon completion of the Initiation Time Delay [or immediately if AFAS initiated from RTGB-202 Manual Initiation switches].

When S/G level is restored to the AFAS reset point, the Bistable, Matrix, Initiation, and Interposing Relays return to the untripped state and: **BISTABLE RELAY STATUS** indicators turn **OFF; MATRIX RELAY STATUS, AFAS LOCKOUT RELAY STATUS 1-3 AND 2-4, SYSTEM STATUS INT, 1-3 AND 2-4** indicators turn **ON**. The System Status ACT indicator will remain OFF and the AFAS Lockout Relay Status indicators should remain ON until the lockout and latching relays are manually reenergized using the **ACTUATION RESET** Pushbutton(s).

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	062 G2.1.32	
	Importance Rating	3.4	

Ability to explain and apply all system limits and precautions.

Proposed Question: Common 42

Unit 1 is Crosstying the 1A2 Load Center to the 1B2 Load Center with 1B2 supplying.

Which Containment Coolers should be removed from service and why?

A. HVS-1A & HVS-1C to minimize single EDG loading should a loss of off-site power occur.

B. HVS-1A & HVS-1B to minimize the loading on the crosstie cables.

C. HVS-1B & HVS-1D to minimize single EDG loading should a loss of off-site power occur.

D. HVS-1C & HVS-1D to minimize the loading on the crosstie cables.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Should remove HVS-1A but not HVS-1C. The Train B HVS (HVS-1C & HVS-1D) should remain in service. Plausible if candidate thinks 1A & 1C are powered from the same Train.

B. Correct. Removing the Train A Containment Coolers (HVS-1A & HVS-1B) in this configuration minimize the loading on the crosstie cables and minimize single EDG loading should a loss of off-site power occur.

C. Incorrect. The reason is correct but the wrong coolers are being removed from service. Should remove HVS-1B but not HVS-1D. The Train B HVS (HVS-1C & HVS-1D) should remain in service. Plausible if candidate thinks **1B & 1B** are powered from the same Train.

D. Incorrect. These coolers need to remain in service. Plausible if candidate does not understand the basis for crosstying as this would not minimize load on cross-tie cables.

Technical Reference(s): 1-NOP-47.01, Crosstying / Removal / Restoration of 480V (Attach if not previously provided)

Buses

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702502-6 (As available)

Question Source:
Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 9
55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
0	LOSS OF A SAFETY RELATED A.C. BUS	28 of 49
PROCEDURE NO.: 1-ONP-47.01	ST. LUCIE UNIT 1	

APPENDIX F
RESTORATION OF 1B2 480V LOAD CENTER
(Page 1 of 3)

INITIAL

1. If the deenergized bus is the 1B2 480V Load Center, Then proceed as follows:

CAUTION
Various instruments and equipment that are normally used for the assessment of critical safety functions may not be operable. Use all available indications.

NOTE
Table 1 contains a listing of the major loads that have been lost.

A. Make one attempt to reenergize the bus by performing the following:

1. CLOSE breaker 1-20402 (4160V feeder). _____
2. CLOSE 1-40503 (480V feeder breaker). _____

B. If the bus can NOT be reenergized quickly, Then perform the following:

1. Ensure that the Pressurizer level and pressure controllers are selected to the X channel, then refer to ONOP 1-0120035, Pressurizer Pressure and Level, to restore the PZR heaters, as necessary. _____
2. Ensure the following fans are running:
   - HVS-2A (Rx cavity cooling fan) _____
   - HVE-3A (Rx support cooling fan) _____
   - HVE-21A (CEDM cooling fan) _____
   - HVS-1A & B (containment cooling fans) _____
3. Refer to 1-ONP-25.01, Loss of RCB Cooling Fans, due to the loss of 2 containment coolers. _____

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	003 A2.05	
	Importance Rating	2.5	

Ability to (a) predict the impacts of the following on the Reactor Coolant Pump and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: Effects of VCT pressure on RCP seal leakoff flows.

Proposed Question: Common 43

While burping the Volume Control Tank (VCT), level was increased to 75% without any concurrent adjustment in VCT pressure as level was raised.

This caused Reactor Coolant Pump (RCP) controlled bleedoff (CBO) flow to _____(1)_____, and will require _____(2)_____ to restore controlled bleedoff flows to normal.

A. 1. decrease 2. venting the VCT

B. 1. increase 2. aligning CBO flow to the Quench Tank

C. 1. increase 2. opening CBO Throttle Valve V2198

D. 1. decrease 2. closing CBO Throttle Valve V2198

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. VCT pressure will decrease in this condition. Plausible if candidate thinks that aligning CBO to the Quench Tank will restore CBO flow to normal.

C. Incorrect. VCT pressure will decrease in this condition. Plausible if candidate thinks that opening the CBO Throttle Valve will restore CBO flow to normal.

D. Incorrect.VCT pressure will decrease in this condition. Plausible if candidate thinks that closing the CBO Throttle Valve will restore CBO flow to normal.

Technical Reference(s): 0711202, RCP System Description, Figure 9 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments: From 0711202, RCP System Description, Figure 9

CONTROLLED BLEEDOFF

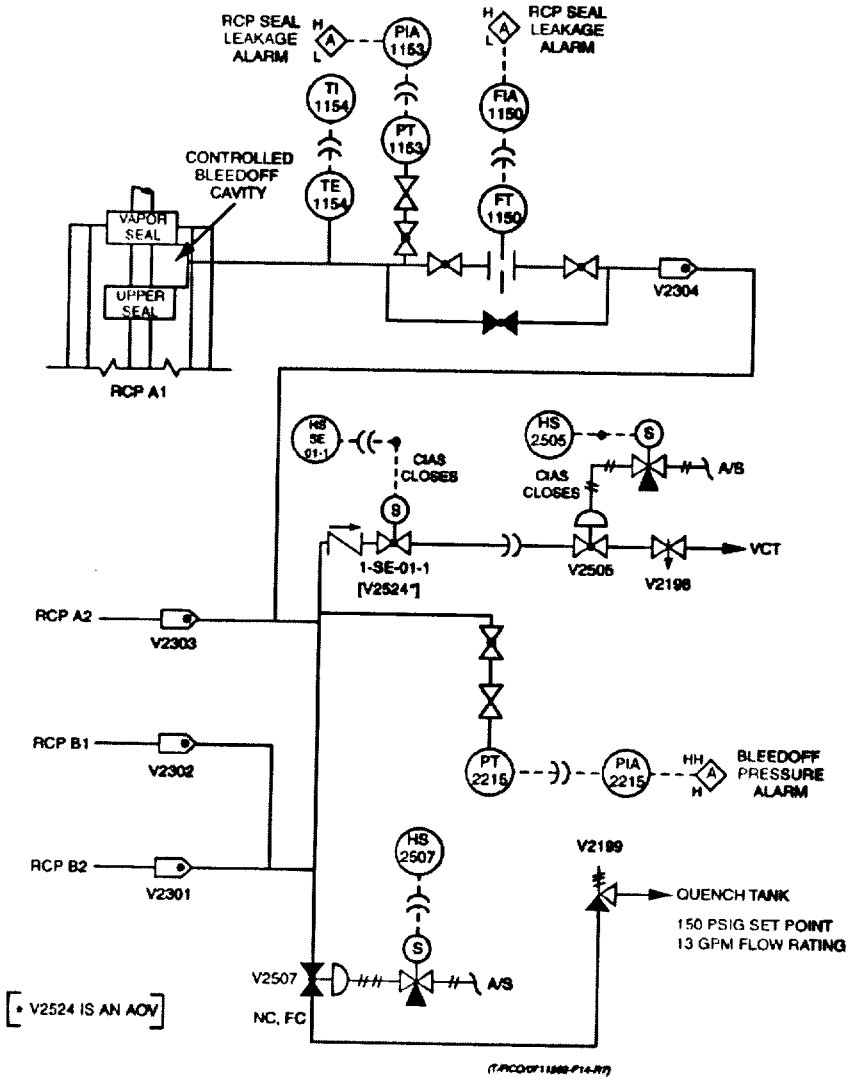


FIGURE 9

Comments: Original question below.

During the performance of the 125V DC Ground Diagnostic Off-Normal procedure you are required to separate 125V DC Bus 2A/2AA from 125V DC Bus 2AB due to ground alarms associated with both buses.

Which of the following is correct concerning the status of the 2AB DC Bus during the time that it is separated from the 2A/2AA DC Bus:

It is inoperable because no battery is connected to the bus.

It is inoperable because the 2AB Battery Charger is a non-qualified battery Charger.

It remains operable because it is still tied to an operable battery bank.

It remains operable because the 2AB DC Bus is Class 1E, Safety Related.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	064 K2.02	
	Importance Rating	2.8	

Knowledge of electrical power supplies to the following: Fuel oil pumps.

Proposed Question: Common 44

Which ONE (1) of the following describes the operation of the Emergency Diesel Generator Diesel Fuel Oil Priming Pumps and associated power supply?

A. Unit 1 starts on low DG fuel line pressure and runs until fuel oil pressure is >20 psig; Powered from its respective 480V MCC 1A7/1B7.

B. Unit 2 starts on low level in the DG day tank and runs until the day tank HI level alarm; Powered from its respective 480V MCC Bus 2A7/2B7.

C. Unit 1 starts when the DG is started and runs until the DG is >200 rpm; Powered from its respective 125 VDC Bus 1A/1B.

D. Unit 2 starts when the DG is started and runs until the output breaker is closed; Powered from its respective 125 VDC Bus 2A/2B.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Unit 1 runs until EDG >200 rpm. Plausible if candidate thinks that the low fuel oil pressure signal is enabled when EDG start signal is received and that the fuel oil priming pump is AC powered.

B. Incorrect. Unit 2 runs until EDG >500 rpm. Plausible if candidate thinks that a low day tank level signal is enabled when EDG start signal is received and that the fuel oil priming pump is AC powered.

C. Correct. Unit 1 runs until EDG >200 rpm.

D. Incorrect. Unit 2 runs until EDG >500 rpm. Plausible if candidate thinks that the pump continues to run until output breaker is closed.

Technical Reference(s): 0711501, EDG SD page 37 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # 703 Added 2nd half to Stem to identify power supply.

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10

55.43 _____

Comments: Original question below.

Which one of the following correctly describes the operation of the DC fuel oil pump?

A. Unit 1 starts on low fuel line pressure.
B. Unit 2 starts on low level in the DG day tank.
C. Unit 1 normally starts every time the DG is started and runs until the DG output breaker is closed.
D. Unit 2 normally starts every time the DG is started and remains running as long as the DG is left running.

DC Electric Motor Driven Fuel Oil Pump

One positive displacement pump per engine. Refer to Figure 10.

- 125 VDC Safety bus powered, rated at 0.75 HP and 6 gpm [0.5 HP and 4.5 gpm].
- Provided as a BACKUP, and can be used to prime the engine.
- Installed for 10-second start capability
- Starts on EDG start signal to reduce starting time
  - Unit 1 runs until EDG >200 rpm. [Unit 2 runs until EDG >500rpm] / TSA installed TDAT stops Unit 2 priming pumps > 500rpm.
- Pump discharge relief valve recirculates unused fuel oil back to the day tanks at 50 psig.
- Jogged by Fuel Prime pushbutton located on the local EDG control panel.

A hand-pump is provided to prime the diesel as a backup for the DC electric pump. The hand-operated, positive displacement pump is used to prime the diesel after maintenance, extended shutdowns, or upon failure of the motor operated pump.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	073 K1.01	
	Importance Rating	3.6	

Knowledge of the physical connections and/or cause-effect relationships between (SYSTEM) and the following: Those systems served by PRMS.

Proposed Question: Common 45

If a valid high radiation alarm is received on the 2B Steam Generator Blowdown Radiation Monitor at Unit 2, which of the following automatic actions will occur?

A. The SG blowdown isolation valves and the blowdown sample isolation valves for both SGs will close.

B. The SG blowdown isolation valve and the blowdown sample isolation valve for the 2B SG will close.

C. Only the SG blowdown isolation valve for the 2B SG will close, the SG blowdown sample isolation valves for both SGs close.

D. Only the SG blowdown isolation valve for the 2B SG will close, the SG blowdown sample valves remain open.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Only the blowdown and sample isolations for the affected SG close. Plausible if candidate thinks that both SGs are affected.

B. Correct.

C. Incorrect. SG sample isolation valve on the unaffected SG does not close. Plausible if candidate thinks that both sample isolation valves close.

D. Incorrect. SG sample isolation valve on the affected SG will close. Plausible if candidate thinks that only the blowdown isolation valve closes.

Technical Reference(s): 2-ONP-26.01, Process Radiation (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702411-08 (As available)

Question Source:
- Bank # 2067
- Modified Bank # _____ (Note changes or attach parent)
- New _____

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 11
- 55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
6A	PROCESS RADIATION MONITORS	8 of 24
PROCEDURE NO.: 2-ONP-26.01	ST. LUCIE UNIT 2	

4.2 Steam Generator Blowdown Monitors (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS

2. If a S/G Blowdown monitor has malfunctioned, Then:

   A. NOTIFY I&C.

   B. NOTIFY Chemistry.

   C. REFER TO Chemistry Procedure C-200, Offsite Dose Calculation Manual (ODCM), Section 3.3.3.9, Radioactive Liquid Effluent Monitoring Instrumentation, for applicable action requirements.

NOTE

- The only plant condition that will cause a valid HIGH alarm on the S/G Blowdown Monitor is a Primary to Secondary S/G tube leak.
- The S/G Blowdown Radiation Monitors isolate on a HIGH alarm; the monitored sample will be from the stagnant fluid left in the piping and is NOT a valid indication of S/G activity.
- The Air Ejector process monitor may be a valid indication of S/G activity when the S/G Blowdown monitor is isolated.

3. If the affected monitor is functioning properly and indicates high activity, Then PERFORM the following:

   A. If PLP-121 is in HIGH alarm, Then ENSURE the following:

      - FCV-23-3 is CLOSED
      - FCV-23-7 is CLOSED

REVISION NO.:	PROCEDURE TITLE:	PAGE:
6A	PROCESS RADIATION MONITORS	9 of 24
PROCEDURE NO.: 2-ONP-26.01	ST. LUCIE UNIT 2	

4.2 Steam Generator Blowdown Monitors (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
3. (continued)	
B. If PLP-122 is in HIGH alarm, Then ENSURE the following: • FCV-23-5 is CLOSED • FCV-23-9 is CLOSED	
C. If Channels PLP-121 and PLP-122 are alarmed, Then CONSIDER the possibility of high background radiation in the vicinity of the detectors.	
D. CHECK EAG-403, Condenser Air Ejector, to determine extent of leakage into the secondary system.	

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	076 A1.02	
	Importance Rating	2.6	

Ability to predict and/or monitor changes in parameters associated with operating the (SYSTEM) controls including: Reactor and turbine building closed cooling water temperatures.

Proposed Question: Common 46

The following conditions exist on Unit 2:

- The Unit has experienced a Safety Injection Actuation.
- Manual action was required to place ICW to TCW supply valves, MV-21-2 and MV-21-3, in their proper position.
- The SIAS signal has been reset.

What is the effect on Turbine Cooling Water (TCW) with the configuration of Intake Cooling Water (ICW) at this time?

TCW temperature is:

A. steady or rising while ICW flow is being supplied to the essential and non-essential headers.

B. lowering while ICW flow is being supplied to the essential header only.

C. lowering while ICW flow is being supplied to the essential and non-essential headers.

D. steady or rising while ICW flow is being supplied to the essential header only.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Correct if SIAS not present. Plausible if candidate thinks that the ICW to TCW valves are open or re-open automatically when SIAS was reset.

B. Incorrect. Valves are closed therefore temperature will not lower. Plausible if candidate thinks that the TCW valves are open following an SIAS.

C. Incorrect. Correct if SIAS not present. Plausible if candidate thinks that the ICW to TCW valves are open or re-open automatically when SIAS was reset.

D. Correct.

Technical Reference(s): 2-EOP-99 Appendices / Figures / Tables / Data Sheets, Appendix P (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # 1943 Modified stem and distractors to address change in TCW temperature. See Comments.

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4

55.43 _____

Comments:

The following conditions exist on Unit 2:

- The Unit has experienced a Safety Injection Actuation
- The SIAS signal has been reset

Which of the following describes the configuration of the Intake Cooling Water System (ICW) at this time?

