Draft Submittal

(Pink Paper)

SEQUOYAH APRIL/MAY 2007 EXAM

EXAM NOS. 05000327/2007301
AND 05000328/2007301

APRIL 9 - 11, 2007 AND
MAY 9, 2007 (written)

Reactor Operator Operator Written Exam

42. 038 EK3.06 001

When performing E-3, Steam Generator Tube Rupture, why is it important to isolate the ruptured steam generator from the intact steam generators?

A. All of the contingencies assume that the cooldown will NOT commence until this action is taken.

B. Limits primary to secondary leakage on the subsequent cooldown and depressurization.

C. Ensures that the subsequent cooldown will NOT result in a challenge to the PTS Safety Function.

D. Ensures that the differential pressure between the intact and ruptured SGs remains high enough to ensure early detection of subsequent failures.

A. Incorrect. Contingencies address inability to isolate ruptured SG in ECA series.
B. Correct. Cooling down the ruptured SG by depressurizing it will cause a higher DP, and more flow, from the RCS to the SG.
C. Incorrect. Challenges to Integrity are controlled by C/D rate.
D. Incorrect. Having a DP between the ruptured and intact SGs does not ensure early detection of additional failures.

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the reasons for the following responses as the apply to the SGTR: Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures

Question No. 47

Tier 1 Group 1

Importance Rating: RO 4.2

Technical Reference: E-3 Basis

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271E-3 Objective 4

Question Source: Bank

Question History: Callaway 2005

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

Source:	BANK	Source If Bank:	CALLAWAY 2005 NRC
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

X. LESSON BODY: **INSTRUCTOR NOTES**

5. ISOLATE flow from Ruptured S/G(s):
   a. Refer to EOP for Substeps
   b. Refer to EOP for RNO

   NOTE: Isolating the ruptured S/G is required to allow thermal stratification of the water in the ruptured S/G. This will allow a cooling down with the intact S/Gs while maintaining RCS subcooling. If ruptured S/G cannot be isolated then transition to ECA-3.

Objective 5
Limits flow through the Ruptured S/G ARV.
Limit Ruptured S/G pressure drop by isolating SF to TDAFW pump turbine
Contains radioactive material in the S/G and limits pressure drop in ruptured S/G
Isolates MSIVs, MSIV Bypass valves (and main steam header if MSIV cannot be closed) to limit pressure drop in ruptured S/G
Objective 7
Discuss RCS pressure, RCS temperature, Ruptured S/G pressure and intact S/G pressure for response to a ruptured S/G

CAUTION: Refer to CAUTION in EOP

Caution regarding feeding a ruptured S/g and using it for cooldown

6. MONITOR Ruptured S/G(s) level:
   a. Refer to EOP for Substeps
   b. Refer to EOP for RNO

To reduce feed flow to the ruptured steam generators to minimize the potential for steam generator overfill.
To establish and maintain a water level in the ruptured steam generators above the top of the U-tubes in order to promote thermal stratification to prevent ruptured steam generator depressurization.

7. VERIFY Ruptured S/G ISOLATED from Intact S/G(s).
   a. Refer to EOP for Substeps
   b. Refer to EOP for RNO

Allows cooldown of the RCS while maintaining subcooling. This allows thermal stratification of ruptured S/G water level and permits equalization of RCS and S/G pressure to stop leak flow

48. 055 EK3.01 001

Which ONE (1) of the following describes the minimum amount of time and reason why the station batteries (and load shedding instructions) are designed to ensure DC power is available after a loss of all AC power?

	Time	**Reason**
A.	2 Hours	station blackout rule
B.	2 Hours	technical specification requirement
C✓	4 Hours	station blackout rule
D.	4 Hours	technical specification requirement

a. Incorrect, batteries are rated (with load shedding) for 4 hours, without chargers to provide necessary DC power to maintain BOTH reactors at hot shutdown after a loss of ALL AC sources

b. Incorrect, batteries are rated (with load shedding) for 4 hours, without chargers to provide necessary DC power to maintain BOTH reactors at hot shutdown after a loss of ALL AC sources

c. Correct.

d. Incorrect, batteries are rated (with load shedding) for 4 hours, without chargers to provide necessary DC power to maintain BOTH reactors at hot shutdown after a loss of ALL AC sources

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the reasons for the following responses as the apply to the Station Blackout: Length of time for which battery capacity is designed

Question No. 48

Tier 1 Group 1

Importance Rating: RO 2.7

Technical Reference: FSAR 8.0 Electric Power, 8.1.4 Design Basis

Proposed references to be provided to applicants during examination:

Learning Objective: OPL271ECA-0.0, Obj 3.a
OPL273C0527, Obj 5

Question Source: Bank

Question History: 2004 NRC Exam

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.8

Comments:

Source:	BANK	Source If Bank:	SEQUOYAH 2004 NRC EX
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	YES

TRAINING OBJECTIVES:

A. Terminal Objective:

Upon completion of this lesson and others presented, the student shall demonstrate an understanding of the ECA-0.0, Loss of All AC Power by successfully completing a written examination with a score of 80 percent or greater.

B. Enabling Objectives

1. Explain the operational implications of the following concepts as they apply to a Loss of All AC Power. (EPE 055 EK1)
   a. Effect of battery discharge rates on capacity
   b. Natural Circulation Cooling

2. Explain the interrelations between a Loss of All AC Power and the following. (EPE 055 EK2)
   a. Valves
   b. Sensors, detectors and indicators
   c. Controllers and positioners
   d. Pumps
   e. Motors
   f. Heat exchangers and
   g. Breakers, relays, and disconnects

3. Explain the reasons for the following responses as they apply to a Loss of All AC Power. (EPE 055 EK3)
   a. Length of time for which battery capacity is designed
   b. Actions contained in EOP for loss of offsite and onsite power

4. Discuss the operation and monitoring of the following as they apply to a Loss of All AC Power (EPE 055 EA1)
   a. In-core thermocouple temperatures
   b. Manual EDG start
   c. Manual Main Turbine jacking
   d. Reduction of loads on the battery
   e. Battery, when approaching fully discharged
   f. Restoration of power with one EDG
   g. Restoration of power from offsite

5. Determine and interpret the following as they apply to a Loss of All AC Power (station blackout). (EPE 055 EA2)
   a. Existing valve positioning on a loss of instrument air system
   b. RCS core cooling through natural circulation cooling to S/G cooling
   c. Actions necessary to restore power
   d. Instruments and controls operable with only DC battery power available
   e. When battery is approaching fully discharged
   f. Faults and lockouts that must be cleared prior to re-energizing buses

APPENDIX B
Battery Capacity during SBO Event

125v DC Battery Capacity (FSAR requirements)

Capacity and Load Shed:

- Can supply all connected loads for 45 minutes
- Can supply all SBO load for an additional 195 minutes
- 10CFR50.63 requires SQN to mitigate a Station Blackout event within 4 hours
- 45 min + 195 min = 240 min or 4 hours.
- Load shed must be accomplished within 45 minutes
- AC power must be restore within 4 hours to recharge batteries
- Capacity is verified by load test

Battery recharging:

- Recharged within ≤12 hrs following 30 minutes of AC loss while supplying normal and accident loads
- Recharged within ≤36 hrs following 4 hours of AC loss while supplying normal loads

Single failure capacity during a loss of ALL Standby AC:

- Three batteries can supply all loads required for safe shutdown of both units
- Three batteries can supply essential loads to maintain the plant in safe shutdown

250v DC Battery Capacity (FSAR requirements)

Used during an SBO event to restore AC offsite power
Capacity to supply required load at the end of a 4 hour SBO event
Capacity is verified by analysis

5. Select recovery procedure after AC power restoration.

E. Step Discussion See EPM-3-ECA0.0 for detailed step bases

1. Step 1 suspends FRP implementation since they assume that at least one train of shutdown boards is energized. Status trees are monitored for information only. Once AC power is restored, either ECA-0.1 or ECA-0.2 will resume FRP implementation at the appropriate time.

   Without AC power, the ECCS pumps are inoperable and the FRPs are ineffective

2. Steps 2 and 3 verify reactor and turbine trips. Though these steps appear redundant to E-0's immediate actions, keep in mind that ECA-0.0 can be entered at any time that both trains of shutdown boards are observed to be deenergized (either by "rules of usage" or by foldout page transition). Thus, it is possible to enter this procedure before E-0 immediate actions have been performed.

   For example, it is possible to enter E-0, look at foldout page, and immediately transition to ECA-0.0 before performing E-0 Step 1

3. Step 4 records present time as a handy reference. To comply with the 4-hour battery coping requirement per 10CFR50.63, certain DC load shed actions must be performed within 45 minutes following the loss of all AC power event.

   Refer to 10CFR50.63 and plant modification DCN M09120A

4. Step 9 checks the TD AFW pump flow interlock that requires that flow be less than a certain setpoint to allow taking manual speed control of the TD AFW pump.

5. Step 10 attempts emergency start before normal start because emergency start can be done from the horseshoe area of the control room, while normal start requires a trip back to M-26.

   If at least one shutdown board on this unit is energized, then resume FRP implementation and return to procedure and step in effect

6. Step 11 is a continuous action step. If this step is reached, initial attempts to energize at least one train of shutdown boards have been unsuccessful. If power is subsequently restored to at least one train of shutdown boards at any time after this, the operator should proceed to Step 32 to begin recovery actions.

49. 056 G2.4.31 001

Given the following plant conditions:

- Unit 1 is at 80% power.
- The following alarm is received:
  - 1-AR-M1-B, B3, 6900V UNIT BD 1C FAILURE OR UNDERVOLTAGE
- Unit Board 1C has an 86-1C flag on the Alternate Feeder Breaker

Which ONE (1) of the following describes the unit condition and the actions required?

A. Unit Board 1C Failure; The unit should have tripped; Trip the reactor and enter E-0, Reactor Trip or Safety Injection.

B. Unit Board 1C Failure; The board should have transferred to the normal feeder; Verify the normal feeder is closed and operate the alternate feeder control switch to clear the disagreement light

C. Loss of Off-Site power to Unit Board 1C; The unit should have tripped; Trip the reactor and enter E-0, Reactor Trip or Safety Injection.

D. Loss of Off-Site power to Unit Board 1C; The board should have transferred to the normal feeder; Verify the normal feeder is closed and operate the alternate feeder control switch to clear the disagreement light.

A. Correct. Unit should have tripped on loss of #3 RCP. If undervoltage was the cause, the bus should have transferred and there will not be an 86 on it
B. Incorrect. Transfer would only occure for undervoltage
C. Incorrect. LOOP incorrect because of the red flag on the alternate feed, and the presence of no otgher alarms
D. Incorrect. LOOP incorrect due to red flag and no other alarms. If it was a loss of off-site feed, bus would transfer

QUESTIONS REPORT

for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Emergency Procedures / Plan Knowledge of annunciators alarms and indications, and use of the response instructions.

Question No. 49

Tier 1 Group 1

Importance Rating: RO 3.3

Technical Reference: AR-M1B, B3

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271AOP-P.01, B.7

Question Source: New

Question History:

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.7

Comments:

Source:	NEW	Source If Bank:	
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. PROGRAM: OPERATOR TRAINING - LICENSED

II. COURSE: LICENSE TRAINING

III. LESSON TITLE: AOP-P.01, LOSS OF OFFSITE POWER

IV. LENGTH OF LESSON/COURSE: 1.0 hour(s)

V. TRAINING OBJECTIVES:

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of AOP-P.01, LOSS OF OFFSITE POWER.

B. Enabling Objectives:

	Objectives
0.	Demonstrate an understanding of NUREG 1122 knowledge's and abilities associated with Loss of Offsite Power that are rated ≥ 2.5 during Initial License Training for and ≥-3.0 during License Operator Requalification Training the appropriate position as identified in Appendix A.
1.	State the purpose/goal of this AOP-P.01.
2.	Describe the AOP-P.01 entry conditions.
	a. Describe the setpoints, interlocks, and automatic actions associated with AOP-P.01 entry conditions.
	b. Describe the ARP requirements associated with AOP-P.01 entry conditions.
	c. Interpret, prioritize, and verify associated alarms are consistent with AOP-P.01 entry conditions.
	d. Describe the plant parameters that may indicate a Loss of Offsite Power.
3.	Describe the initial operator response to stabilize the plant upon entry into AOP-P.01.
4.	Upon entry into AOP-P.01, diagnose the applicable condition and transition to the appropriate procedural section for response.
5.	Summarize the mitigating strategy for the failure that initiated entry into AOP-P.01.
6.	Describe the bases for all limits, notes, cautions, and steps of AOP-P.01.
7.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
8.	Given a set of initial plant conditions use AOP-P.01 to correctly:
	a. Recognize entry conditions.

	Objectives
	b. Identify required actions.
	c. Respond to Contingencies.
	d. Observe and Interpret Cautions and Notes.
9.	Describe the Tech Spec and TRM actions applicable during the performance of AOP-P.01.
10.	Apply GFE and system response concepts to the abnormal condition – prior to, during and after the abnormal condition.

50. 057 AK3.01 001

Given the following plant conditions:

- Unit 1 is at 100% RTP
- A loss of 120V AC Vital Instrument Power Board 1-IV occurs.
- A reactor trip does NOT occur.

Which ONE (1) of the following describes action required and the reason for the action in accordance with AOP-P.03, Loss of Unit 1 Vital Instrument Power Board?

A. Place rod control in MANUAL due to loss of Auctioneered Tavg input; Control #4 Feedwater Reg Valve manually due to loss of AUTO control.

B. Place rod control in MANUAL due to loss of Auctioneered Tavg input; Control #2 Feedwater Reg Valve manually due to loss of AUTO control.

C. Place rod control in MANUAL due to loss of Tref input; Control #4 Feedwater Reg Valve manually due to loss of AUTO control.

D. Place rod control in MANUAL due to loss of Tref input; Control #2 Feedwater Reg Valve manually due to loss of AUTO control.

A. Correct. Loss of Auctioneeered Tavg would cause rod motion, so rods are placed in Manual. #4 FRV is also operated manually due to loss of control
B. Incorrect. Wrong FRV
C. Incorrect. Tref comes from board 1-I. Would be cause to place rods in manual, but Tref input is not lost. Correct FRV
D. Incorrect. Tref and #2 FRV are both incorrect for loss of board 1-IV

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital ac electrical instrument bus

Question No. 50

Tier 1 Group 1

Importance Rating: RO 4.1

Technical Reference: AOP P.03

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271AOP-P.03 & 04, B.3

Question Source: New

Question History:

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.7

Comments: -

Source:	NEW	Source If Bank:	
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** AOP-P.03 & .04, LOSS OF 120V AC VITAL INSTRUMENT POWER BOARDS

IV. **LENGTH OF LESSON/COURSE:** 2.0 hour(s)

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate *or* explain, using classroom evaluations and/or simulator scenarios, the requirements of AOP-P.03 & .04, LOSS OF 120V AC VITAL INSTRUMENT POWER BOARDS.

B. Enabling Objectives:

	Objectives
0.	Demonstrate an understanding of NUREG 1122 knowledge's and abilities associated with Loss of a Vital Instrument Power Board that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate position as identified in Appendix A.
1.	State the purpose/goal of this AOP-P.03 & -P.04.
2.	Describe the AOP-P.03 & -P.04 entry conditions.
	a. Describe the setpoints, interlocks, and automatic actions associated with AOP-P.03 & -P.04 entry conditions.
	b. Describe the ARP requirements associated with AOP-P.03 & -P.04 entry conditions.
	c. Interpret, prioritize, and verify associated alarms are consistent with AOP-P.03 & -P.04 entry conditions.
	d. Describe the plant parameters that may indicate a Loss of a Vital Instrument Power Board.
3.	Describe the initial operator response to stabilize the plant upon entry into AOP-P.03 & -P.04.
4.	Upon entry into AOP-P.03 & -P.04, diagnose the applicable condition and transition to the appropriate procedural section for response.

5.	Summarize the mitigating strategy for the failure that initiated entry into AOP-P.03 & -P.04.
6.	Describe the bases for all limits, notes, cautions, and steps of AOP-P.03 & -P.04.
7.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
8.	Given a set of initial plant conditions use AOP-P.03 & -P.04 to correctly:
	a. Recognize entry conditions.
	b. Identify required actions.
	c. Respond to Contingencies.
	d. Observe and Interpret Cautions and Notes.
9.	Describe the Tech Spec and TRM actions applicable during the performance of AOP-P.03 & -P.04.
10.	Apply GFE and system response concepts to the abnormal condition – prior to, during and after the abnormal condition.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.4 Loss of 120V AC Vital Instrument Power Board 1-IV

1. **CHECK** reactor TRIPPED

   OR

   Reactor Trip REQUIRED.

   - **GO TO** E-0, Reactor Trip or Safety Injection WHILE continuing in this procedure.

   PERFORM the following:

   a. **ENSURE** 1-FIC-3-103 SG-4 Main FW Reg Valve flow controller in MANUAL

   AND

   CONTROL S/G level(s) on program.

   b. **ENSURE** rod control in MANUAL.

   c. **MONITOR** Pressurizer Level and Pressure:

   IF pressurizer level approaches Reactor Trip setpoint (92%)

   OR

   Pressurizer pressure approaches PORV lift setpoint (2335 psig), **THEN**

   TRIP Reactor and **GO TO** E-0, Reactor Trip or Safety Injection WHILE continuing in this procedure.

2. **EVALUATE** the following Tech Specs for applicability:

   - 3.8.2.1, AC Power Distribution System, Operating
   - 3.8.2.2, AC Power Distribution System, Shutdown
   - 3.7.1.2, Auxiliary Feed Water

51. 058 AA1.01 001

Given the following plant conditions:

- Unit 1 is steady-state at 100% power.
- Unit 2 is in Mode 6 with vessel upper internals removal in progress.
- 125V DC Vital Battery IV Output Breaker tripped and can't be reclosed.

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

A. Align 125V DC Vital Battery Charger 1-S (spare) to Vital Battery Board IV.

B. Align 125V DC Vital Battery Bank V and Charger 2-S (spare) to Vital Battery Board IV.

C. Suspend core alterations on Unit 2 until 125V DC Channel IV is returned to OPERABLE status.

D. Restore 125V DC Channel IV to OPERABLE status within 15 minutes or initiate a shutdown of Unit 1.

A. Incorrect. Not capable of being aligned.

B. Correct. per 0-SO-250-1

C. Incorrect. No TS requirement.

D. Incorrect. Wrong time requirement per TS.

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Ability to operate and / or monitor the following as they apply to the Loss of DC Power: Cross-tie of the affected dc bus with the alternate supply

Question No. 51

Tier 1 Group 1

Importance Rating: RO 3.4

Technical Reference: AOP-P.02

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271AOP-P.02, B.8.b

Question Source: Bank

Question History:

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.10

Comments: –

Source:	BANK	Source If Bank:	SQN BANK
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	

I. **PROGRAM**: OPERATOR TRAINING - LICENSED

II. **COURSE**: LICENSE TRAINING

III. **LESSON TITLE**: AOP-P.02, LOSS OF 125V DC VITAL BATTERY BOARD

IV. **LENGTH OF LESSON/COURSE**: 2.0 hour(s)

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate *or* explain, using classroom evaluations and/or simulator scenarios, the requirements of AOP-P.02, LOSS OF 125V DC VITAL BATTERY BOARD.