MV-21-2 and MV-21-3 (Intake Cooling water valves to the TCW heat exchangers) are:

open and ICW flow is being supplied to the essential and non-essential headers.

open and ICW flow is being supplied to the essential header only.

closed and ICW flow is being supplied to the essential and non-essential headers.
closed and ICW flow is being supplied to the essential header only.

REVISION NO.: 30	PROCEDURE TITLE: APPENDICES / FIGURES / TABLES / DATA SHEETS ST. LUCIE UNIT 2	PAGE: 88 of 155
PROCEDURE NO.: 2-EOP-99		

APPENDIX P
RESTORATION OF COMPONENTS ACTUATED BY ESFAS
(Page 15 of 16)

SECTION 5: SYSTEM / COMPONENT RESTORATION
(continued)

A Train (√) B Train (√)

7. Miscellaneous Components.

☐ **A.** OPEN Containment Sample Isolation Valves by PLACING the hand switch to CLOSE and then to OPEN.

- FCV-26-2/4/6 —
- FCV-26-1/3/5 —

☐ **B.** Restore Steam Generator Blowdown and Sample systems as necessary.
REFER TO OP-0830021, Blowdown System Operation.

☐ **C.** OPEN the Waste Gas Cntmt Isol valves by PLACING the control switch to OPEN RESET.

- V6750 ___
- V6718 ___

☐ **D.** OPEN Reactor Drain Tank Cntmt Isol valves by PLACING the control switch to RESET.

- V6341 ___
- V6342 ___

☐ **E.** OPEN the ICW to the TCW Heat Exchanger valves by PLACING the control switch to CLOSE and then OPEN.

- MV-21-3 ___
- MV-21-2 ___

(continued on next page)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	078 K2.02	
	Importance Rating	3.3	

Knowledge of electrical power supplies to the following: Emergency air compressor.

Proposed Question: Common 47

Which of the following supplies power to the Unit 2 Instrument Air Compressor Emergency Cooling Pump and Fan?

A. MCC-2C

B. MCC-2A5

C. MCC-2AB

D. MCC-2B5

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Turbine building MCC. Plausible as this MCC is in the same building as MCC-2AB.
B. Incorrect. Reactor MCC. Plausible as this is a safety related MCC.
C. Correct.
D. Incorrect. Reactor MCC. Plausible as this is a safety related MCC.

Technical Reference(s): 2-1010030, Loss of Instrument Air, Appendix A (Attach if not previously provided)
0711413, Plant Air Systems

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)

New X

Question History: Last NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 7
55.43

Comments:

REVISION NO.: 21	PROCEDURE TITLE: LOSS OF INSTRUMENT AIR	PAGE: 10 of 18
PROCEDURE NO.: 2-1010030	ST. LUCIE UNIT 2	

APPENDIX A
OPERATION OF THE 2A INSTRUMENT AIR COMPRESSORS
(Page 1 of 2)

INITIAL

1. If normal TCW flow is available to Instrument Air Compressor 2A, Then:

   A. OPEN V13197, 2A Instrument Air Compressor Jacket Inlet Isol (TGB/24/N-22/E-B). _____

   B. OPEN V13201, 2A Instrument Air Compressor Jacket Outlet Isol (TGB/24/N-22/E-B). _____

   C. Ensure OPEN V18109, Instr Air Rcvr Inlet from 2A Isol Aftercooler (TGB/29/S-22/W-A). _____

   D. CLOSE V18660 2C/2D Instrument Air Compressor Discharge Isol (TGB/29/S-22/W-A). _____

E. Request the RCO to position the Instrument Air Compressor 2A Control Switch to the RESET position, located at the Control Room Plant Auxiliaries Panel.

F. When notified by the RCO that Step 1.E has been completed, Then locally START Instrument Air Compressor 2A. _____

2. If normal TCW flow is NOT available to the Instrument Air Compressor 2A, Then align Emergency Cooling Water as follows:

CAUTION
If Compressor temperatures continue to rise, Then it may be necessary to secure the Station Air Compressor.

A. OPEN V13197, 2A Instrument Air Compressor Jacket Inlet Isol (TGB/24/N-22/E-B). _____

B. OPEN V13201, 2A Instrument Air Compressor Jacket Outlet Isol (TGB/24/N-22/E-B). _____

C. Ensure Instrument Air Compressor Emergency Head Tank is at the minimum required level of ¾ full (TGB/40/N-24/B).

D. Ensure breaker 2-42414, Emergency Cooling Fan, located on MCC 2AB is ON by verifying local light indication. _____

E. Ensure breaker 2-42416, Recirculation Pump 2A, located on MCC 2AB is ON by verifying local light indication. _____

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	103 K3.03	
	Importance Rating	3.7	

Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on the following: Loss of containment integrity under refueling operations.

Proposed Question: Common 48

Unit 2 is in Mode 6 performing fuel movement.

Which of the following conditions require fuel movement to be stopped?

A. Equipment Hatch is open and capable of closure in 35 minutes.

B. Open Containment Purge Makeup air manual isolation valves are open with administrative controls (Open PEN Log).

C. Only one personnel airlock door is capable of being closed.

D. Equipment Hatch is closed and only one individual is stationed at the Personnel Airlock Door with the doors open.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Penetration flow path(s) providing direct access from the containment atmosphere to the outside atmosphere may be unisolated under administrative control.

C. Incorrect. Only one door required to be closed. Plausible if candidate thinks both airlock doors must be closed.

D. Incorrect. Only one individual is required, although two are stationed at the Personnel Airlock Doors.

Technical Reference(s): Unit 2 Technical Specifications 3.9.4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0902723-01 (As available)

Question Source: Bank # 2098
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 2002

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 9
55.43 _____

Comments:

REFUELING OPERATIONS

3/4.9.4 CONTAINMENT BUILDING PENETRATIONS

LIMITING CONDITION FOR OPERATION

3.9.4 The containment building penetrations shall be in the following status:

a. The equipment door closed and held in place by a minimum of four bolts.

b. A minimum of one door in each airlock is closed.

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed by an isolation valve, blind flange, or manual valve, or

2. Be capable of being closed by an OPERABLE automatic containment isolation valve.

Note: Penetration flow path(s) providing direct access from the containment atmosphere to the outside atmosphere may be unisolated under administrative controls.

APPLICABILITY: During movement of recently irradiated fuel within the containment.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving movement of recently irradiated fuel in the containment building.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	010 A2.03	
	Importance Rating	4.1	

Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: PORV failures.

Proposed Question: Common 49

Given the following conditions:

- Unit 2 is at 35% power.
- All pressurizer heaters are "ON".
- Green lights for Pressurizer Spray valves PCV-1100E & F are illuminated.
- RCS pressure is 1880 psig and lowering slowly.
- Pressurizer tailpipe temperature is 220°F.
- RED and GREEN lights for Pressurizer PORV V-1474 are illuminated.
- PORV V-1474 (SE-02-03) control switch is in OVERRIDE.

Based upon current plant conditions, which ONE (1) of the following set of actions is required?

A. Close block valve V-1476 and verify temperature decrease on TIA-1110. Maintain power to V-1476.

B. Trip the reactor. Enter EOP-01, Standard Post Trip Actions, and close block valve V-1476.

C. Close block valve V-1476 verify temperature decrease on TIA-1110. Refer to 2-1-0120031, Excessive Reactor Coolant System Leakage.

D. Trip the reactor, initiate Safety Injection, and go to Enter EOP-01, Standard Post Trip Actions.

REVISION NO.:	PROCEDURE TITLE:	PAGE:
12B	PRESSURIZER RELIEF / SAFETY VALVE	5 of 8
PROCEDURE NO.: 2-0120036	ST. LUCIE UNIT 2	

7.0 OPERATOR ACTIONS

7.1 Immediate Operator Actions

1. None

7.2 Subsequent Operator Actions

INSTRUCTIONS	CONTINGENCY ACTIONS
1. RELIEF VALVE FAILURE OR LEAKAGE:	**1.**
A. Determine which PORV is open or leaking by observing acoustic flow monitors or PORV position indicating lights.	**A.** If it is NOT known which PORV is stuck open, Then immediately close both block valves (V-1476 and V-1477).
B. If a PORV has failed OPEN, Then place the control switch to OVERRIDE position and verify valve closure by:	**B.** If the relief valve does NOT close and pressurizer pressure is less than 2340 psia, Then immediately close the applicable block valve (V-1476 or V-1477).

Proposed Answer: B

Explanation (Optional):

A. Incorrect. This is a required action for a lower tailpipe temperature. Valve would be closed in an effort to stop the depressurization.
B. Correct
C. Incorrect. This is a required action for a lower tailpipe temperature.
D. Incorrect. Not below SI setpoint and would be required if the PORV could not be isolated.

Technical Reference(s): 2-ONP-0120036, PZR Relief/Safety Valve (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10
55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	063 A4.02	
	Importance Rating	2.8	

Ability to manually operate and/or monitor in the control room: Battery voltage indicator.

Proposed Question: Common 50

With 2A DC bus battery charger placed in the EQUALIZING mode, which of the following will occur?

A. Charger output voltage immediately rises to the equalize setting, battery voltage will slowly rise and amps will lower as the battery charges.

B. Charger output voltage remains the same, battery voltage will slowly rise and amps will lower as the battery charges.

C. Charger output voltage and battery voltage immediately rise to the equalize setting and amps lower as the battery charges.

D. Charger output voltage lowers to the equalize setting, battery voltage will slowly lower and amps will fall as the battery discharges.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Plausible if candidate does not recognize that the charger output must rise for the battery voltage to rise.

C. Incorrect. Plausible if candidate does not recognize that the battery must charge before voltage increases.

D. Incorrect. Plausible if candidate does not recognize significance of an equalizing charge.

Technical Reference(s): 0711503, 125 VDC (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702503-05 (As available)

Question Source:
Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content:
55.41 7
55.43 _____

Comments: From 0711503, 125 VDC; Page 11 of 85

Over time, the condition of the electrolyte and plates in the battery cells deteriorate which reduces battery capacity and overall battery performance. Applying a higher than

normal voltage to the battery reconditions the cells and forces each cell to reach their maximum idle potential. This is referred to as equalize charging.

The charger is placed in the equalize mode by manipulating the Equalizer Timer Switch. The Equalizer Timer Switch can select a time of up to 24 hours. When the switch is rotated to select a time, the equalize circuit is placed in service and the float circuit is removed. The Equalize Potentiometer provides a means of manually adjusting the set voltage which the charger control circuit will maintain. When the timer reaches zero, the Equalize Potentiometer input to the charger control circuit is automatically removed and the Float Potentiometer provides the voltage setting. Positioning the Equalizer Timer Switch in HOLD places the battery charger in the equalize mode indefinitely.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	062 A2.11	
	Importance Rating	3.7	

Ability to (a) predict the impacts of the following on the (SYSTEM) and (B) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: Aligning standby equipment with correct emergency power source (D/G).

Proposed Question: Common 51

Unit 2 was operating at 100% power when an electrical transient occurred.

Given the following events and conditions:

- All Intake Cooling Water (ICW) Pumps were running while swapping ICW pumps.
- 2AB buses were aligned to the 'B' Train.
- The 2B3 bus was deenergized and is now powered from the 2B Emergency Diesel.
- All other electrical buses remained energized.

Which ONE (1) of the following is a complete list of running ICW pumps and what action is required to restore equipment to its correct emergency power source?

A. 2A and 2C ICW pumps;
Remain in this alignment until bus 2AB is aligned to bus 2A2.

B. 2C ICW pump;
Start the 2A ICW pump and restore bus 2B3 to bus 2B2.

C. 2A and 2B ICW pumps;
Remain in this alignment until bus 2B3 is restored to bus 2B2.

D. 2A, 2B and 2C ICW pumps;
Align bus 2AB to the 'A' Train to minimize EDG loading.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. The 2C ICW pump would not be running. Plausible action if candidate thinks that the 2C ICW pump should be realigned to 'A' Train.

B. Incorrect. The 2C ICW pump would not be running. Plausible if candidate thinks that starting the 2A ICW pump would now support both trains of CCW and TCW.

C. Correct. The 2A ICW pump is powered from 2A3 bus and 2B ICW pump is powered from the 2B EDG. The current alignment is satisfactory.

D. Incorrect. The 2C ICW pump would not be running. Plausible if candidate does not recognize that the 2C ICW pump is aligned via the 2B3 bus. Aligning bus 2AB to 'A' Train is conceivable if candidate believes it is running.

Technical Reference(s): 0704201, Cooling Water Systems SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # 2387 Modified by changing Stem to convert to an A2 question.

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 4, 7

55.43 _____

Comments:
Unit 2 was operating at 100% power when an electrical transient occurred. Given the following events and conditions:

All ICW pumps were running while swapping ICW pumps.
The ICW pumps were in a normal electrical alignment.
The 2B3 bus was deenergized.
All other electrical buses remained energized

Which one of the following is a complete list of running ICW pumps?
2A ICW pump
2C ICW pump
2A and 2C ICW pumps
2A, 2B and 2C ICW pumps
Comments: From 0704201, Cooling Water Systems; page 27/28 of 92

Auto-Start Capability of the C ICW Pump
The power supply for the C ICW pumps is the AB 4160V swing bus. The word swing implies that the AB 4160V bus can be aligned to the A or B side safety related buses through key interlocked breakers. Normally the Unit 1 4160V AB bus is aligned to the "B" side 4160V safety related bus, while the Unit 2 4160V AB bus is aligned to the "A" side 4160 safety related bus. Reference Figure 19.
All Intake Cooling water pumps are equipped with "Pull-to-Lock" type control switches

located on RTGB 102 [202]. These switches enable the operator to maintain positive control over the combination of pumps that are designed to be in operation during normal and emergency conditions. The idle pump switch (normally the 'C' pump) is administratively kept in the "Pull-to-Lock" position. Whenever the 'C' pump is being used to replace the 'A' or 'B' pump, it must be aligned electrically to the power source of the pump it is replacing and the idle pump's control switch must be in the "Pull-to-Lock" position. If these two conditions are met, the 'C' pump will have automatic start capability in the event of a Loss of Offsite Power. If either of these two conditions are not met, the 'C' pump will not start automatically, but can be started manually. The reason for this interlock is to prevent two ICW pumps from being loaded on the same Emergency Diesel Generator in the event of a Loss of Offsite Power.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	008 A4.08	
	Importance Rating	3.1	

Ability to manually operate and/or monitor in the control room: CCW pump control switch.

Proposed Question: Common 52

The 2C Component Cooling Water Pump is aligned to automatically start on an SIAS.

For this to occur, the 2B CCW Pump is configured with its:

A. RTGB control switch in the "Pull-to-Lock" position.

B. Breaker in the "Racked Out" position.

C. Breaker DC control power fuses removed.

D. NORMAL/ISOLATE switch in the ISOLATE position.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Plausible if candidate thinks that the breakers interlock must be satisfied to start the 2C CCW Pump.

C. Incorrect. Plausible if candidate thinks that the DC control power fuses act as an interlock to start the 2C CCW Pump.

D. Incorrect. Plausible if candidate does not recognize that the position of the NORMAL/ISOLATE switch for the 2B CCW Pump does not impact the 2C pump.

Technical Reference(s): 0711209, CCW System SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702209-09 (As available)

Question Source: Bank # 4 Minor rearrangement of Stem to clean up distractors.

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7

55.43 _____

Comments: From 0711209, CCW System; Page 12 of 69

The CCW pumps can be operated from two locations:

- **NORMAL** operation by the respective control switch at the RTGB 106 [206] in the control room. The circuit NORMAL/ISOLATE switch, located at the 4160 VAC switchgear, is in the NORMAL position. Each pump control switch has five positions:

  - **START** which starts the pump
  - **STOP** which stops the pump
  - **PULL TO LOCK**
    The standby CCW pump (normally 'C') controls at RTGB 106 [206] is maintained in the **PULL TO LOCK** position. This configuration prevents the standby pump from AUTO starting for a SIAS and/or LOOP condition, thereby ensuring that only one CCW pump would be loaded to one EDG and preventing an overload condition. The time that a standby pump is not in PULL TO LOCK is minimized to the time just prior to starting it. The standby pump would be taken from PULL TO LOCK to AUTO GREEN FLAG for a very short time prior to starting the standby pump. Once the running pump is stopped, its control switch would be taken to PULL TO LOCK.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	076 K4.03	
	Importance Rating	2.9	

Knowledge of (SYSTEM) design feature(s) and or interlock(s) which provide for the following: Automatic opening features associated with SWS isolation valves to CCW heat exchangers.

Proposed Question: Common 53

The 1A & 1B CCW Heat Exchanger Outlet Valves (TCV-14-4A & 4B) are normally set to automatically maintain the _____ temperature at ____°F.

A. CCW Heat Exchanger CCW outlet; 115.

B. CCW Heat Exchanger Intake Cooling Water outlet; 115.

C. CCW Heat Exchanger Intake Cooling Water outlet; 100.

D. CCW Heat Exchanger CCW outlet; 100.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Partially correct as the temperature element is on the CCW side of the CCW HX outlet piping. Plausible if candidate thinks that a higher temperature is maintained.

B. Incorrect. TCV maintains 100°F and sensing is on the CCW outlet piping. Plausible if candidate thinks that the ICW TCV senses ICW outlet at a higher temperature.

C. Incorrect. Partially correct as 100°F is maintained, however, sensing is on the CCW outlet piping. Plausible if candidate thinks that the ICW TCV senses ICW temperature.

D. Correct. The temperature element is on the CCW side of the CCW HX outlet piping.

Technical Reference(s): 1-NOP-21.12, ICW System Alignment; Appendix A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 4, 7
55.43 _____

Comments:

REVISION NO.: 1	PROCEDURE TITLE: INTAKE COOLING WATER SYSTEM INITIAL ALIGNMENT	PAGE: 15 of 22
PROCEDURE NO.: 1-NOP-21.12	ST. LUCIE UNIT 1	

APPENDIX A
INITIAL VALVE ALIGNMENT
(Page 9 of 15)

COMPONENT ID	COMPONENT NAME	LOCATION	POSITION	PERF INITIAL	DATE / TIME	IV INITIAL	DATE / TIME
1B ICW SIDE IN TGB 39' elevation							
SB212003	1B CBHX ICW INLET ISOL	TGB/42/S-5/W-G	OPEN			N/A	N/A
SH212004	PI-21-30B ROOT	TGB/44/S-5/W-G	OPEN			N/A	N/A
SH212014	1B OBHX INLET HEAD DRAIN	TGB/41/S-5/W-G	CLOSED			N/A	N/A
SH212005	1B OBHX OUTLET HEAD VENT	TGB/46/S-5/W-G	CLOSED			N/A	N/A
SH212010	1B OBHX OUTLET HEAD DRAIN	TGB/41/S-5/W-D	CLOSED			N/A	N/A
SH212007	PI-21-31B ISOL	TGB/44/S-5/W-D	OPEN			N/A	N/A
CCW PLATFORM (1A ICW SIDE)							
SB21190	ICW TO CCW HX A/B CROSS-TIE ISOL	CCW/21/N-984/E-1728	LOCKED CLOSED				
TCV-14-4A	1A CCW HX OUTLET (set at 100 degrees)	CCW/15/N-995/E-1726	AUTO				
SB21192	1A CCW HX INLET ISOL	CCW/21/N-1001/E-1725	LOCKED OPEN				
SH21197	1A CCW HX TUBE SIDE INLET HEAD VENT	CCW/33/N-1003/E-1721	CLOSED				

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	103 K4.06	
	Importance Rating	3.1	

Knowledge of (SYSTEM) design feature(s) and or interlock(s) which provide for the following: Containment isolation system.

Proposed Question: Common 54

Assume a Large Break LOCA raises containment pressure to 11 psig.

Compare the automatic response of the Main Steam Isolation Valves (MSIVs) for this LOCA on Unit 1 to that on Unit 2.

On Unit 1, the MSIVs _____; On Unit 2, the MSIVs _____.

A. close; close

B. close, remain open

C. remain open; close

D. remain open; remain open

Proposed Answer: C

Explanation (Optional):

A. Incorrect. No MSIS on Containment pressure. Plausible if candidate thinks that the Unit 1 MSIVs go closed.

B. Incorrect. Unit 2 has closure on MSIS, Unit 1 does not. Plausible if candidate thinks that the Unit 2 MSIVs stay open.

C. Correct.

D. Incorrect.Unit 2 has closure on MSIS. Plausible if candidate thinks that the Unit 2 MSIVs stay open.

Technical Reference(s): 0711304, Main Steam System SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702824-11 (As available)

Question Source: Bank # 1008
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 9
55.43 _____

Comments: From 0711304, Main Steam System; Page 21 of 81

0711304, Rev. 16
Page 21 of 81
FOR TRAINING USE ONLY

- [On Unit 2, since the MSIVs do not have an outlet check valve as part of their design, the MSIV must close in response to a steam pipe rupture in containment. Therefore, containment pressure has been added as another input to the MSIS signal for Unit 2. An MSIS is initiated either by a containment pressure of 3.5 psig or a S/G pressure less than 600 psia.]

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	005 K5.09	
	Importance Rating	3.2	

Knowledge of the operational concepts as they apply to the RHRS: Dilution and Boration considerations

Proposed Question: Common 55

Given the following conditions:

- Unit 2 is in Mode 6. Fuel is in the reactor vessel.
- Shutdown Cooling loop 'A' is in service using Low Pressure Safety Injection Pump 2A.
- 23.5 feet of water above the reactor vessel flange.
- It is desired to stop Shutdown Cooling for approximately 30 minutes to move lighting and equipment in the refueling cavity
- No Core Alterations or movement of Irradiated Fuel Assemblies are in progress.

Which ONE (1) of the following correctly describes the requirement associated with this evolution?

A. The RCS must be less than 100°F.

B. Immediately close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.

C. Activities involving reduction of RCS boron concentration are not permitted.

D. Cavity level must be raised to greater than 25 feet above the reactor vessel flange.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Mode 6 requires temperature < 140

B. Incorrect. Actions are for radiation monitor indications increasing

C. Correct. With no RHR loop in operation, dilution or reduction in boron concentration is not allowed.

D. Incorrect. Cavity level >23 feet if <2 RHR loops are operable

Technical Reference(s): TS 3.9.8.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source:
- Bank # X
- Modified Bank # _____ (Note changes or attach parent)
- New _____

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge X
- Comprehension or Analysis _____

10 CFR Part 55 Content:
- 55.41 _____
- 55.43 2

Comments:
WTSI Bank

REFUELING OPERATIONS

3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

HIGH WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.1 At least one shutdown cooling loop shall be OPERABLE and in operation.*

APPLICABILITY: MODE 6 when the water level above the top of the reactor pressure vessel flange is greater than or equal to 23 feet.

ACTION:

With no shutdown cooling loop OPERABLE and in operation, suspend all operations involving an increase in reactor decay heat load or operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of Technical Specification 3.9.1 and within 1 hour initiate corrective action to return the required shutdown cooling loop to OPERABLE and operating status as soon as possible. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

SURVEILLANCE REQUIREMENTS

4.9.8.1 At least once per 12 hours:

a. At least one shutdown cooling loop shall be verified to be in operation

b. The total flow rate of reactor coolant to the reactor pressure vessel shall be verified to be greater than or equal to 3000 gpm.**

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	011 K2.02	
	Importance Rating	3.1	

Knowledge of electrical power supplies to the following: PZR heaters.

Proposed Question: Common 56

Unit 2 has experienced an inadvertent Train A SIAS. The RCO can energize the "A" side backup heaters by resetting the SIAS signal and:

A. resetting the 480 VAC breakers and reenergizing the "A"side backup heaters.

B. closing the "A" side 4160VAC feeder breaker to the pressurizer heater bus, resetting the 480 V breakers, and reenergizing the "A" side backup heaters.

C. placing the backup interlock bypass keyswitch to the pressure/level position, resetting the 480VAC breakers and reenergizing the "A" side backup heaters.

D. placing the backup interlock bypass keyswitch to the pressure position, closing the "A" side 4160VAC feeder breaker and placing the "A" side backup heaters control switch in ON.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Plausible if candidate does not recognize that SIAS opens the 4160V feeder.
B. Correct.
C. Incorrect. Plausible if candidate recognizes this action for a loss of a level instrument per the ONP.
D. Incorrect. Plausible in candidate recognizes this action instrument failure per the ONP, however, inadequate actions to get the breaker to close.

Technical Reference(s): 0711206, PZR Pressure and Level Control (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702206-13 (As available)

Question Source: Bank # 245
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 7
55.43 _____

Comments: From 0711206, PZR Pressure and Level Control; Page 17 of 135

SCENARIO 2: Loss of off-site power: NO repositioning of HS-124 is necessary.

Result: Both 4160V feeder breakers and all eight 480V contactors open.
D/Gs start and carry emergency loads on 2A3 and 2B3 4160 VAC buses.

Recovery: When Pressurizer level >27%, close 'A' and 'B' 4160V breakers,
Reset 480V heaters on RTGB-203 to restore backup heaters B1 and B4.
{All other Unit 2 heaters are interlocked out (for DG loading concerns) by 3 to 2 4160 VAC bus tie breaker open interlock.}

NOTE: Pressurizer pressure controllers fail high on a loss of power. Their normal power supply is non-essential.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	015 A3.04	
	Importance Rating	3.3	

Ability to monitor automatic operations of the Nuclear Instrumentation including: Maximum disagreement allowed between channels.

Proposed Question: Common 57

In preparation for conducting a Nuclear and Delta T Power Calibration in accordance with 2-OSP-69.01, a 10 minute average was recorded for DCS Calorimetric Power = 99.8%.

The following were the recorded Reactor Protection System values:

RTGB (Q Power)	Delta T Power	Nuclear (NI) Power
Channel A = 99.7%	Channel A = 99.6%	Channel A = 99.7%
Channel B = 99.7%	Channel B = 99.7%	Channel B = 99.3%
Channel C = 99.7%	Channel C = 99.7%	Channel C = 99.4%
Channel D = 99.9%	Channel D = 99.9%	Channel D = 99.6%

Based on the above values, first adjust:

A. RTGB Channel A to agree with DCS Calorimetric.

B. Channel A Nuclear to agree with Channel A Delta T.

C. Channel A Delta T to agree with DCS Calorimetric.

D. RTGB Channel A to agree with Channel A Delta T.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. DCS Calorimetric is the plant reference calorimetric value. ΔT Power is 1st adjusted to match it, and then NI Power is adjusted to match ΔT Power. Plausible if candidate does not recognize that DCS and ΔT do not match.

B. Incorrect. ΔT Power is 1st adjusted to match it, then NI Power is adjusted to match Delta T Power. Plausible if candidate does not recognize that DCS and ΔT do not match.

C. Correct. This action is required to correctly obtain the actual power level.

D. Incorrect. Q Power from the RTGB is the auctioneered higher of NI and Delta T Power for that channel. Plausible if candidate does not recognize that DCS and ΔT do not match.

Technical Reference(s): 2-OSP-69.01, Nuclear and Delta T Power Calibration (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702403-08 (As available)

Question Source: Bank # _____
Modified Bank # _____
New X

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 6, 10
55.43 _____

Comments:

REVISION NO.: 8	PROCEDURE TITLE: NUCLEAR AND DELTA T POWER CALIBRATION	PAGE: 5 of 22
PROCEDURE NO.: 2-OSP-69.01	ST. LUCIE UNIT 2	

7.0 INSTRUCTIONS INITIAL

7.1 Nuclear and Delta T Power Calibration

1. Calculation of Calorimetric Power

NOTE

- After the LEFM is selected for the DCS Calorimetric Power Calculation, indicated calorimetric power may decrease several percent due to feedwater venturi fouling.
- Use of the DCS calorimetric power 10 minute average or 2 minute average is acceptable for the nuclear and delta T power calibration.

A. If LEFM is NOT selected for use in the DCS Calorimetric Power Calculation, Then CONSIDER selecting the LEFM input in accordance with 2-NOP-09.06, Leading Edge Meter Operation and Distributed Control System Input.

B. REQUEST T_{cold} from ERDADS Cold Leg Temperature display (screen number CLT) and RECORD T_{cold} _____°F.

C. DEMAND a DCS calorimetric and RECORD the value of reactor power. (Use Point 10 min-avg or 2 min-avg) _____%

D. CALCULATE primary system power in accordance with OP 2-3200020 and RECORD the value of reactor power. _____%

NOTE

For this procedure use DCS power as the Plant Reference Calorimetric Power value unless there is a 2% Power deviation between the DCS and manual calorimetric values. In which case use the higher value as the Plant Reference Calorimetric Power value.

E. If the power values recorded in Step 7.1.1.C and 7.1.1.D are different by more than 2% power, Then PERFORM the following:

1. RECORD the higher value as the Plant Reference Calorimetric Power value. _____%

2. NOTIFY I&C to perform monthly calibration while continuing with this procedure. _____

REVISION NO.: 8	PROCEDURE TITLE: NUCLEAR AND DELTA T POWER CALIBRATION	PAGE: 6 of 22
PROCEDURE NO.: 2-OSP-69.01	ST. LUCIE UNIT 2	

7.1 Nuclear and Delta T Power Calibration (continued) INITIAL

NOTE
Near End of Cycle (EOC), a noticeable difference may exist between RPS NI power range channels A, B, C and D, and RRS power range channels 9 and 10. If the difference is greater than or equal to 2%, correction will be made during I&C monthly surveillance.

2. Channel A Reactor Protection System

A. PLACE the Meter Input Switch to the DELTA T PWR Position.

B. RECORD the following values:

- Plant Reference Calorimetric Power Value _____
- DVM Delta T Power (%) Channel A _____
- RPSCIP Nuclear Power-Delta T Power Channel A _____

C. PLACE the Meter Input Switch to the NUCLEAR PWR Position.

D. RECORD the following values:

- DVM Nuclear Power (%) Channel A _____
- Q Power (%) JI-003A Channel A _____

Acceptance Criteria: Delta T Power Signal agrees with Calculated Calorimetric Power

E. Delta T Power and Calorimetric Power agree, no adjustment is required. _____

OR

Delta T Power and Calorimetric Power do NOT agree, adjustment is required in accordance with Appendix A.

Acceptance Criteria: Nuclear Power and Delta T Power are nulled

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	016 K5.01	
	Importance Rating	2.7	

Knowledge of the operational implications of the following concepts as they apply to the Non-Nuclear Instrumentation: Separation of control and protection circuits.

Proposed Question: Common 58

The function of the Unit 1 RPS Power Ratio Calculator is to:

A. provide power signals to the Core Protection Calculator (CPC) for calculating PDIL Setpoints.

B. receive power signals from Wide Range Log safety channels and calculate the (+) and
(-) limits shown on the RTGB-104 Axial Power Ratio recorder.

C. receive power signals from NI Control Channels 9 and 10 to calculate the (+) and (-) limits shown on the RTGB-104 Power Ratio recorder.

D. receive power signals from NI Control Channels 9 and 10 to calculate the Axial Shape Index displayed on the RTGB-104 Axial Power Ratio recorder.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Does provide PDIL data, however, the power signal is from the control channels. Plausible if candidate thinks the calculator generates the power signals.
B. Incorrect. This records axial power on both units. Plausible if candidate thinks the wide range channels are used.
C. Incorrect. Power ratio calculator only uses these signals, they are generated from the power range safety channels. Plausible if candidate thinks these signals are generated from the control channels.
D. Correct.

Technical Reference(s): 0711404, RPS SD (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702404-04 (As available)

Question Source: Bank # 523
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 6
55.43 _____

Comments: From 0711404, RPS SD; Page 26 of 98

Power Ratio Calculator (PRC)

The power ratio calculator provides three [two] functions:

1. HI and HI-HI channel deviation alarms setpoints calculation (Unit 1 Only)
2. Selection of the $Q_{CEAPDS\ [ADS]}$ signal from the maximum of four Q_{pwr} CPC developed inputs for PPDIL & PDIL
3. The power ratio signal calculation to PRC recorder red blue, and green pens on RTGB104[204]

The power ratio calculator is located in the rear of RPS cabinet D. Input signals to the calculator are supplied from the following sources: (Refer to Figure 21.)

- the comparator averager (Unit 1)
- CPC-2 (Q_{pwr}) Channels A-D via isolation assemblies
- the two Linear Power Range Control Channels (nuclear power and axial flux imbalance).

The comparator averager (Unit 1 only) is located in the rear of RPS cabinet A and generates the "Grand Average" power signal. To generate the Grand Average, the

comparator averager receives four inputs one from each of the Linear Power Range Safety Channels which is the sum of the upper and lower subchannels. The Grand Average is then compared against both the output of each safety channel NI and the PRC. The PRC program will then set the Hi and HI-Hi deviation setpoints. Finally the Hi and HI-Hi setpoints are compared against the channel to average deviation to determine if alarms are required. Indication of deviation is alarmed on annunciator (L-20 Reactor Power Range Subchannel Deviation) and also indicated on the RPS cabinets via red alarm lites. An alarm reset push-button is provided on each RPS channel. These alarms would be used as indications of azimuthal flux tilt or channel failure.