B. Enabling Objectives:

	Objectives
0.	Demonstrate an understanding of NUREG 1122 knowledge's and abilities associated with Loss of 125V DC Vital Battery Board that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate position as identified in Appendix A.
1.	State the purpose/goal of this AOP-P.02.
2.	Describe the AOP-P.02 entry conditions.
	a. Describe the setpoints, interlocks, and automatic actions associated with AOP-P.02 entry conditions.
	b. Describe the ARP requirements associated with AOP-P.02 entry conditions.
	c. Interpret, prioritize, and verify associated alarms are consistent with AOP-P.02 entry conditions.
	d. Describe the plant parameters that may indicate a Loss of 125V DC Vital Battery Board.
3.	Describe the initial operator response to stabilize the plant upon entry into AOP-P.02.
4.	Upon entry into AOP-P.02, diagnose the applicable condition and transition to the appropriate procedural section for response.

5.	Summarize the mitigating strategy for the failure that initiated entry into AOP-P.02.
6.	Describe the bases for all limits, notes, cautions, and steps of AOP-P.02.
7.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
8.	Given a set of initial plant conditions use AOP-P.02 to correctly:
	a. Recognize entry conditions.
	b. Identify required actions.
	c. Respond to Contingencies.
	d. Observe and Interpret Cautions and Notes.
9.	Describe the Tech Spec and TRM actions applicable during the performance of AOP-P.02.
10.	Apply GFE and system response concepts to the abnormal condition – prior to, during and after the abnormal condition.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.4 Loss of 125V DC Vital Battery Board IV (cont'd)

8. **MONITOR** 125V Vital Battery Board IV ready to be ENERGIZED

   GO TO Step 12.

NOTE Restoring power from a charger is preferred after a fault on the battery board.

9. **RESTORE** 125V DC Vital Battery Board IV from one of the following **USING** 0-SO-250-1, 125 Volt DC Vital Power System: **[C.1]**

   - 125V DC Battery IV
   - 125V DC Vital Battery Charger IV
   - 125V DC Vital Battery Charger 2-S
   - Spare Vital Battery IV with Battery V

10. **MONITOR** 125V DC Vital Battery Bd IV voltage between 125V and 140V.

    CONTINUE with Step 12.

    WHEN voltage returned to normal, **THEN**
    GO TO Step 20.

11. **GO TO** Step 20.

57. 062 AK3.01 001

Given the following plant conditions:

- Unit 1 is tripped.
- The crew is performing actions of AOP-M.01, Loss of Essential Raw Cooling Water.
- ERCW Supply Header 2B to the Aux Building has been isolated to stop the leak.
- 0-FCV-67-152, CCS OB1/OB2 Discharge Valve to header B, has been closed.
- A Safety Injection signal is subsequently received.

Which ONE (1) of the following describes the function of 1-FCV-67-152 for these conditions?

A. The valve will open to its 35% open position. ERCW flow will be provided from Header 1B.

B. The valve will open to its 35% open position. NO ERCW flow will be provided.

C. The valve will remain closed because there is no ERCW pressure on the header.

D. The valve will remain closed because there is no ERCW Pump running on the header.

A. Incorrect. Since ERCW was manually isolated, no flow will be available
B. Correct. Valves open to Position A (35%)
C. Incorrect. The valves will rspond to the ESF actuation. Pressure on the header will not affect the ESF actuation
D. Incorrect. The valves will rspond to the ESF actuation. Pumps running on the header will not affect the ESF actuation

QUESTIONS REPORT

for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water The conditions that will initiate the automatic opening and closing of the SWS isolation valves to the nuclear service water coolers

Question No. 52

Tier 1 Group 1

Importance Rating: RO 3.2

Technical Reference: AOP-M.01, section 2.4 step 8

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271AOP-M.01, B.8.c

Question Source: New

Question History:

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.8

Comments:

Source:	NEW	Source If Bank:	
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** AOP-M.01 LOSS OF ESSENTIAL RAW COOLING WATER

IV. **LENGTH OF LESSON/COURSE:** 2.0 hour(s)

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of AOP-M.01, LOSS OF ESSENTIAL RAW COOLING WATER

B. Enabling Objectives:

0.	Demonstrate an understanding of NUREG 1122 Knowledge's and Abilities associated with a Loss of Essential Raw Cooling Water that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate license position as identified in Appendix A.
1.	Explain the purpose/goal of AOP-M.01.
2.	Discuss the AOP-M.01 entry conditions. a. Describe the setpoints, interlocks, and automatic actions associated with AOP-M.01 entry conditions. b. Describe the ARP requirements associated with AOP-M.01 entry conditions. c. Interpret, prioritize, and verify associated alarms are consistent with AOP-M.01 entry conditions. d. Describe the Administrative conditions that require Turbine Trip/ Reactor trip due to Loss of Essential Raw Cooling Water.
3.	Describe the initial operator response to stabilize the plant upon entry into AOP-M.01.
4.	Upon entry into AOP-M.01, diagnose the applicable condition and transition to the appropriate procedural section for response.
5.	Summarize the mitigating strategy for the failure that initiated entry into AOP-M.01.
6.	Describe the bases for all limits, notes, cautions, and steps of AOP-M.01.

7.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
8.	Given a set of initial plant conditions use AOP-M.01 to correctly: a. Recognize entry conditions b. Identify required actions c. Respond to Contingencies d. Observe and Interpret Cautions and Notes
9.	Describe the Tech Spec and TRM actions applicable during the performance of AOP-M.01.
10.	Apply GFE and system response concepts to the abnormal condition – prior to, during and after the abnormal condition

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.5 ERCW Supply Header 2B Failure to Auxiliary Building

CAUTION: During operation, CCP and SI Pumps may experience bearing failure 10 minutes after loss of ERCW cooling.

1. **DISPATCH** personnel to locate rupture.

2. **DISPATCH** operators with radios to perform Appendix F, Rx MOV Board ERCW Valves. [Aux Bldg el. 749', Rx MOV Boards].

3. **ENSURE** 2A-A CCP RUNNING.

4. **STOP** and **LOCK OUT** the following:

   - 2B-B CCP
   - 2B-B SI Pump

5. **DISPATCH** operator to place Aux Air Compressor B-B in SAFE STOP. [Aux Bldg, 734' elev, Refuel Floor]

NOTE The following step removes all cooling water from the 0B1/0B2 CCS HX.

6. **CLOSE** 2-FCV-67-147, Hdr 2B to Hdr 1A Isol Valve. [Rx MOV Bd 2B2-B Compt. 3B].

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.5 ERCW Supply Header 2B Failure to Auxiliary Building (cont'd)

CAUTION 1 **Crosstying A and B train ERCW supply headers should only be performed if cooling is urgently required for Unit 1 Train B CCS related equipment. LCO 3.0.3 may be applicable.**

CAUTION 2 **Opening of crosstie valve 1-FCV-67-147 (in Step 7.RNO) may result in fouling or blockage of 0B1/0B2 CCS Hx. If time permits, CCS Hx 0B2 should be isolated prior to opening crosstie valve to prevent fouling BOTH heat exchangers. After approx. 10 min, 0B2 CCS Hx will be returned to service.**

NOTE ERCW flow on 2B header will be very low if rupture was isolated in previous step.