If any one channel is out of service, its input can be bypassed using a channel disconnect switch located on the front of the comparator averager panel.

Four Q_{power} signals from each channel's CPC-2 are fed into an auctioneering circuit which then sends the highest of these signals as $Q_{CEAPDS\ [ADS]}$ to the CEAPDS display unit [Analog Display System]. The $Q_{CEAPDS\ [ADS]}$ signal is used in the determination of the power dependent insertion limit (PDIL).

The power ratio signal (ASI) is defined as (L-U)/(L+U). The ASI calculator uses signals from NI channels 9 and 10, with the IN-OUT switch in the IN position, to determine the average ASI. If one channel is out of service, the IN-OUT switch is placed in OUT and the remaining channel is then used for determining the ASI. The highest of the four signals from CPC-2 is used in the calculation of the positive and negative ASI deviation limits (PR_N and PR_P) which are based on the magnitude of the Q_{PWR} input signal. The three output signals (ASI blue pen , PR_N Green pen , and PR_P red pen) are recorded on a three pen recorder on RTGB 104 [204]. They are also sent to a comparator that will actuate an alarm if ASI goes outside the band.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	056 GG2.2.25	
	Importance Rating	2.5	

Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.

Proposed Question: Common 59

Which of the following describes the basis for the size difference between the Unit 1and Unit 2 Condensate Storage Tanks (CST)?

Unit 2 CST volume:

A. was designed to supply a specified amount of makeup to Unit 1 in the event of total loss of AC power to Unit 1.

B. was designed to supply a specified amount of makeup to Unit 1 in the event of damage to Unit 1 CST.

C. is analyzed for a 8 hour HOT STANDBY period following a Loss of Offsite Power, Unit 1 is analyzed for a 4 hour period.

D. is analyzed for a cooldown to Shutdown Cooling entry conditions following a period of HOT STANDBY, Unit 1 is analyzed for HOT STANDBY only.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Wrong reason for the amount of makeup.
B. Correct.
C. Incorrect. Unit 1 is analyzed for 8 hours
D. Incorrect. Both are analyzed for a cooldown.

Technical Reference(s): Unit 2 Tech Spec Bases: 3/4.7.1.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 1942
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 4
55.43 _____

Comments:

SECTION NO.: 3/4.7	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 9 OF ADM-25.04 PLANT SYSTEMS ST. LUCIE UNIT 2	PAGE: 5 of 11
REVISION NO.: 2		

3/4.7 PLANT SYSTEMS (continued)

BASES (continued)

3/4.7.1 TURBINE CYCLE (continued)

3/4.7.1.3 CONDENSATE STORAGE TANKS

The OPERABILITY of the condensate storage tank with the minimum water volume ensures that sufficient water is available to maintain the Unit 2 RCS at HOT STANDBY conditions for 4 hours followed by an orderly cooldown to the shutdown cooling entry temperature (350°F). The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

The actual water requirements are 149,600 gallons for Unit 2 and 125,000 gallons for Unit 1. Included in the required volumes of water are the tank unusable volume of 9400 gallons and a conservative allowance for instrument error of 21,400 gallons.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	027 A2.01	
	Importance Rating	3.0	

Ability to (a) predict the impacts of the following on the Containment Iodine Removal System and (b) based on those predictions, use procedure to correct, control, or mitigate the consequences of those abnormal operation: High temperature in the filter system.

Proposed Question: Common 60

Unit 1 was shutdown for two months following a design-basis LOCA inside Containment. Given the following events and conditions:

- The atmosphere inside containment was heavily contaminated.
- The containment Iodine removal system has been in continuous operation for one month to clean up the containment atmosphere in preparation for reentry.
- Iodine Removal System fan HVE-1 had been shutdown for 1 hour while Chemistry prepared to replace the charcoal filter.
- A high temperature alarm occurred on the charcoal filter/adsorber section for Iodine Removal System fan HVE-1.

Which ONE (1) of the following statements correctly describes the problem and the actions to be taken?

A. The high temperature alarm was caused by Iodine loading of the charcoal filter. Start HVE-1 to clear the alarm and replace the charcoal filter after sampling by Chemistry.

B. The high temperature alarm was caused by Iodine loading of the filter. Start HVE-1 and bypass the charcoal filter train until Chemistry can replace the charcoal filter.

C. The high temperature alarm was caused by no airflow through the charcoal filter. This is an expected alarm when HVE-1 is not running. No action is required.

D. The high temperature alarm was caused by a smoldering fire in the charcoal filter. Do not start HVE-1 or the fire will be accelerated.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. The charcoal filter cannot be bypassed. Plausible if candidate recognizes the high temp alarm is caused by iodine loading.

C. Incorrect. This is not an expected alarm and action is required to clear the alarm. Plausible: Plausible if candidate recognizes the alarm was caused by a lack of airflow.

D. Incorrect. There is no reason to expect that a fire has occurred. There is no ignition source and the alarm actuates at 200°F - far less than the ignition temperature of charcoal.

Technical Reference(s): 711602, Containment & Shield Bldg Ventilation; pages 29-30 (Attach if not previously provided)
1-NOP-25.05, Note at 6.2.6

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702602-20 (As available)

Question Source: Bank # 2392
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 4, 5

Comments: From 711602, Containment & Shield Bldg Ventilation; Pages 29-30

REVISION NO.:	PROCEDURE TITLE:	PAGE:
0A	CONTAINMENT VENTILATION SYSTEMS	7 of 10
PROCEDURE NO.: 1-NOP-25.05	ST. LUCIE UNIT 1	

6.2 Airborne Radioactivity Removal System Startup — INITIAL

1. ENSURE Section 3.0, Prerequisites, completed. _____
2. REVIEW Section 4.0, Precautions / Limitations. _____
3. OBTAIN approval of the SM / US to start the fans. _____
4. START HVE-1, Airborne Activity Removal Fan. _____
5. START HVE-2, Airborne Activity Removal Fan. _____

NOTE

- High charcoal temperatures are postulated to occur only as a result of restricted air flow rates less than 55 cfm.
- Iodine desorption occurs at approximately 300°F and charcoal ignition approximately 640°F.

6. MONITOR the following on TR-25-2:
   - Point 1, HVE-1 Charcoal Adsorber (TE-25-9) _____
   - Point 2, HVE-2 Charcoal Adsorber (TE-25-10) _____

END OF SECTION 6.2

DETAILED DESCRIPTION

Airborne Radiation Removal units, HVE-1 and HVE-2, are belt driven vane-axial type, and rated for 10,000 cfm at 6" WC. HVE-1 and HVE-2 are powered from 480 VAC MCC 1A5 and1B5, and are controlled with STOP-START switches from RTGB 106. A flow switch in the discharge of each fan provides a fan low flow alarm on RTGB 106, **at 2500 cfm.**

Normal use HEPA filters are constructed with aluminum separators. Due to hydrogen generation concerns, each HEPA filter used in containment is fabricated from glass media pleated over composition-asbestos separators. Factory tests ensure the filter meets a minimum efficiency of 99.97% when tested with 0.3 micron dioctylphalate (DOP) smoke. Periodic in-place leak testing is performed to assure filter integrity. A differential pressure detector senses the pressure drop across this filter bank and provides a HEPA filter high differential pressure alarm on RTGB-106, **at 3.0" WC ?P.**

The tray-type charcoal adsorbers are filled with iodine-impregnated charcoal. Iodine-impregnated charcoal is capable of removing 99.9% minimum of iodine with **5%** in the form of methyl iodide (CH_3I), when operating at 70% relative humidity and **150** degrees F. A thermocouple senses the temperature of the charcoal adsorber and provides indication on RTGB 106 through a temperature recorder. A high charcoal temperature alarm on RTGB 106, actuates **at 200°F.**

SYSTEM OPERATION

1-NOP-25.05, "Containment Ventilation Systems", provides instruction for system operation. Prerequisites include:

- Align the system per 1-NOP-25.03, "Ventilation Systems Initial Alignment"
- Containment fan coolers are operating
- Containment ambient air temperature is <120°F.

Applicable notes include:

- High charcoal temperature is postulated to occur only if air flow is <55 cfm
- Iodine desorption occurs at ~300°F
- Charcoal ignition occurs at ~640°F.

The containment airborne radioactivity removal fans will normally be operated as directed by the Chemistry Department. During operation the charcoal adsorber temperature and HEPA filter differential pressure should be closely monitored on RTGB 106. If a high temperature alarm is received on the charcoal adsorber of the non-operating fan, the fan should be started immediately and preparations made for replacement of the charcoal adsorber. While the fan(s) are running, containment iodine should be sampled to determine if iodine buildup is of sufficient magnitude to cause heat buildup.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	034 A1.02	
	Importance Rating	2.9	

Ability to predict and/or monitor changes in parameters associated with operating the Fuel Handling Equipment controls including: Water level in the refueling canal.

Proposed Question: Common 61

Unit 1 has been in a refueling outage for 14 days, with a total core offload in progress.

Which of the following requires immediate suspension of refueling operations?

A. Loss of two of the four operable Wide Range neutron flux monitors.

B. A Containment electrical penetration is removed for repairs under administrative controls.

C. Refueling cavity level is 22 feet above the top of fuel assemblies that are seated in the reactor.

D. Refueling cavity level is 22 feet above the top of the reactor flange.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Unit 1 uses the Wide Range channels for monitoring, however, the Tech Spec is met.

B. Incorrect. Reason this can be performed is because we are not in the recently irradiated fuel (72 hours is recently irradiated). Allowed per Tech Specs as long as Admin controls are in place.

C. Correct. This is correct for Unit 1 only.

D. Incorrect. This is correct for Unit 2 only.

Technical Reference(s): Unit 1 Tech Spec 3.9.10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____

Modified Bank # 2079 Changed outage time and replaced Distractors A & B.

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 9, 10

55.43 _____

Comments:
Unit 1 has been in a refueling outage for 12 days, with a total core offload in progress.
Which of the following requires immediate suspension of refueling operations?

Spent fuel pool temperature is reported to be 125°F.

One of the two running spent fuel pool pumps is temporarily stopped for electrical train swap.

Refueling canal level is 22 feet above the top of fuel assemblies that are seated in the reactor.

Refueling canal level is 22 feet above the top of the reactor flange.

REFUELING OPERATIONS

WATER LEVEL – REACTOR VESSEL

LIMITING CONDITION FOR OPERATION

3.9.10 At least 23 feet of water shall be maintained over the top of irradiated fuel assemblies seated within the reactor pressure vessel.

APPLICABILITY: During CORE ALTERATIONS.
During movement of irradiated fuel assemblies within containment.

ACTION:

With the requirements of the above specifications not satisfied, immediately suspend CORE ALTERATIONS and movement of irradiated fuel assemblies within containment, and immediately initiate action to restore refueling cavity water level to within limits.

SURVEILLANCE REQUIREMENTS

4.9.10 The water level shall be determined to be at least its minimum required depth within 2 hours prior to the start of and at least once per 24 hours thereafter during CORE ALTERATIONS and during movement of irradiated fuel assemblies within containment.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	041.K4.17	
	Importance Rating	3.7	

Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following: Reactor trip

Proposed Question: Common 62

Given the following conditions:

- Unit 2 is operating at 45% power.
- The SBCS Valve Permissive switch is in MANUAL.
- SBCS Valve Controllers are in AUTO.
- A reactor trip occurs.

Which ONE (1) of the following describes the SBCS response?

A. SBCS Valves Quick Open.

B. SBCS Valves Modulate Open.

C. SBCS Valves remain closed. Atmospheric Dump Valves must be manually opened.

D. SBCS Valves remain closed. Atmospheric Dump Valves will throttle open automatically.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Quick Open will only occur at higher Tave associated with higher power levels.

B. Correct. At 45% power, Tavg will be low enough that the Quick Open feature of SBCS will not actuate on a trip

C. Incorrect. With permissive in manual, valves will still operate in auto. ADVs would be manually throttled if required

D. Incorrect. ADVs can throttle in Auto, but they are operated manually. Also, SBCS is available on a trip with Permissive in manual

Technical Reference(s): OSP for SBCS functional diagram (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702406-02 (As available)

Question Source:
- Bank # _____
- Modified Bank # _____ (Note changes or attach parent)
- New X

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	055 K3.01	
	Importance Rating	2.5	

Knowledge of the effect that a loss or malfunction of the Condenser Air Removal will have on the following: Main condenser.

Proposed Question: Common 63

Unit 1 is at in HOT STANDBY with a vacuum in the Condenser. The Condensate recirc regulator, FCV 12-1, goes full closed.

If FCV 12-1 remained closed, which of the following statements describes the plant response?

A. The running condensate pump will trip on low flow.

B. Degrading condenser vacuum due to loss of condensate flow through the air ejector condenser.

C. Degrading condenser vacuum due to loss of exhaust hood sprays.

D. Water hammer in the MSR reheater drains piping due to loss of quench water.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Condensate Pumps have no low flow trip, feedwater and heater drains pumps have low flow trips.
B. Correct.
C. Incorrect. Exhaust hood sprays still available in this condition.
D. Incorrect.Quench water supplied from feedwater, not condensate.

Technical Reference(s): 0711301, Condensate, Feedwater, Heater Vent and Drains (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 1921
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 4
55.43 _____

Comments: From 0711301, Condensate, Feedwater, Heater Vent and Drains; Page 14 of 108

SJAE/GS Condenser Cooling

FCV-12-1, Condensate Header Recirc to Condenser, maintains condensate flow through the SJAE and gland steam condensers for proper operation during low flow conditions in the condensate system.

A local control station controls air operated, FAIL CLOSED, valve FCV-12-1:

- Locally opened prior to starting a Condensate pump.
- The recirculation valve automatically maintains setpoint to maintain condensate header flow ≥ 8000 [10000] gpm.
- A control room alarm is received if condensate header flow is ≤ 8000 gpm.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	079 K1.01	
	Importance Rating	3.0	

Knowledge of the physical connections and/or cause-effect relationships between Station Air System and the following: IAS

Proposed Question: Common 64

Due to a loss of instrument air, Unit 2 Instrument Air System has been cross-tied with the Station Air System.

In accordance with the Loss of Instrument Air ONP, what actions must be taken within 1 hour?

A. Perform a controlled downpower and take the Unit off the line.

B. Install a diesel driven air compressor to augment the Station Air supply.

C. Blow down the Instrument Air header drains to remove oil, water, and crud build-up.

D. Isolate the Station Air cross-tie and open the Unit 1 cross-tie to the Unit 2 Instrument Air System.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Not necessary, the Station Air System can supply Instrument Air.
B. Incorrect. Not necessary, the Station Air System can supply Instrument Air.
C. Correct.
D. Incorrect.Unit 1 cross-tie opens automatically when Instrument Air pressure is decreasing.

Technical Reference(s): ONP 2-1010030, Loss of Instrument Air (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702860-8 (As available)

Question Source:
Bank # 1767
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content:
55.41 10
55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
21	LOSS OF INSTRUMENT AIR	6 of 18
PROCEDURE NO.: 2-1010030	ST. LUCIE UNIT 2	

7.1 Immediate Operator Actions (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE
The automatic cross-tie feature of the Instrument Air System occurs at approximately 85 psig lowering on the affected unit. The cross-tie valve on Unit 1 will close if EITHER of the following conditions occur:
- The Unit 1 Instrument Air header pressure lowers below 85 psig.
- The Unit 2 Instrument Air header pressure rises above 95 psig.

3.	If Instrument Air header pressure is lowering, Then VERIFY the standby instrument air compressor (2C or 2D) has started.	**3.**	If the standby instrument air compressor (2C or 2D) has NOT started, Then manually START the standby instrument air compressor (2C or 2D).

NOTE
The time period that the Service Air header feeds the Instrument Air header through the cross-tie should be minimized to prevent oil intrusion into the Instrument Air header.

4. If the Instrument Air header pressure is still lowering, Then PERFORM the following:

A. ENSURE the Service Air Compressor is running.

B. OPEN SH18718, Service Air Cross-tie to Instrument Air Isol.

C. If the Instrument Air header is fed from the Service Air header for greater than 1 hour, Then BLOW DOWN the Instrument Air header low point drains hourly to remove oil, water and crud build-up.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	001 K6.14	
	Importance Rating	4.0	

Knowledge of the effect that a loss or malfunction of the following will have on the Control Rod Drive: Location and interpretation of reactor trip breaker.