7. **CHECK** ERCW Supply Hdr 2B parameters to determine if Rupture ISOLATED: –

   - 2-FI-67-62, at expected value
   - 2-PI-67-488A between 78 psig and 124 psig.

a. **CLOSE** 2-FCV-67-82, Aux Bldg Hdr 2B Isol Valve. [Rx MOV Bd 2B2-B Compt. 3C]

b. **IF** desired to isolate 0B2 CCS Hx prior to opening crosstie valve,
THEN
PERFORM the following:

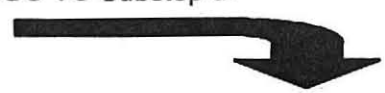
1) **CLOSE** 0-67-1501 CCS Hx 0B2 Inlet.

2) **WHEN** 0-67-1051 CLOSED,
THEN
OPEN 1-FCV-67-147, Hdr 1A to Hdr 2B Isol Valve. [Rx MOV Bd 1A2-A Compt. 9A].

RECORD time _____

3) **IF** CCS Hx 0B2 indicates fouling or flow blockage
OR 1-FCV-67-147 has been OPEN for approximately 10 minutes,
THEN
OPEN 0-67-1501 CCS Hx 0B2 Inlet.

4) **GO TO** Substep d.



(Step continued on next page)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.5 ERCW Supply Header 2B Failure to Auxiliary Building (cont'd)

7. (Continued)

c. **EVALUATE** opening 1-FCV-67-147, Hdr 1A to Hdr 2B Isol Valve [Rx MOV Bd 1A2-A Compt. 9A].

RECORD time _____

d. **IF** desired,
THEN
PLACE 0-FCV-67-152 in the 35% position.

e. **CLOSE** the following valves:

- 2-FCV-67-128, Hdr 2B Supply to Space Coolers, A/C & Air Compressors [Rx MOV Bd 2B2-B Compt. 6C]
- 2-FCV-67-123, Containment Spray HX 2B ERCW Supply [0-M-27A]
- 2-FCV-67-83, Lower Compt Cooler 2D Supply Isol [0-M-27A]
- 2-FCV-67-91, Lower Compt Cooler 2B Supply Isol [0-M-27A]
- 2-FCV-67-138, Upper Compt Cooler 2B Supply Isol [0-M-27A]
- 2-FCV-67-141, Upper Compt Cooler 2D Supply Isol [0-M-27A]

(Step continued on next page)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.5 ERCW Supply Header 2B Failure to Auxiliary Building (cont'd)

7. (Continued)

f. **DISPATCH** an operator to **CLOSE** the following valves:

- 2-67-524B, Supply Hdr 2B to Inst Room Cooler 2B
  [Aux Bldg, 669' elev, Penetration Room, above Ductwork by panel 2-L-26A].
- 2-67-675, ERCW Isol to B Shutdown Board Room A/C Water Chiller
  [Aux Bldg, elev 714' 12' up at Col R-A-12].
- 2-67-521B, Hypochlorite Treatment Circulation Line Isol
  [elev 669' TDAFWP Rm by ERCW supply valves]

g. **IF** 1A ERCW header was aligned to 0B1/0B2 CCS HX,
THEN
GO TO Step 9.

8. **ENSURE** the following valves are closed:

- 0-FCV-67-152, CCS HX 0B1/0B2 Disch Valve to Hdr B
- 0-FCV-67-151, CCS HX 0B1/0B2 Disch Valve to Hdr A
  [Rx MOV Bd 1A2-A Compt. 8D]

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.5 ERCW Supply Header 2B Failure to Auxiliary Building (cont'd)

9. **START** additional Lower Compartment Cooling Fans and CRDM Fans as required to maintain containment temperature.

10. **OPERATE** ERCW Pumps as necessary to perform the following:

    - **CONTROL** pressure between 78 psig and 124 psig.
    - **MAINTAIN** support of system loads

    IF ERCW header pressure is high, **THEN** **EVALUATE** opening ERCW supply to Containment Spray HX and/or DG HXs to reduce pressure.

11. **REFER TO** the following:

    - Appendix D, Affected Equipment List (Header 2B)
    - Appendix P, Potential Tech Spec Impacts.

12. **ENSURE** all breakers reopened **USING** Appendix F, Rx MOV Board ERCW Valves.

13. **REFER** to AOP-M.03, Loss of Component Cooling Water.

14. **GO TO** appropriate plant procedure.

END OF SECTION

76. E04 G2.1.28 001

Given the following plant conditions:

- Reactor Trip and Safety Injection have occurred on Unit 2.
- The crew has transitioned to ECA-1.2, LOCA Outside Containment.
- The leak has NOT been identified and the crew is preparing to isolate Cold Leg Injection.

Which ONE (1) of the following describes how Cold Leg Injection is isolated, and how to determine if the leak has been stopped in accordance with ECA-1.2?

A. Close FCV-63-93 and FCV-63-94, Cold Leg Injection Valves, simultaneously. Verify isolation by observing pressurizer level.

B. Close FCV-63-93 and FCV-63-94, Cold Leg Injection Valves, simultaneously. Verify isolation by observing RCS pressure.

C. Close FCV-63-93 and FCV-63-94, Cold Leg Injection Valves, one at a time. Verify isolation by observing pressurizer level.

D. Close FCV-63-93 and FCV-63-94, Cold Leg Injection Valves, one at a time. Verify isolation by observing RCS pressure.

A. Incorrect. Valves are closed 1 at a time, not simulataneously. RCS pressure is checked
B. Incorrect. Correct parameter but 1 valve closed at a time
C. Incorrect. PZR level is not the parameter checked, but actions are correct.
D. Correct.Valves are closed one at a time and pressure is checked prior to determining whether to reopen or leave closed. RCS pressure is the parameter checked

QUESTIONS REPORT

for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Conduct of Operations: Knowledge of the purpose and function of major system components and controls.

Question No. 53

Tier 1 Group 1

Importance Rating: RO 3.2

Technical Reference: ECA-1.2

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271ECA-1.2 Objective 4

Question Source: New

Question History:

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

Source:	NEW	Source If Bank:	
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

X. LESSON BODY: **INSTRUCTOR NOTES**

e. CHECK RCS pressure RISING.

RNO - GO TO Step 2.

f. GO TO Cautions prior to Step 4.

Basis:
This step instructs the operator to verify that all normally closed valves in low pressure lines and other plant specific lines that penetrate containment are closed. The valving connecting the RHR System to the RCS is of particular interest in this step since the RHR System is a low pressure system (600 psig) connected to the high pressure reactor coolant system (2500 psig). Therefore, a rupture or break outside containment is most probable to occur in the low pressure RHR System piping. These valves are normally closed following an accident.
Normal and excess letdown valves are also checked closed since these are plant-specific low pressure lines which penetrate containment.