Proposed Question: Common 65

Which of the following would result upon loss of 120V Vital AC instrument bus MA?

A. 2 TCBs open, no reactor trip.

B. 2 TCBs open, reactor trips.

C. 4 TCBs open, no reactor trip.

D. 4 TCBs open, reactor trips.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible if candidate thinks loss of K relay only
B. Incorrect. Plausible if candidate thinks and don't understand the parallel paths to the CEDM
C. Correct.
D. Incorrect. Always lose 2 of the logic matrix relays for this configuration. Plausible if candidate thinks

Technical Reference(s): 2-ONP-0970030, 120 VAC Instrument Bus (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702503-05 (As available)

Question Source: Bank # 798

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 6

55.43 _____

Comments:

REVISION NO.: 14B	PROCEDURE TITLE: 120V INSTRUMENT AC SYSTEM (CLASS 1E) / QSPDS ST. LUCIE UNIT 2	PAGE: 4 of 20
PROCEDURE NO.: 2-0970030		

5.0 ENTRY CONDITIONS

5.1 Plant conditions indicate loss of instrument bus or its associated inverter has occurred. One or more of the following may be present:

1. Annunciators A-43, B-43, A-53, or B-53, 120V AC Inst. Bus Inverter Trouble.
2. Loss of power to either MA, MB, MC or MD RPS cabinets along with automatic trip of four TCBs.
3. Loss of power to MA, MB, MC or MD ESFAS cabinet.
4. Loss of power to MA, MB, MC or MD safety related measurement instrumentation of RTGBs.
5. Loss of QSPDS Liquid Plasma Display on RTGB-203 and 204.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.20	
	Importance Rating	4.3	

Ability to execute procedure steps.

Proposed Question: Common 66

Each choice below contains a procedure step in 1-NOP-03.06, Filling and Draining the RCS and Refueling Cavity Using LPSI, dealing with HCV-3615, LPSI Header To Loop 1A2 Valve using a different action verb. Each choice also provides the status of the valve and an action to be done when the step is encountered.

Which choice correctly identifies proper procedural compliance?

NOTE: The handswitch for HCV-3615 is a spring-return to mid-position switch.

A. VERIFY HCV-3615, LPSI Header To Loop 1A2, OPEN.
HCV-3615 indicates CLOSED.
The RCO should manually open HCV-3615 using the handswitch.

B. THROTTLE OPEN HCV-3615, LPSI Header To Loop 1A2.
HCV-3615 indicates OPEN.
The RCO should place the HCV-3615 handswitch to OPEN then release it.

C. ENSURE HCV-3615, LPSI Header To Loop 1A2, OPEN.
HCV-3615 indicates CLOSED.
The RCO should manually open HCV-3615 using the handswitch.

D. CHECK HCV-3615, LPSI Header To Loop 1A2, OPEN.
HCV-3615 indicates OPEN.
The RCO should place the HCV-3615 handswitch to OPEN then release it.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Verify is to observe an expected condition or characteristic. Does not imply additional operation action beyond observation unless in the EOPs or ONPs.

B. Incorrect. Throttle is to operate a valve in an intermediate position to obtain a certain flowrate, however, the valve already indicates open.

C. Correct. To make sure or certain; if an action that should have occurred has not occurred, perform the action.

D. Incorrect. To perform a comparison without the status; to observe a characteristic or condition that is unknown; or to note a condition and compare it with some procedural requirement.

Technical Reference(s): ADM-11.01, Standardized Terminology (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702802-06 (As available)

Question Source: Bank # 2579 Modified Stem to be NOP vice EOP.

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 10

55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
9Y	STANDARDIZED TERMINOLOGY	52 of 68
PROCEDURE NO.: ADM-11.01	ST. LUCIE PLANT	

TABLE 2
ACTION VERB & KEYWORD DEFINITIONS
(Page 7 of 20)

DRAIN	To draw flow off a liquid. [DRAIN the oil from the motor.]
DRAW	To cause to come out of a container, to extract. [DRAW a sample from the barrel.]
ENERGIZE	To supply electrical energy to a component; commonly used to describe an electrical bus or other dedicated electrical path. [ENERGIZE the bus.]
ENGAGE	To come together to interlock or to place in gear or in service.
ENSURE	To make sure or certain; if an action that should have occurred has NOT occurred, perform the action. [ENSURE SIAS has occurred.] (Check to see whether or NOT SIAS has occurred, and if not, manually initiate SIAS.)

REVISION NO.:	PROCEDURE TITLE:	PAGE:
9Y	STANDARDIZED TERMINOLOGY	65 of 68
PROCEDURE NO.: ADM-11.01	ST. LUCIE PLANT	

TABLE 2
ACTION VERB & KEYWORD DEFINITIONS
(Page 20 of 20)

VENT	To permit a gas or liquid contained under pressure to escape from a vent. [VENT the pump.]
VERIFY	To observe an expected condition or characteristic. Does NOT imply additional operation action beyond observation. [VERIFY discharge pressure is stable.]

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.25	
	Importance Rating	2.8	

Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.

Proposed Question: Common 67

Unit 2 is entering a refueling outage. The following plant conditions exist:

- RCS is at 152°F and atmospheric pressure.
- 2A LPSI Pump is running with cross-tie valve V3545 open.
- Pressurizer level is 10% cold calibrated.
- Reactor has been subcritical for 130 hours.
- CCW temperature is 85°F.

What are the minimum and maximum continuous Shutdown Cooling flow limits for these conditions?

(2-NOP-03.05, Shutdown Cooling, Appendix C is provided.)

	Minimum	Maximum
A.	>1000 gpm	<2850 gpm
B.	>1000 gpm	<3300 gpm
C.	>3000 gpm	<2850 gpm
D.	>3000 gpm	<3300 gpm

Proposed Answer: B

Explanation (Optional):

A. Incorrect. 1000 gpm per pump is correct but the 2850-gpm value is from the wrong curve on Figure 1A (V3545 closed). Plausible if candidate chooses wrong curve.

B. Correct.

C. Incorrect. 3000 gpm is a Mode 6 requirement. Plausible if candidate thinks plant is already in Mode 6.

D. Incorrect. 3000 gpm is a Mode 6 requirement. Plausible if candidate thinks plant is already in Mode 6.

Technical Reference(s): 2-NOP-03.05, Shutdown Cooling (Attach if not previously provided)

Proposed references to be provided to applicants during examination: 2-NOP-03.05, Appendix C (all)

Learning Objective: _____ (As available)

Question Source: Bank # 2562

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____

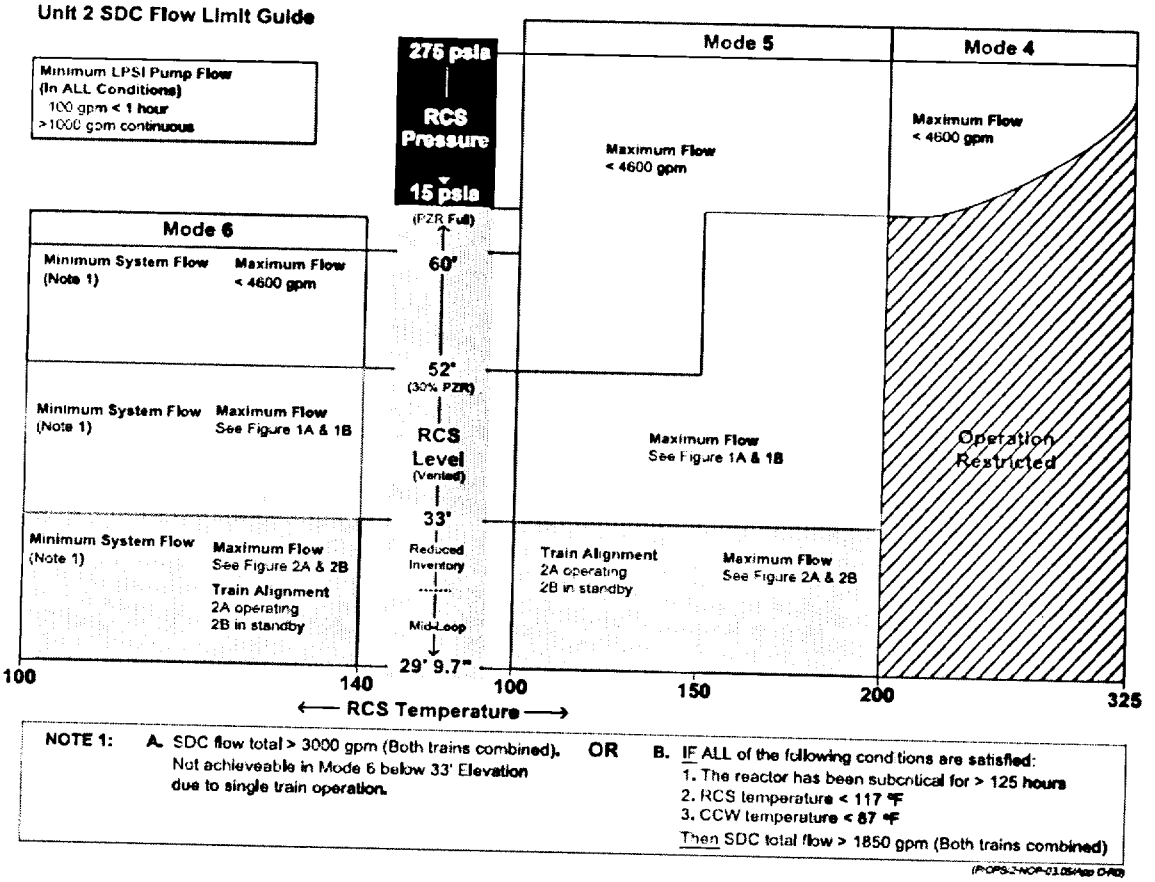
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____

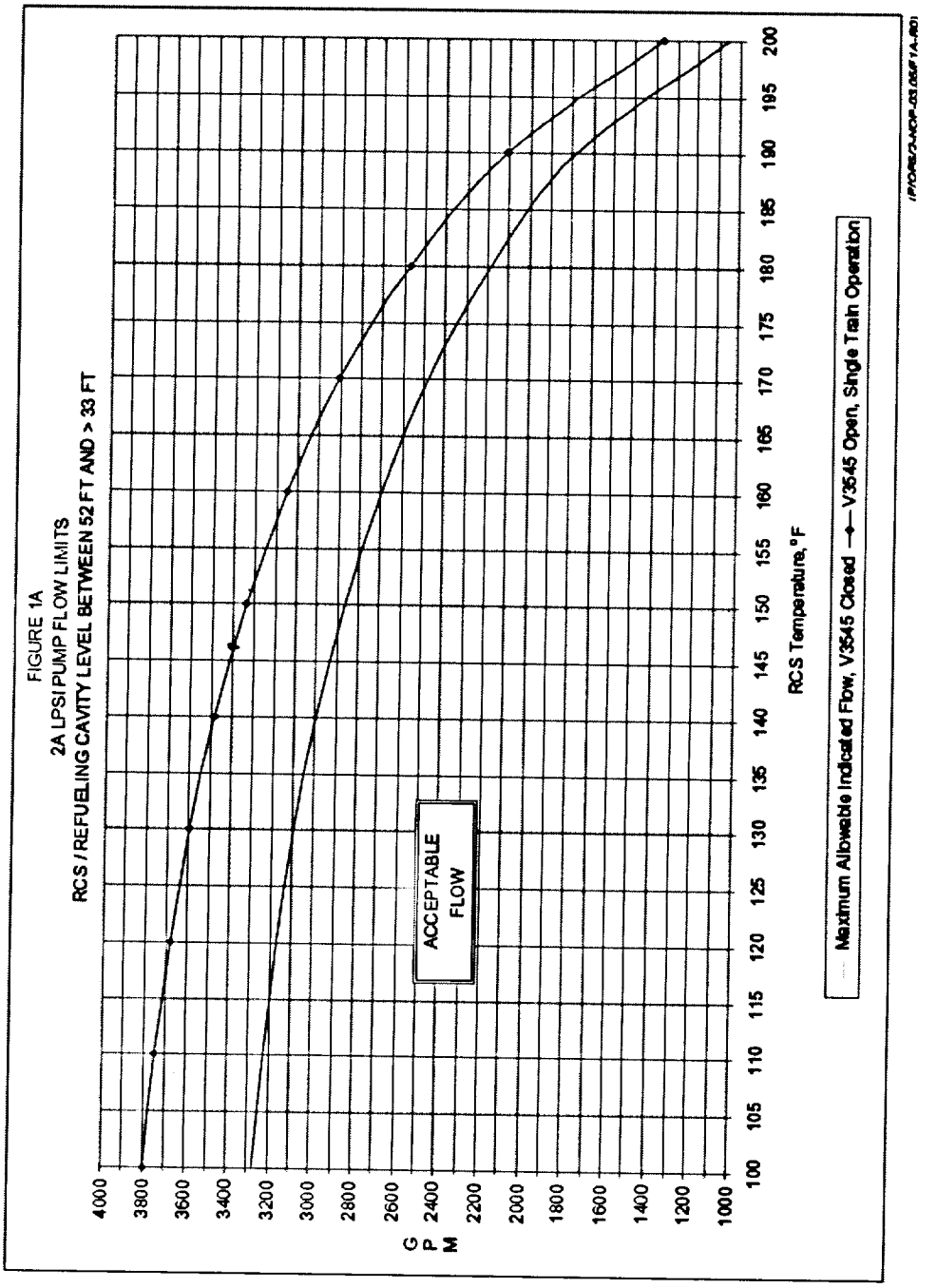
55.43 5

Comments:

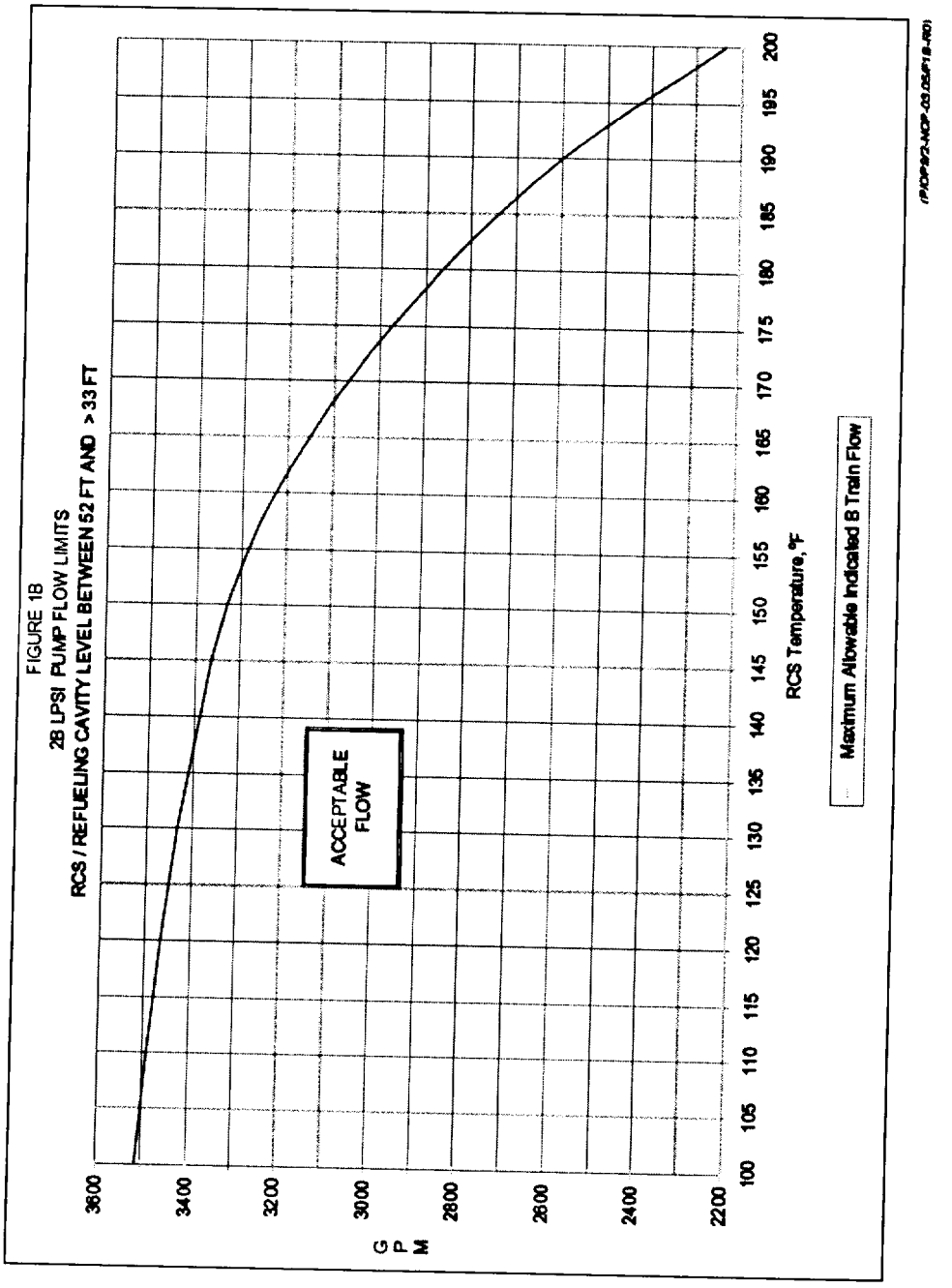
APPENDIX C
SDC & LPSI PUMP FLOW REQUIREMENTS
(Page 1 of 5)



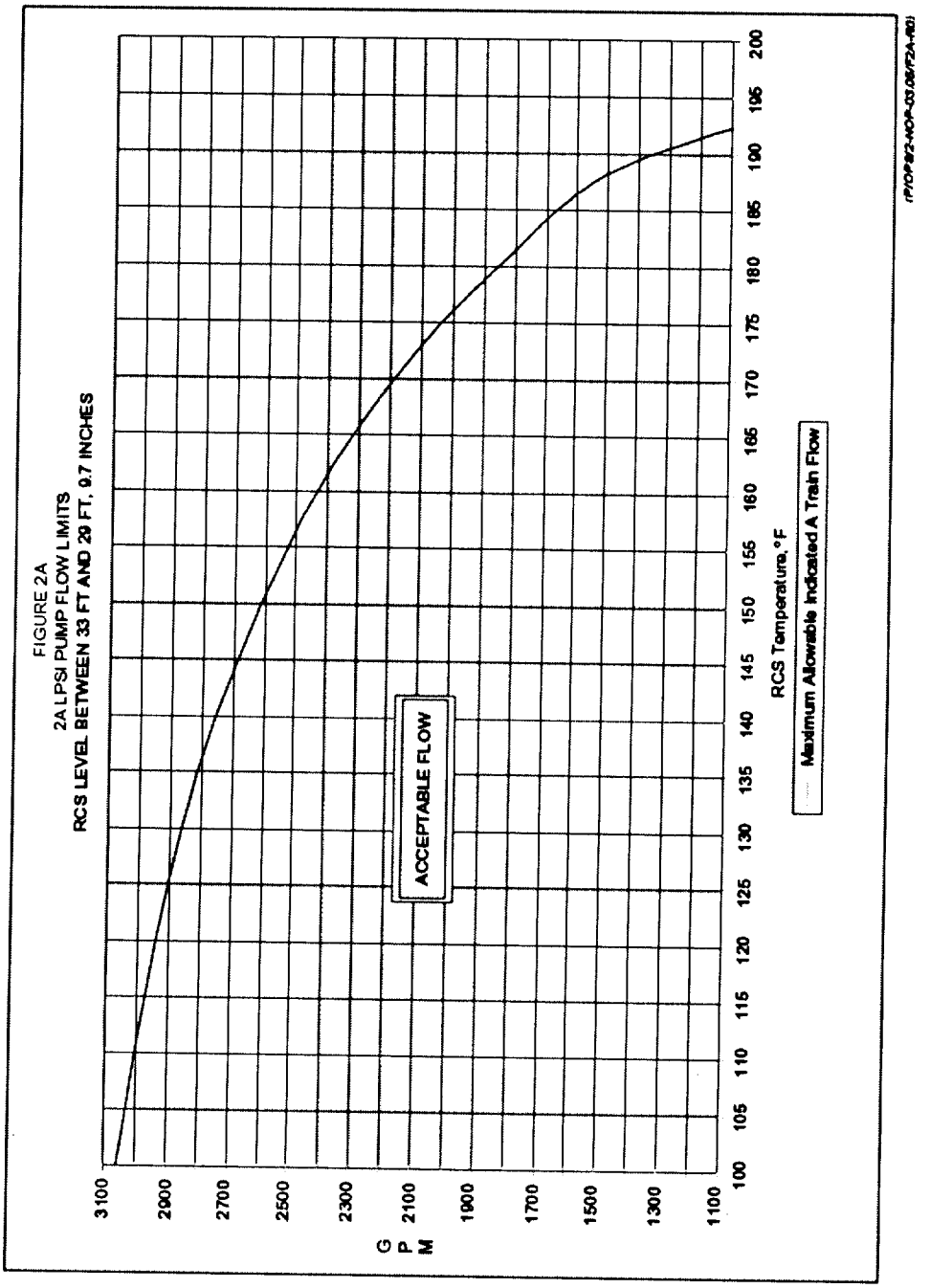
APPENDIX C
SDC & LPSI PUMP FLOW REQUIREMENTS
(Page 2 of 5)



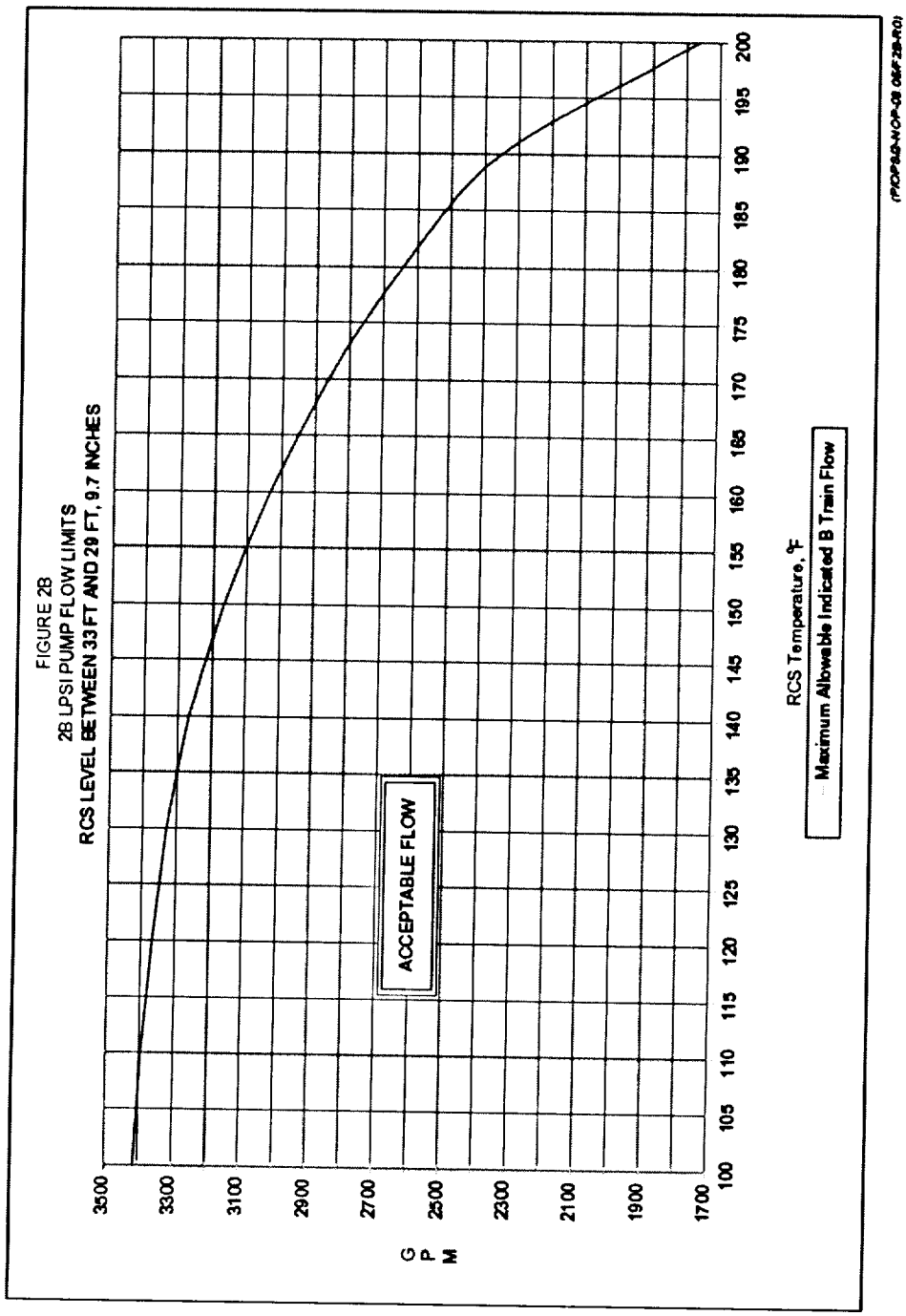
APPENDIX C
SDC & LPSI PUMP FLOW REQUIREMENTS
(Page 3 of 5)



APPENDIX C
SDC & LPSI PUMP FLOW REQUIREMENTS
(Page 4 of 5)



APPENDIX C
SDC & LPSI PUMP FLOW REQUIREMENTS
(Page 5 of 5)



Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.31	
	Importance Rating	4.2	

Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the required plant lineup.

Proposed Question: Common 68

Given the following parameter values from the Unit 2 QSPDS Saturation Margin Page:

INDICATION	VALUE
UPPER HEAD TEMP	572°F
HOT LEG 2A TEMP	577°F
HOT LEG 2B TEMP	580°F
COLD LEG 2A2 TEMP	536°F
COLD LEG 2B1 TEMP	538°F
REP CET TEMP	582°F
PZR Pressure	2060 psia

What are the Saturation Margin pressures (psia) for these conditions?

(Steam Tables are provided.)

A. UPPER HEAD - 814 subcooled; RCS - 734 subcooled; CET - 713 subcooled

B. UPPER HEAD - 814 subcooled; RCS - 754 subcooled; CET - 693 subcooled

C. UPPER HEAD - 754 subcooled; RCS - 947 subcooled; CET - 754 subcooled

D. UPPER HEAD – 1246 subcooled; RCS - 1326 subcooled; CET - 1347 subcooled

Proposed Answer: A

Explanation (Optional):

A. Correct.
B. Incorrect. Used saturation pressure for 584°F for CET.
C. Incorrect. Used saturation pressure for 538°F for RCS.
D. Incorrect.Used saturation pressures for correct temperatures but did not properly apply calculation ($P_{margin} = P_{pzr} - P_{sat}$).

Technical Reference(s): 0711407, ICIS & QSPDS Figure 36 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Steam Tables

Learning Objective: _____ (As available)

Question Source:
Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

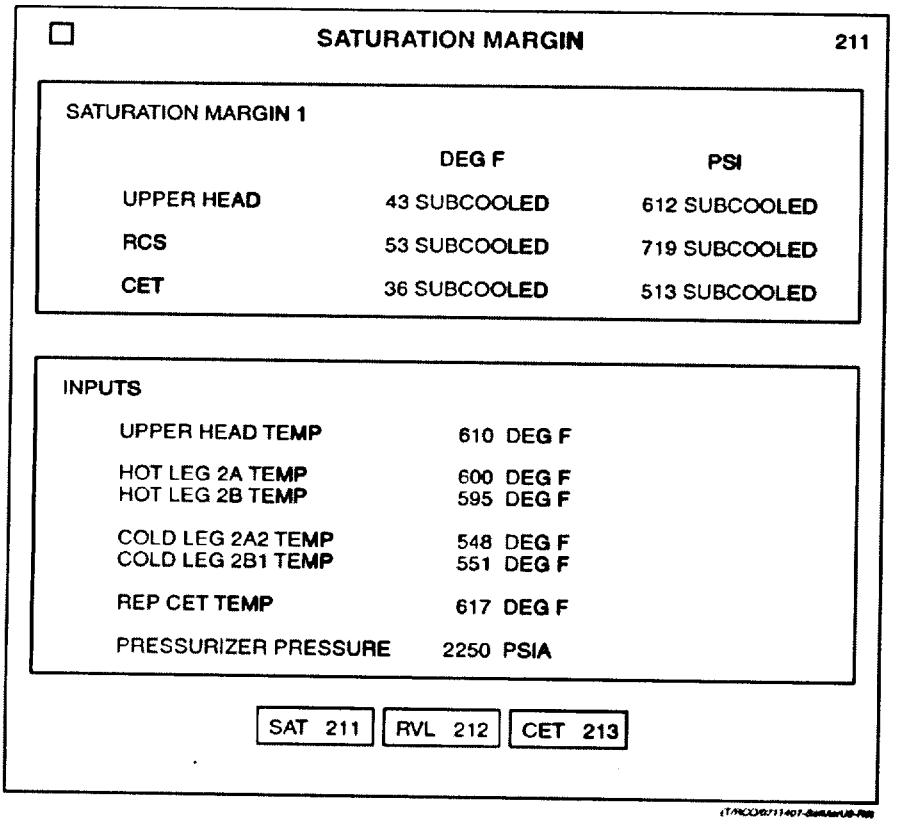
Question History: Last NRC Exam _____

Question Cognitive Level:
Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content:
55.41 5
55.43 _____

Comments:

UNIT 2 QSPDS SATURATION MARGIN PAGE



Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.1	
	Importance Rating	3.7	

Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.

Proposed Question: Common 69

During a reactor startup it becomes apparent that the reactor will become critical approximately 700 pcm earlier than the ECC calculation.

Which of the following describes the correct course of action?

A. Continue the CEA withdrawal to criticality after notifying the RE of the situation.

B. Insert the CEAs to a position equivalent to -500 pcm from the apparent critical position.

C. Insert the CEAs to a position equivalent to -500 pcm from the ECC calculated position.

D. Stop the CEA withdrawal, maintaining present rod height until the RE determines the appropriate CEA movement actions.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Partially correct (notify RE). Plausible if candidate thinks this action is sufficient to control core reactivity.

B. Correct.

C. Incorrect. Partially correct (position equivalent to -500 pcm). Plausible if candidate thinks this action is sufficient to control core reactivity.

D. Incorrect. Partially correct (stop the CEA withdrawal and notify RE). Plausible if candidate thinks this action is sufficient to control core reactivity.

Technical Reference(s): GOP-302 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702841-19 (As available)

Question Source: Bank # 1744
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10
55.43 _____

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
24A	REACTOR PLANT STARTUP – MODE 3 TO MODE 2	6 of 57
PROCEDURE NO.: 2-GOP-302	ST. LUCIE UNIT 2	

4.6 With the Reactor critical, the RCS T-avg should be maintained greater than 525°F.

1. If T-avg decreases below 525°F, Then at least once per 30 minutes verify RCS T-avg is greater than or equal to 515°F.

2. If T-avg decreases below 515°F, Then restore T-avg to greater than or equal to 515°F within 15 minutes or be in Hot Standby (Mode 3) within the next 15 minutes. Refer to Technical Specification 3.1.1.5.

4.7 If CEAs reach the position associated with the calculated ECC and the Reactor is NOT critical, Then continue to withdraw regulating groups until the Reactor becomes critical, but NOT beyond a CEA position equivalent to +500 PCM greater than the ECC position.

4.8 If it appears that the Reactor may go critical before reaching the -500 PCM position, Then do NOT continue to withdraw regulating groups. Insert the regulating groups to a position equivalent to -500 PCM from the position at which criticality appeared imminent and follow the instructions contained in this procedure.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.13	
	Importance Rating	3.6	

Knowledge of tagging and clearance procedures.

Proposed Question: Common 70

Instrumentation & Control (I&C) has requested a clearance to de-energize a component by removing its fuses.

Which of the following statements describes how removal of the fuses is controlled according to ADM-09.08, Operations In-Plant Equipment Clearance Orders?

A. By direction of the I&C work order.

B. Equipment clearance order tags placed on the fuses.

C. A non-tagged step in the Equipment clearance order.

D. Equipment clearance order tags placed on or close to the fuse holders.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Would be correct for relaying fuses by the Relay Department.
B. Incorrect. Not permitted by procedure.
C. Incorrect. Correct for grounding devices.
D. Correct.

Technical Reference(s): ADM-09.08, Operations In-Plant Equipment Clearance (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 1915

Modified Bank # _____ (Note changes or attach parent)

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 10

55.43 _____

Comments:

REVISION NO.: 10A	PROCEDURE TITLE: OPERATIONS IN-PLANT EQUIPMENT CLEARANCE ORDERS ST. LUCIE PLANT	PAGE: 29 of 67
PROCEDURE NO.: ADM-09.08		

6.3 Electrical Practices (continued)

6. If DC control power (on 480V breakers and above) is required to be cleared, Then the appropriate fuses shall be REMOVED and the fuse block insert shall be TAGGED or the DC control power breaker shall be TAGGED off.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.34	
	Importance Rating	2.8	

Knowledge of the process for determining the internal and external effects on core reactivity.