If pressure is rising then the leak has been isolated from the RCS, therefore additional diagnosic steps continuing attempts to identify the leak are skipped over. However the leak may not be isolated from the RWST and loss of RWST inventory may be occurring.

If pressure is not rising then the leak has not been isolated from the RCS and steps to identify the source of the leak are to be completed

2. ATTEMPT to isolate break from RCS USING FCV-63-93:

a. CLOSE RHR Train A cold leg injection valve FCV-63-93.

RNO - GO TO Step 3.

b. CHECK RCS pressure RISING

RNO - PERFORM the following:
1) OPEN FCV-63-93.
2) GO TO Step 3.

c. GO TO Cautions prior to Step 4.

Basis:
This step instructs the operator to close the isolation valve in the low pressure injection line for Train A RHR that connects to the RCS and penetrates containment. If the LOCA outside containment occurred as a result of failed check valves on the cold leg injection lines to loops 2 and 3, then this action will isolate the break from the RCS.

To attempt to identify and isolate a LOCA outside containment.

This step begins instructing the operator to sequentially close and open all normally opened valves in paths that penetrate containment to identify and isolate the break outside containment.

IF the leak is isolated from the RCS additional diagnosic steps continuing attempts to identify the leak need not be performed. However the leak may not be isolated from the RWST and loss of RWST inventory may be occurring

X. LESSON BODY: **INSTRUCTOR NOTES**

3. ATTEMPT to isolate break from RCS USING FCV-63-94:
   a. CLOSE RHR Train B cold leg injection valve FCV-63-94.

      RNO - GO TO Cautions prior to Step 4.

   b. CHECK RCS pressure RISING.

      RNO - OPEN FCV-63-94.

Basis:
This step instructs the operator to close the isolation valve in the low pressure injection line for Train B RHR that connects to the RCS and penetrates containment. If the LOCA outside containment occurred as a result of failed check valves on the cold leg injection lines to loops 1 and 4, then this action will isolate the break from the RCS.

CAUTION 1 After the break is isolated from the RCS, loss of RWST inventory will continue until RWST leak path is isolated.

Basis:
This caution alerts operators that continued RWST inventory loss to the Auxiliary Building may be occurring until the affected RHR piping is isolated.

CAUTION 2 High radiation or high temperatures in the Auxiliary Building may prevent local determination of break location.

Basis:
This caution alerts operators that local determination of break location and status may not be safe or possible if high radiation or high temperature conditions prevent personnel access.

To attempt to identify and isolate a LOCA outside containment.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2. **ATTEMPT** to isolate break from RCS **USING** FCV-63-93:

   a. **CLOSE** RHR Train A cold leg injection valve FCV-63-93.

   a. **GO TO** Step 3.

   b. **CHECK** RCS pressure RISING.

   b. **PERFORM** the following:

      1) **OPEN** FCV-63-93.

      2) **GO TO** Step 3.

   c. **GO TO** Cautions prior to Step 4.

3. **ATTEMPT** to isolate break from RCS **USING** FCV-63-94:

   a. **CLOSE** RHR Train B cold leg injection valve FCV-63-94.

   a. **GO TO** Cautions prior to Step 4.

   b. **CHECK** RCS pressure RISING.

   b. **OPEN** FCV-63-94.

77. E05 EA1.3 001

Given the following plant conditions:

Unit 1 is responding to a Loss of Heat Sink per FR-H.1, Response to Loss of Secondary Heat Sink.

- All Steam Generator Wide Range levels are Off-Scale low.
- RCS temperature is approximately 588°F and rising slowly.

Which ONE (1) of the following describes the preferred method of initiating Auxiliary Feed flow for these conditions?

A. Feed at the highest possible rate to one S/G to preclude initiation of RCS Bleed and Feed.

B. Feed at the minimum required flow to prevent possible SG tube failures.

C. Feed at the highest possible rate to one S/G to reestablish SG inventory and secondary heat sink.

D. Feed at the minimum required flow to establish a controllable cooldown rate and prevent loss of RCS inventory.

A. Incorrect. Bleed and Feed would already be initiated under these conditions.
B. Incorrect. Tube failures are the primary concern when initiating feed, but for these conditions, restoration of 1 SG as soon as possible is the priority
C.Correct. If RCS temp is rising with no inventory, AFW flow should be directed to one SG at the max rate in an attempt to recover heat sink. This minimizes the chance for multiple tube failures as well as the quickest way to recover at least 1 SG as heat sink. At this point, bleed and feed should already be initiated.
D. Incorrect. On a loss of heat sink, cooldown rate is not the priority. The RCS has already heated up. Loss of inventory is a concern due to potential tube failures, but addressed by feeding only 1 SG

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the reasons for the following responses as they apply to the (Loss of Secondary Heat Sink) Desired operating results during abnormal and emergency situations.

Question No. 54

Tier 1 Group 1

Importance Rating: RO 3.8

Technical Reference: FR-H.1 BD

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271FR-H.1 Objective 4

Question Source: Bank

Question History: WTSI Various previous NRC

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.10

Comments: –

Source:	BANK	Source If Bank:	WTSI
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** FR-H.1, LOSS OF SECONDARY HEAT SINK

IV. **LENGTH OF LESSON/COURSE:** 2 hours

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of FR-H.1, Loss Of Secondary Heat Sink.

B. Enabling Objectives

0.	Demonstrate an understanding of NUREG 1122 Knowledge's and Abilities associated with FR-H.1, Loss Of Secondary Heat Sink, that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate license position as identified in Appendix A.
1.	Explain the purpose/goal of FR-H.1.
2.	Discuss the FR-H.1 entry conditions. a. Describe the setpoints, interlocks, and automatic actions associated with FR-H.1 entry conditions. b. Describe the requirements associated with FR-H.1 entry conditions.
3.	Summarize the mitigating strategy for the failure that initiated entry into FR-H.1.
4.	Describe the bases for all limits, notes, cautions, and steps of FR-H.1.
5.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
6.	Given a set of initial plant conditions use FR-H.1 to correctly: a. Identify required actions b. Respond to Contingencies c. Observe and Interpret Cautions and Notes
7.	Apply GFE and system response concepts to the performance of FR-H.1 conditions.