Proposed Question: Common 71

A reactor startup is being performed 20 hours after a trip from 100% power.

- Estimated Critical Rod Position is Regulating Group 7 at 60 inches.
- Criticality is predicted in approximately 5 hours.

If the startup proceeded ONE (1) hour EARLIER than scheduled, what is the effect on the 1/M plot data taken during the startup?

The 1/M plot will...

A. **correctly** predict criticality at a **lower** rod height.

B. **correctly** predict criticality at a **higher** rod height.

C. **incorrectly** predict criticality in the **conservative** direction.

D. **incorrectly** predict criticality in the **non-conservative** direction.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. If xenon was decaying away it will take more $\Delta\rho$ from rods for criticality.
B. Correct. More xenon implies more poison in the core and a higher rod height for criticality.
C. Incorrect. 1/m data is a measured value whereas the ECP is a calculation.
D. Incorrect. 1/m data is a measured value whereas the ECP is a calculation.

Technical Reference(s): 1-GOP-302, Reactor Plant Startup – Mode 3 to Mode 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # X
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 1
55.43 _____

Comments: WTSI Bank

REVISION NO.: 15	PROCEDURE TITLE: REACTOR PLANT STARTUP – MODE 3 TO MODE 2 ST. LUCIE UNIT 1	PAGE: 6 of 64
PROCEDURE NO.: 1-GOP-302		

4.10 Critical boron concentration shall be determined by sample chemical analysis.

4.11 During the approach to criticality, the US should ensure that activities which may distract operators such as shift turnover and surveillance testing are avoided. When positioning control rods, procedural instructions shall be strictly adhered to and all actions should be conservative in nature.

4.12 When an ECC is being prepared for a startup following a shutdown from other than 100% equilibrium conditions, additional caution must be exercised when determining Column 1 and Column 2 parameter values. Ensure the values assigned to these parameters are consistent with the same shutdown power level.

4.13 During all approaches to criticality an ICRR plot shall be made in accordance with Appendix C, Estimated Critical Conditions and Inverse Count Rate Ratio.

REVISION NO.: 15	PROCEDURE TITLE: REACTOR PLANT STARTUP – MODE 3 TO MODE 2 ST. LUCIE UNIT 1	PAGE: 57 of 64
PROCEDURE NO.: 1-GOP-302		

APPENDIX C
ESTIMATED CRITICAL CONDITIONS AND INVERSE COUNT RATE RATIO
(Page 6 of 7)

ECC CALCULATION WORKSHEET

Unit No.: _____ Startup No.: _____ Date of ECC: ___/___/___ Exposure: _____ EFPH

PARAMETER	COLUMN 1 CONDITIONS PRIOR TO SHUTDOWN TIME 1: Date: ___/___/___ Time: _____		COLUMN 2 ESTIMATED CRITICAL CONDITIONS TIME 2: Date: ___/___/___ Time: _____		Difference (PCM)	Sign Determination
POWER DEFECT	At __% power Figure A.1	_____ PCM	N/A	N/A	(+)_____ PCM	(+) Always
Xenon Worth	From DCS or Figure A.4	_____ PCM	From Figure A.4 or as provided by R.E.	_____ PCM	( )_____ PCM	(+) If Column 1 is greater than Column 2 (-) If Column 1 is less than Column 2
Samarium and Neptunium Worth	From Figure A.5	_____ PCM	From Figure A.5 or as provided by R.E.	_____ PCM	( )_____ PCM	
Boron Worth (Note 1)	_____PPM times _____Boron Worth From Figure A.8	_____ PCM	Present Boron Conc _____ PPM times _____ Boron Worth From Figure A.8	_____ PCM	( )_____ PCM	
CEA Reactivity Worth	Group___withdraw to___inches Use Figure A.6 or A.7	_____ PCM	Group___ withdrawn to _____ inches Use Figure A.6 or A.7 (Note 2)	_____ PCM	( )_____ PCM	(-) If Column 1 is greater than Column 2 (+) If Column 1 is less than Column 2
Net Reactivity	Total up the reactivities in the Difference column and enter the value here. Observe signs. →				( )_____ PCM	
Total Change in Boron	Net Reactivity / Col. 2 Boron Worth = ( ) (PCM) / (PCM/PPM) →				( )_____ PPM	If sign is +, Borate If sign is -, Dilute
Estimated Critical Boron Concentration	_____ Present RCS Boron + ( ) / (Total Change in Boron) →				( )_____ PPM	(Note 3)

CEA Position at -1000 PCM from ECC = _____ Inches withdrawn on Group _____ Startup (Mode 2) entry point
CEA Position at +500 PCM from ECC = _____ Inches withdrawn on Group _____
CEA Position at -500 PCM from ECC = _____ Inches withdrawn on Group _____

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.3.4	
	Importance Rating	2.5	

Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

Proposed Question: Common 72

Given the following:

- A large break LOCA has occurred on Unit 1.
- HPSI Pump 1A has developed a 40 gpm leak on the pump suction.
- Attempts to isolate HPSI Pump 1A have failed.
- RAS has actuated.
- An Emergency Team member who is 49 has volunteered to close HPSI Pump 1A suction valve locally.

The MAXIMUM allowed CDE (thyroid) exposure the Emergency Coordinator can authorize the Emergency Team member to receive while performing this evolution is:

A. 5 REM.

B. 50 REM.

C. 100 REM.

D. No upper limit for CDE exposure.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. This is the 10CFR20 annual limit for the whole body.

B. Incorrect. Performance of actions that would not directly mitigate the event, minimize escalation, or minimize effluent releases

C. Correct. Performance of actions that mitigate the escalation to the event, rescue persons from a non-life threatening situation, minimize exposures or minimize effluent releases.

D. Incorrect. Applies to rescue of person from a life-threatening situation.

Technical Reference(s): HP-201 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 2701

Modified Bank # _____ Changed values based on procedure revision.

New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 12

55.43 _____

Editorial Mods to distractors

REVISION NO.:	PROCEDURE TITLE:	PAGE:
13	EMERGENCY PERSONNEL EXPOSURE CONTROL	8 of 34
PROCEDURE NO.: HP-201	ST. LUCIE PLANT	

ATTACHMENT 1
EXPOSURE LIMITS FOR EMERGENCY RESPONSE PERSONNEL
(Page 1 of 2)

NOTE
1. Both Total Dose (TEDE) and Thyroid Dose (CDE) should be used for purposes of controlling exposure.
2. Protective clothing, including respirators, should be used where appropriate.

For the following missions, the exposure limit is[1]:	Total Dose[2] (TEDE)	THYROID[3] (CDE)
Performance of actions that would not directly mitigate the event, minimize escalation, or minimize effluent releases.	5 REM	50 REM
Performance of actions that mitigate the escalation to the event, rescue persons from a non-life threatening situation, minimize exposures or minimize effluent releases.	10 REM	100 REM
Performance of actions that decrease the severity of the event or terminate the processes causing the event in an attempt to control effluent releases to avoid extensive exposure of large populations. Also, rescue of persons from a life-threatening situation.	25 REM	250 REM
Rescue of person from a life-threatening situation. (Volunteers[4] should be above the age of 45.)	(5)	(5)

(1) Exposure limits to the lens of the eye are 3 times the Total Dose (TEDE) values listed.

(2) Total Dose (TEDE) is the total whole body exposure from both external and internal (weighted) sources - Total Effective Dose Equivalent.

(3) Thyroid Dose (CDE) commitment from internal sources - Committed Dose Equivalent. The same dose limits also apply to other organs (CDE), skin (Shallow Dose Equivalent) and extremities (Extremity Dose Equivalent).

(4) Volunteers with full awareness of risks involved including numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects.

(5) No upper limit for Total Dose (TEDE) and/or Thyroid Dose (CDE) exposure has been established because it is not possible to prejudge the risks that one person should be allowed to take to save the life of another. Also, no specific limit is given for thyroid exposure since in the extreme case, complete thyroid loss might be an acceptable sacrifice for a life saved. This should not be necessary if respirators and/or thyroid protection for rescue personnel are available as the result of adequate planning.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.3.11	
	Importance Rating	2.7	

Ability to control radiation releases.

Proposed Question: Common 73

A shutdown is required due to Dose Equivalent I-131 level of five microcuries/gram.

Which of the following is the reason for reducing Tave to less than 500°F following the reactor shutdown?

A. Prevents the direct release of activity should a Steam Generator Tube Rupture occur.

B. Slows the release of noble gas to the Reactor Coolant, reducing the source term of the activity.

C. Minimizes the temperature related degradation of the CVCS demineralizers while RCS clean-up is in progress.

D. Minimizes the magnitude of the iodine spiking phenomena caused by the unit shutdown.

Proposed Answer: A

Explanation (Optional):

A. Correct.
B. Incorrect. Not in accordance with Tech Spec bases.
C. Incorrect. Not in accordance with Tech Spec bases.
D. Incorrect. Not in accordance with Tech Spec bases.

Technical Reference(s): Unit 1 Tech Spec Bases 3.4.8 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 18425 INPO (See comments)
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 5
55.43 _____

Comments: Changed Tcold to Tavg in Stem for St. Lucie.

SECTION NO.: 3/4.4	TITLE: TECHNICAL SPECIFICATIONS BASES ATTACHMENT 6 OF ADM-25.04 REACTOR COOLANT SYSTEM ST. LUCIE UNIT 1	PAGE: 9 of 16
REVISION NO.: 1		

3/4.4 REACTOR COOLANT SYSTEM (continued)

BASES (continued)

3/4.4.8 SPECIFIC ACTIVITY (continued)

Reducing T_{avg} to < 500°F prevents the release of activity should a steam generator tube rupture since the saturation pressure of the primary coolant is below the lift pressure of the atmospheric steam relief valves. The surveillance requirements provide adequate assurance that excessive specific activity levels in the primary coolant will be detected in sufficient time to take correction action. Information obtained on iodine spiking will be used to assess the parameters associated with spiking phenomena. A reduction in frequency of isotopic analyses following power changes may be permissible if justified by the data obtained.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.47	
	Importance Rating	3.4	

Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate Control Room reference material.

Proposed Question: Common 74

Unit 1 is operating at 100% power when a loss of offsite power occurs resulting in a reactor trip and a loss of forced reactor coolant circulation. Reactor Coolant System (RCS) hot leg temperature is greater than cold leg temperature and Steam Generator (SG) levels are stable.

Which ONE (1) of the following combinations of parameter trends, occurring 30 minutes after the trip, indicates that natural circulation is occurring?

	RCS HOT LEG TEMPERATURE	RCS COLD LEG TEMPERATURE	SG PRESSURES	REP CET SUBCOOLING
A.	Decreasing	Stable	Stable	Increasing
B.	Increasing	Decreasing	Increasing	Stable
C.	Stable	Decreasing	Increasing	Decreasing
D.	Increasing	Stable	Decreasing	Increasing

Proposed Answer: A

Explanation (Optional):

A. Correct. Plausible if candidate thinks

B. Incorrect. Does not meet criteria for NC flow. Plausible if candidate thinks that with SG pressure increasing and REP CET subcooling stable that NC flow is verified.

C. Incorrect. Does not meet criteria for NC flow. Plausible if candidate thinks that given the conditions it is acceptable for REP CET subcooling to be lowering.

D. Incorrect. Does not meet criteria for NC flow. Plausible if candidate thinks that with Thot increasing and SG pressure decreasing that NC flow is verified.

Technical Reference(s): 1-EOP-09, LOOP/LOFC (Attach if not previously provided)

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # 20566 INPO
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam _____

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 _____
55.43 5

Comments:

REVISION NO.:	PROCEDURE TITLE:	PAGE:
20	LOSS OF OFFSITE POWER/LOSS OF FORCED CIRCULATION ST. LUCIE UNIT 1	11 of 26
PROCEDURE NO.: 1-EOP-09		

4.0 OPERATOR ACTIONS (continued)

INSTRUCTIONS	CONTINGENCY ACTIONS
[*] **14. Verify Single Phase Natural Circulation** If NO RCPs are operating, Then VERIFY natural circulation in at least **ONE** loop by **ALL** of the following: • Loop ΔT less than 50°F • Hot leg temperature constant or lowering • Cold leg temperature constant or lowering • RCS subcooling is greater than or equal to minimum subcooling based on Rep CET temperature • NO abnormal difference (greater than 20°F) between T_{HOT} and Rep CET temperature	**14.1** ENSURE proper control of S/G feeding and steaming.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.10	
	Importance Rating	3	

Knowledge of annunciator response procedures.

Proposed Question: Common 75

The following annunciators are received on Unit 1:

- M-5 LETDOWN PRESSURE HIGH/LOW
- M-7 REGENERATIVE HEAT EXCHANGER LETDOWN DP HIGH

Based on the above annunciators, what automatic action has occurred?

A. 1A Charging Pump tripped.

B. Letdown Pressure Control Valve (PCV2201P) has closed.

C. Letdown Isolation Valve (V2516) has closed.

D. Letdown Level Control Valve (LCV2110P) has closed.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Plausible if candidate thinks the alarm is caused by a Charging/Letdown mismatch.

B. Incorrect. Plausible if candidate thinks that the Pressure Control Valve closing will bring in both alarms or will be closed by this signal.

C. Correct. V2516 automatically closes at 275 psid to isolate Letdown.

D. Incorrect. Plausible if candidate thinks that the Level Control Valve closing will bring in both alarms or will be closed by this signal.

Technical Reference(s): 1-ARP-01-M05 & M07 (Attach if not previously provided)

0711205, Chemical and Volume Control System Lesson

Proposed references to be provided to applicants during examination: _____

Learning Objective: 0702205-03 (As available)

Question Source:
- Bank # 1508
- Modified Bank # _____ Changed stem to remove "What action, if any..." statement and changed distractor B to reflect an additional failure.
- New _____

Question History: Last NRC Exam _____

Question Cognitive Level:
- Memory or Fundamental Knowledge _____
- Comprehension or Analysis X

10 CFR Part 55 Content:
- 55.41 7
- 55.43 _____

Comments:

REVISION:	PROCEDURE TITLE:	PANEL:
2	ANNUNCIATOR RESPONSE PROCEDURE	M
PROCEDURE NO:		WINDOW:
1-ARP-01-M5	ST. LUCIE UNIT 1	5

ANNUNCIATOR PANEL **M**

1	2	3	4	**5**	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48

LETDOWN PRESS HIGH/LOW

M-5

DEVICE:
PA-2201/151

LOCATION:
RAB/RTGB-105

SETPOINT:
500 psig (HIGH)
390 psig (LOW)

ALARM CONFIRMATION:
1. PIC-2201, Letdown Press

OPERATOR ACTIONS:
1. IMPLEMENT the following procedures:
   - 1-ONP-02.03, Charging and Letdown
   - 1-ONP-02.01, Boron Concentration Control
2. If letdown system pressure is being affected by an RCS pressure swing, Then IMPLEMENT ONOP 1-0120035, Pressurizer Pressure and Level.
3. MONITOR VCT level and HUT levels to ensure V2345, Letdown Relief Valve, has not lifted and/or has reseated.
4. If RCS leakage is suspected, Then GO TO ONOP 1-0120031, Excessive Reactor Coolant System Leakage.

CAUSES: Alarm may be due to the following:
1. RCS pressure swing
2. Failure of at least ONE of the following:
   - PIC-2201
   - PA-2202
   - PCV-2201P/Q, Letdown Pressure Control Valve
   - LCV-2210P/Q, Letdown Level Control Valve
   - Letdown system piping

REFERENCES:
1. CWD 8770-B-327 sheet 151
2. P&ID 8770-G-078 sheet 120A
3. TEDB

REVISION: 1	PROCEDURE TITLE: ANNUNCIATOR RESPONSE PROCEDURE	PANEL: M
PROCEDURE NO: 1-ARP-01-M7	ST. LUCIE UNIT 1	WINDOW: 7

ANNUNCIATOR PANEL M

1	2	3	4	5	6	**7**	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48

REGENERATIVE HEAT EXCHANGER LETDOWN ΔP HIGH
M-7

DEVICE:
PDIS-02-1/157

LOCATION:
RCB/27/S-25/E-50

SETPOINT:
235 psid

ALARM CONFIRMATION:
1. PDIS-C2-1, Regenerative HX Differential Pressure
2. PIC-1100X/Y, Pressurizer Pressure
3. PIC-2201, Letdown Pressure

OPERATOR ACTIONS:

NOTE
V2516 automatically closes at 275 psid to isolate letdown.

1. IMPLEMENT 1-ONP-02.03, Charging and Letdown
2. If RCS pressure is NOT at expected value for current plant conditions, Then IMPLEMENT ONOP 1-0120035, Pressurizer Pressure and Level.

CAUSES: The alarm is due to a malfunction in the letdown system, i.e. valve failure or line break, which allows an excessive differential pressure to be developed across the Regenerative HX.

REFERENCES
1. CWD 8770-B-327 sheets 157
2. P&ID 8770-G-078 sheet 120B
3. TEDB

ES-401, Rev. 9 ST. Lucie 3/20/06 **Written Examination Review Worksheet** **Form ES-401-9**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation

Instructions

[Refer to Section D of ES-401 and Appendix B for additional information regarding each of the following concepts.]

1. Enter the level of knowledge (LOK) of each question as either (F)undamental or (H)igher cognitive level.
2. Enter the level of difficulty (LOD) of each question using a 1 – 5 (easy – difficult) rating scale (questions in the 2 – 4 range are acceptable).
3. Check the appropriate box if a psychometric flaw is identified:
   - The stem lacks sufficient focus to elicit the correct answer (e.g., unclear intent, more information is needed, or too much needless information).
   - The stem or distractors contain cues (i.e., clues, specific determiners, phrasing, length, etc).
   - The answer choices are a collection of unrelated true/false statements.
   - The distractors are not credible; single implausible distractors should be repaired, more than one is unacceptable.
   - One or more distractors is (are) partially correct (e.g., if the applicant can make unstated assumptions that are not contradicted by stem).
4. Check the appropriate box if a job content error is identified:
   - The question is not linked to the job requirements (i.e., the question has a valid K/A but, as written, is not operational in content).
   - The question requires the recall of knowledge that is too specific for the closed reference test mode (i.e., it is not required to be known from memory).
   - The question contains data with an unrealistic level of accuracy or inconsistent units (e.g., panel meter in percent with question in gallons).
   - The question requires reverse logic or application compared to the job requirements.
5. Check questions that are sampled for conformance with the approved K/A and those that are *designated SRO-only* (K/A and license level mismatches are unacceptable).
6. Based on the reviewer's judgment, is the question as written (U)nsatisfactory (requiring repair or replacement), in need of (E)ditorial enhancement, or (S)atisfactory?
7. At a minimum, explain any "U" ratings (e.g., how the Appendix B psychometric attributes are not being met).

RO/COMMON Questions

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
1	H	2										X		U	007EK2.02 (2.6/2.8) Does not meet K/A If you covered the bullet that said a reactor trip recovery is in progress you could still ask and answer this question. It would meet another K/A. Loss of bus etc. **(NEW)**
2	H	2		X										E	009EA1.09 (3.6/3.6) Appears to meet K/A. Teaching in stem. "EOP-3.0 LOCA entered and cooldown and depressurization in progress." **(BANK)**
3	H	2	X											E	029EA2.09 (4.4/4.5) Appears to meet K/A. Stem needs to have initial reactor power, an applicant could assume that power was at 45%, and then there may not be a correct answer. **(NEW)**
4	H	2										X		U	025AK2.02 (3.2/3.2) Appears to be a borderline K/A match, a loss of Residual heat removal has not occurred. (I understand that temperature is going up, and flow is oscillating) but total cooling has not been lost. Also the procedure actions state to throttle LPSI header flow (is that the same as lower? Can you actually get to these conditions in the plant without be at reduced inventory? Wrong importance rating on submitted question. (2.6) if this question is retained need to change the stem to which one of the following.... IAW ONP-1-... **(NEW)**
5	H	2										X		E	026AA2.03 Appears to be a borderline K/A match. Listed as being on 2002 NRC exam. **(BANK)**
6	F	2					X							E	027AK3.03 Changed from 027AK3.01 with out approval. **Determination to be made on adequacy of K/A replacement.** Distractor C should read the stuck open spray valve is identified as being at the lower temperature and approaching T cold. **(NEW)**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
7	F	2				X								E	029EK1.02 Borderline K/A match, but tough K/A to match. Distractor C does not appear to be credible. **(NEW)**
8	H	2					X							E	038EA1.04 appears to match K/A. Need to ensure that the only reference is figure 1A (Page 119 of 155) is the only reference. Need to add IAW 2-EOP-04 to the stem or someone might consider D also correct. **(NEW)**
9	H	2	X											E	054AK3.04 appears to match K/A Need to add IAW 1-EOP-01 to the stem. **(BANK)**
10	F	2				X								U	055EA1.05 appears to match K/A, distractors C and D do not appear to be credible. Also without any power what will happen? Needs to be worded "When power returns..." **(NEW)**
11	F	2	X											E	056AK3.02 appears to match K/A Very simple question. Need to add IAW 1- EOP-9.0 to the stem. Is this the same for both units? You listed a unit 2 procedure but referenced unit 1 in the question stem **(NEW)**
12	H	2												E	057AA2.01 Licensee changed to AA2.15 with out informing the NRC. This question came straight from Licensees (**BANK**). **Determination to be made on adequacy of K/A replacement.** Otherwise question appears to match K/A. Very simple.
13	F	1				X								U	058AK1.01 Question appears to match K/A. Very simple. Distractor C does not appear to be a credible distractor. Distractor D may not be credible (does the RTGB 201 have this indication? **(BANK)**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
14	F	2					X					X		U	062AA2.06 Licensee changed K/A without NRC knowledge to 067AA2.13. **Determination to be made on adequacy of K/A replacement.** Distractor B could be viewed as correct in certain cases. Distractor D may also be correct. What is the definition of contained? See 2nd block of figure 1 **(BANK)**
15	F	2					X							U	065AK3.08 appears to match K/A. C and D could be correct, these actions should have happened or been performed so it could be argued that they are correct. **(BANK)**
16	F	1												U	CEA02EA1.2 Very simple GFE 1. Distractors C and D not credible. 3-4hours? **(BANK)**
17	H	2										X		U	CE05EG2.4.31 Does not match K/A. There are not any annunciator alarms or response instructions as required by the K/A. **(BANK)**
18	H	2	X											E	CE06EK2.2 Appears to match K/A. Teaching in stem reword to say: Which one of the following describes how RCS pressure will initially respond on a loss of main feed. (BANK)
19	H	2				X								U	001AK2.06 Appears to match K/A. At what point does automatic withdrawal occur? Distractors A and B may not be credible. (If rod is in manual and a malfunction is occurring why would any of the AWPs stop the rod? **(BANK)**
20	F	2	X			X								U	005AK1.02 Appears to match K/A. The first portion of the stem states that CEA # 41 is stuck, an assumption listed states to assume that CEA # 47 is trippable. This would make choice A also correct. Fix Stem. **(Modified Bank)** Need to see original

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
21	H	2												S	024AA1.26 Appears to match K/A. **(BANK)**
22	H	2				X								U	028AK1.01 Appears to match K/A. Distractors A, B, and D are not credible. All three of these distractors would happen if the LT failed low, knowing that only one can be correct the only answer to select is C. Need to develop better distractors. **(BANK)**
23	H	2												S	032AA2.05 Appears to match K/A. **(NEW)**
24	H	2												U	037AA2.12 **(K/A changed from NRC provided outline)** This ins nothing more than an RCS leak determination. If you took the SG Tube leak out of the stem you could still answer this question. Very Simple. Replace. **(NEW)**
25	H	2										X		U	059AA2.03 Does not meet K/A. There is not an accidental liquid radwaste release in progress. Replace. **(NEW)**
26	H	2	X			X								U	068AK2.07 appears to match K/A. Stem should read "If offsite power is lost. Distractors are not all credible. C does not appear to be credible at all. **(NEW)**
27	H	2	X											E	CE13AG2.1.28 Appears to match K/A. Need to add IAW 1-0120039 "Natural Circulation Cooldown."
28	H	2				X	X								003K6.02 Minimal K/A match, if seals fail ... Distractor A is also correct if CBO temperature get >200 degrees (I don't know what the Temp is but distractor analysis states > 200 degrees then the pump should be tripped. C does not appear to be credible this is the normal operating condition of the pump. **(BANK)**
29	F	1												U	004K6.07 Minimal K/A match. Low discriminatory value. **(BANK)**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
30	H	2										X		U	005K3.06 Does not match K/A, What **effect** does this have on containment spray? From the procedure I understand that CS is now providing core cooling, but the effect is that only one train of CS is cooling/depressurizing containment. Rewrite to add effect. **(BANK)**
31	H	2												E	006K5.01 Appears to match K/A. May need to reword distractors A and B "chosen in consideration of"? May bit a little confusing. Does Containment temperature also need to be included? **(BANK)**
32	F	2				X								E	007K1.03 This K/A was changed from original K/A. Change appears to be acceptable. Question appears to match K/A. Distractors B and D do not appear to be credible. Work on distractors **(NEW)**
33	H	2												E	008G2.1.30 Appears to match K/A. Very similar to question #5. May need to move distractors around. **(BANK).**
34	H	2												E	010A3.01 appears to match K/A. Not sure how you arrived at this pressure. With the PORV lifting and discharging to the PRT the pressure in the PRT will be not be based on PORV tailpipe temperature. More Expanation required. (NEW) Distractor analysis should state 230degrees.
35	H	2												S	012K3.04 Question appears to match K/A. **(BANK)**
36	H	2												S	013A4.03 Question appears to match K/A. **(NEW)**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
37	H	2	X											E	022A2.01 Question appears to match K/A. The stem states that all systems are in a normal lineup but the lesson material states that it is normal to have 3 containment cooler fans running while at power the stem states that only 2 CFCs are running in fast. Which one is correct or has plant normals changed? **(NEW)**
38	H	2					X							U	026A1.02 Question appears to match K/A. Distractors And B are subsets of the answer C. D could also be correct. This stem should also contain a reference to a procedure (I am assuming that 2B3 being locked out is the B train bus so B containment spray is not available. This question needs some work. **(NEW)**
39	H	2				X								E	039K1.02 Question kind of matches K/A. Add controls main steam header pressure at.... Distractor B does not appear to be credible. How could they operate different if they are in the same mode? **(BANK)**
40	H	2	X				X							U	059K4.18 Question appears to match K/A. Does the steam ADVs or dumps control reactor power at a higher level to allow turbine startup? If so is A really the correct answer? By reviewing the GOP if ADVs are in operation this May be True of SBCS is in operation B would be the correct answer. Need to add to stem what is happening in the plant. **(BANK)**
41	H	2				X								E	061A3.01 Question appears to match K/A. Why is distractor B credible if the throttle flow rate is 220 gpm? Fix distractor B. **(BANK)**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
42	F	2												E	062G 2.1.32 Question does not really meet K/A System precaution and limitations. The reference material attached refers to a step in the procedure and the reason for that step. It also states that fans A and B should be running therefore C and D should be secured This would make D the correct answer not B as stated on the answer key. Fix. **(NEW)**
43	H	2				X								U	003A2.05 Question appears to match K/A. B and D distractors are not credible. (Do you have a procedure to align CBO flow to the Quench Tank?) **(NEW)**
44	F	2										X		U	064K2.02 Does not meet K/A. The applicant only needs to know when the Fuel oil pumps starts and stops. If the applicant knows this the power supply portion is moot. **(Bank with power supply added)** Not really modified.
45	F	2	X											S	073K1.01 Question appears to match K/A. Stem should read **On** Unit 2. **(BANK)**
46	H	2												S	076A1.02 Question appears to match K/A. Very simple
47	F	2										X		U	078K2.02 Does not really match K/A. Does the site have any emergency air compressors? If not, is this the emergency mode that they would be running in? More information required. **(NEW)**
48	F	1				X								E	103K3.03 Question appears to match K/A. Distractor D needs some work: Both personnel Airlock doors are open with only one individual stationed to close doors. Recommend changing A to read Equipment hatch is closed and held in place with two bolts. **(BANK)** used on 2002 NRC exam

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
49	H	2					X							U	010A2.03 Question appears to match K/A. The answer given as the correct answer does not appear to be correct IAW 2-ONP-0120036 PZR Relief/Safety Valve. It appears that depending on the reference used there are multiple correct answers. **(NEW)**
50	F	2												U	063A4.02 Question appears to match K/A, if these indications are available in the control room. Are any of these indications available in the control room. If they are then we should direct this question to those indicators. **(NEW)**
51	H	3												S	062A2.11 Question appears to match K/A, although for the correct answer no action is required to restore equipment to its correct emergency power source (it already is), **Modified).**
52	F	2												S	008A4.08 Question appears to match K/A. K/A changed with out NRC permission **(BANK)**
53	F	2				X								U	076K4.03 Question appears to match K/A. Distractors B and C are not credible. I know of no system that controls inlet cooling water outlet. This term may confuse applicants. **(NEW)**
54	F	2												S	103K4.06 Question appears to match K/A. **(BANK)**
55	F	2				X								E	005K5.09 question appears to match K/A. Several distractors do not appear to be credible. K/A was changed without **NRC APPROVAL**.
56	F	2										X		U	011K2.02 Question does not meet K/A. The question states how to get power back to "A" heaters after an inadvertent SI (documentation supports an LOOP). None of these actually match the K/A of what is the power supply to the PZR heaters. **(BANK)**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
57	H	2										X		U	015A3.04 Question does not meet K/A. Maximum disagreement allowed between channels is not tested, but that is what the K/A is asking for. **Replace Question**. **(NEW)**
58	F	2												S	016K5.01 Question appears to meet K/A. **(BANK)**
59	F	2												E	056G2.2.25 Question appears to meet K/A. It is apparent from the background document that water for Unit 1 is included in the volume of the Unit 2 CST, but thee is not a reason included. Where is the reason documented.? **(BANK)**
60	H	2					X							U	027A2.01 (K/A swapped from SRO exam) Need to change K/A back to original K/A) Otherwise this question appears to match the K/A. Would a fire cause this alarm to come in? If so how can you say distractor D is wrong. **(BANK)**
61	F	2												S	034A1.02 Question appears to meet K/A. It is not modified the changes in the stem do not affect any of the distractors or the correct answer. It is understood that two distractors were changed however the correct answer is the same and it is in the same position as the original. **(BANK)**
62	H	2												S	041K4.17 Question appears to match K/A K/A changed with out NRC permission **(NEW)**
63	F	2				X								U	055k3.01 Question appears to match K/A. Distractor C and D are not plausible, and distractor A is also weak. Fix distractors or replace question. **(BANK)**
64	F					X								U	079K1.01 Question appears to match K/A. Distractor B is not credible (this could not be done withing 1 hour unless you have one in standby and ready to go). Distractor A also may not be credible. **(BANK)**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
65	F	2												S	001K6.14 Question appears to match K/A. **(BANK)** this is a memory level question see reference 2-0970030/
66	H	2	X	X					X					U	G2.1.20 Really does not match K/A. This is a collecting of verbs and how they may be used in a procedure. Do any of these steps actually state what the procedure states. Teaching in stem. Cold not find this step in the procedure.
67	H	2				X								E	G2.1.25 Question appears to match K/A. How can distractor C be credible minimum flow of 3000gpm with a maximum flow of 2850 gpm? The minimum flow is a direct lookup. **(BANK)** This K/A was swapped with an SRO K/A and needs to be swapped back.
68	H	2				X						X		U	G2.1.31 Question does not appear to match K/A what indications are they verifying correct? How is distractor D credible? **(NEW)**
69	F	2				X								E	G2.2.1 Question appears to match K/A. Distractor A is not credible. Otherwise appears to be sat. (Bank)
70	F	2												S	G2.2.13 Question appears to match K/A.
71	H	2				X								U	G2.2.34 Question appears to match K/A **This K/A was swapped with an SRO K/A and needs to be swapped back**. Distractors C and D do not make sense. **(BANK)**
72	F	2				X								E	G2.3.4 Question appears to match K/A. Change distractor A to 25 REM. **(BANK)**
73	F	2												S	G2.3.11 Question appears to match K/A.
74															G2.4.47 **This K/A was swapped with an SRO K/A and needs to be swapped back**

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			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
75	H	2										X		U	G2.4.10 Question really doesn't match the K/A. This is just recognition of what has happened. It does not test the knowledge of the Annunciator response procedures.