X. LESSON BODY:		INSTRUCTOR NOTES
30.	ATTEMPT to align condensate flowpath to S/G(s): a. Refer to FR-H.1 for Substeps b. Refer to FR-H.1 for RNO *NOTE: When condensate flowpath is established, depressurize S/G at maximum rate using S/G ARVs until flow is established. Dump steam from additional S/Gs as necessary.*	Attempts to establish secondary heat sink in at least one SG may have been initiated in previous steps before initiation of bleed and feed heat removal. These attempts should be continued until a secondary heat sink is restored.
CAUTION:	Refer to CAUTION in FR-H.1 *NOTE: Reestablishment of the secondary heat sink will permittermination of the bleed and feed heatremoval method and establish stabilized plant conditions.*	Control feedwater flow ratesto limit RCS shrinkage and pressure transients.
31.	CONTROL feed flow to S/G: a. Refer to FR-H.1 for Substeps b. Refer to FR-H.1 for RNO *NOTE: If S/G being fed is NOT intact then establish feed flow to an intact S/G and isolate the affected S/G.*	If CETs are rising, the maintain maximum feed flow to one S/G WR level until 10%. If S/G WR level is <10% control feed flow between 25 and 100 gpm to restore S/G level and limit thermal stresses.
32.	DETERMINE if secondary heat sink restored: a. Refer to FR-H.1 for Substeps b. Refer to FR-H.1 for RNO	Assumes secondary heat sink is restored and begins recovery from feed and bleed. If heat sink is NOT restored, then GO TO step 29 and continue attempts to restore secondary heat sink
33.	CHECK RCS temperatures: a. Refer to FR-H.1 for Substeps b. Refer to FR-H.1 for RNO	Checks adequate heat sink is restored and begins recovery from feed and bleed
34.	VERIFY reactor head vent valves CLOSED. a. Refer to FR-H.1 for RNO	Begins termination of feed and bleed

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION **Controlling feedwater flow rates during S/G level recovery will limit RCS shrinkage and pressure transients.**

31. **CONTROL** feed flow to S/G:

a. **CHECK** Core Exit TCs STABLE or DROPPING.	a. **ESTABLISH** maximum available feed flow to one S/G. **WHEN** wide range level greater than 10% [30% ADV], **THEN** **PERFORM** Substep 31.c. **GO TO** Substep 31.d.

(Step continued on next page.)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

31. b. **CHECK** wide range level on selected S/G greater than 10% [30% ADV]

b. **CONTROL** feedwater flow to dry S/G as follows:

1) **IF** AFW flow is available, **THEN** **CONTROL** feed flow to one S/G between 25 and 100 gpm.

2) **IF** only condensate flow available, **THEN** **CONTROL** condensate flow as low as achievable while maintaining the following:

- Core Exit TCs DROPPING
- wide range S/G level RISING.

3) **WHEN** wide range level greater than 10% [30% ADV], **THEN** **PERFORM** Substep 31.c.

GO TO Substep 31.d.

c. **CONTROL** S/G feed flow as necessary to restore narrow range level in selected S/G between 10% [25% ADV] and 50%.

d. **NOTIFY** Chem Lab to sample S/G being fed for activity.

(Step continued on next page.)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

31. e. **MONITOR** if S/G being fed is INTACT:
    - NO abnormal radiation
    - S/G pressure CONTROLLED or RISING.

    e. IF S/G is NOT INTACT, **THEN PERFORM** the following:
    1) **ESTABLISH** feed flow to another intact S/G.
    2) **ISOLATE** affected S/G.

    f. **NOTIFY** TSC to determine recovery methods for any remaining dry S/Gs (S/Gs with <u>wide range</u> level less than 10% [30% ADV]).

32. **DETERMINE** if secondary heat sink restored:

    a. **CHECK** <u>narrow range</u> level in at least one S/G greater than 10% [25% ADV].

    a. **GO TO** Step 29.

33. **CHECK** RCS temperatures:
    - Core exit T/Cs DROPPING
    - RCS T-hot DROPPING.

    GO TO Step 29.

80. E11 EK3.2 001

Which ONE (1) of the following describes the reason and limits required for RCS depressurization in accordance with ECA-1.1, Loss Of RHR Sump Recirculation?

A. To minimize RCS leakage, depressurize the RCS until Pressurizer level is > 65% OR RCS Subcooling is between 40°F and 50°F.

B. To increase SI Injection flow, depressurize the RCS until Pressurizer level is > 54% AND RCS Subcooling is between 20°F and 30°F.

C. To ensure CL Accumulator Injection, depressurize the RCS until Pressurizer level is > 65% AND RCS Subcooling is between 40°F and 50°F.

D. To allow RHR to be placed in service, depressurize the RCS until Pressurizer level is > 54% OR RCS Subcooling is between 20°F and 30°F.

A. Correct. The depressurization is performed to decrease leakage, therefore decreasing makeup requirements.
B. Incorrect. SI injection flow may not increase because there may be no water source.
C. Incorrect. Setup for accumulator injection is performed later in the procedure after SG depressurization.
D. Incorrect. RHR will not be placed in service until after the cooldown and depressurization are performed, later in the procedure.

Knowledge of the reasons for the following responses as they apply to the (Loss of Emergency Coolant Recirculation) Normal, abnormal and emergency operating procedures associated with (Loss of Emergency Coolant Recirculation).

Question No. 55

Tier 1 Group 1

Importance Rating: RO 3.5

Technical Reference: ECA-1.1 and basis

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271ECA-1.1 Objective 4

Question Source: Bank

Question History: WTSI Last Exam VCS 06 Audit

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Source:	BANK	Source If Bank:	WTSI
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** EMERGENCY OPERATING PROCEDURE ECA-1.1, "Loss of RHR Sump Recirculation"

IV. **LENGTH OF LESSON/COURSE:** 1 hour(s)

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of ECA-1.1, "Loss of RHR Sump Recirculation"

B. Enabling Objectives:

B. Enabling Objectives:

0.	Demonstrate an understanding of NUREG 1122 Knowledge's and Abilities associated with Loss of RHR Sump Recirculation that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate license position as identified in Appendix A.
1.	Explain the purpose/goal of ECA-1.1.
2.	Discuss the ECA-1.1 entry conditions. a. Describe the setpoints, interlocks, and automatic actions associated with ECA-1.1 entry conditions. b. Describe the requirements associated with ECA-1.1 entry conditions.
3.	Summarize the mitigating strategy for the failure that initiated entry into ECA-1.1.
4.	Describe the bases for all limits, notes, cautions, and steps of ECA-1.1.
5.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
6.	Given a set of initial plant conditions use ECA-1.1 to correctly: a. Identify required actions b. Respond to Contingencies c. Observe and Interpret Cautions and Notes
7.	Apply GFE and system response concepts to the performance of ECA-1.1 conditions.

X. LESSON BODY:	INSTRUCTOR NOTES
27. DEPRESSURIZE RCS to reduce RCS subcooling: a. Refer to EOP for Substeps b. Refer to EOP for RNO	Decreases RCS pressure to limit break flow for a small break flow if in progress. Terminate depressurization when RCS subcooling requirements are met or PZR level increases that might limit further pressure decreases
28. DETERMINE if RHR should be placed in service: a. Refer to EOP for Substeps b. Refer to EOP for RNO	If prerequisite requirements for RHR system operation are met and TSC concurs then place RHR cooling in service
29. MONITOR if CLAs should be isolated: a. Refer to EOP for Substeps b. Refer to EOP for RNO	Isolates or vents CLA to prevent injection of nitrogen into RCS. Traps nitrogen in CLA after all available water has been injected into RCS.
30. MONITOR if RCPs should be stopped: a. Refer to EOP for Substeps b. Refer to EOP for RNO	Continuous action step. Stops RCPs when RCS pressure is to low to support RCP seal operation
31. CHECK RCS temperature greater than 200°F. a. Refer to EOP for RNO	*Objective 5* If RCS temperature is <200°F skip steps 31 – 40 which depressurizes the S/G to lower RCS temperature
32. CHECK RWST level less than <8%. a. Refer to EOP for RNO	*Objective 5* If RCS temperature is >200°F and water is still left in the RWST then GO TO step 1 and continue core cooling by injection from the RWST
33. PLACE pumps taking suction from RWST in PULL TO LOCK: a. Refer to EOP for Substeps	Prevents cavitation of these pumps for empty RWST

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Upper head voiding may occur during RCS depressurization if no RCPs are running. This may result in rapidly rising pressurizer level.

27. **DEPRESSURIZE** RCS to reduce RCS subcooling:

a. **CHECK** RCS subcooling based on core exit T/Cs greater than 50°F.

a. **GO TO** Step 28.

b. USE normal pressurizer spray.

b. USE one pressurizer PORV.

IF RCS CANNOT be depressurized USING any pressurizer PORV,
THEN
ESTABLISH auxiliary spray USING EA-62-4, Establishing Auxiliary Spray.

c. **DEPRESSURIZE** RCS UNTIL either of the following conditions SATISFIED:

- RCS subcooling based on core exit T/Cs between 40°F and 50°F.

  OR

- Pressurizer level greater than 65%.

c. IF RCS subcooling less than 40°F,
THEN
RAISE RCS makeup flow to restore subcooling.

d. WHEN either condition in Substep 27.c is met,
THEN
STOP RCS depressurization.

81. E12 G2.4.31 001

Given the following plant conditions:

- A steam line rupture has occurred on Unit 1.
- The crew was unable to isolate SGs.
- ECA-2.1, Uncontrolled Depressurization of All Steam Generators, is in progress.
- The crew has taken action to minimize the plant cooldown.
- AFW flow to S/Gs 1, 3 and 4 are currently at 25 gpm.
- The following alarms are received:
  - 1-AR-M3-C3, STM GEN #1 LEVEL LOW
  - 1-AR-M3-C5, STM GEN #3 LEVEL LOW
  - 1-AR-M3-C6, STM GEN #4 LEVEL LOW

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

A. Raise AFW flow to #1, #3, and #4 SGs to ensure NR level remains above 10%

B. Raise AFW flow to #1, #3, and #4 SGs to ensure NR level remains above 50%

C. Maintain AFW flow at its current value. When Thot starts to rise, raise AFW flow.

D. Maintain AFW flow at its current value. When 3 of 4 SGs are at the applicable setpoint, take action in accordance with FR-H.1, Response to Loss of Secondary Heat Sink.

A. Incorrect. After throttling to minimize RCS cooldown, even if levels are low, AFW remains throttled until Thot begins to rise. At that point, AFW is throttled just enough to stabilize temperature. Credible because 10% is the lower limit that level is checked at
B. Incorrect. After throttling to minimize RCS cooldown, even if levels are low, AFW remains throttled until Thot begins to rise. At that point, AFW is throttled just enough to stabilize temperature. Credible because 50% is the upper limit that level is checked at
C. Correct.
D. Incorrect. Since this an operator induced reduction of AFW flow, FR-H.1 actions would not be performed

QUESTIONS REPORT

for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Emergency Procedures / Plan Knowledge of annunciators alarms and indications, and use of the response instructions

Question No. 56

Tier 1 Group 1

Importance Rating: RO 3.3

Technical Reference: ECA-2.1, AR M3

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271ECA-2.1, B.6.a

Question Source: New

Question History:

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.10

Comments:

Source:	NEW	Source If Bank:	
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** ECA-2.1, "UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS"

IV. **LENGTH OF LESSON/COURSE:** 1 hour(s)

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of ECA-2.1, Uncontrolled Depressurization of All Steam Generators

B. Enabling Objectives:

0.	Demonstrate an understanding of NUREG 1122 Knowledge's and Abilities associated with Uncontrolled Depressurization of All Steam Generators that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate license position as identified in Appendix A.
1.	Explain the purpose/goal of ECA-2.1.
2.	Discuss the ECA-2.1 entry conditions. a. Describe the setpoints, interlocks, and automatic actions associated with ECA-2.1 entry conditions. b. Describe the requirements associated with ECA-2.1 entry conditions.
3.	Summarize the mitigating strategy for the failure that initiated entry into ECA-2.1.
4.	Describe the bases for all limits, notes, cautions, and steps of ECA-2.1.
5.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
6.	Given a set of initial plant conditions use ECA-2.1 to correctly: a. Identify required actions b. Respond to Contingencies c. Observe and Interpret Cautions and Notes

7.	Discuss the reasons for maintaining a minimum flow to the S/Gs with levels less than 10% during the uncontrolled depressurization of all SGs.
8.	Apply GFE and system response concepts to the performance of ECA-2.1 conditions.

OBJECTIVES TO BE COVERED IN THESE SEQUOYAH OPERATOR TRAINING PROGRAMS

OBJECTIVE NO.	NONLICENSED OPERATORS	LICENSE TRAINING		
		RO	SRO	REQUAL/SPECIAL
0.		X	X	
1.		X	X	
2.		X	X	
3.		X	X	
4.		X	X	
5.		X	X	
6.		X	X	
7.		X	X	
8.		X	X	

NOTE: The following approval is required for License Requalification and special training only:

Training Program _____

Sequoyah Operator Training Manager _____ /_____
Date

Sequoyah Operations Manager _____ /_____
Date

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE Reducing total feed flow to less than 440 gpm, as directed in this procedure, does NOT require implementation of FR-H.1, Loss of Secondary Heat Sink, as long as a total feed flow capability of 440 gpm is available.

2. **CONTROL** feed flow to minimize RCS cooldown:

a. **CHECK** T-cold cooldown rate less than 100°F/hr.

a. **REDUCE** feed flow to 25 gpm to each S/G.

OPEN MD AFW pump recirc valves FCV-3-400 and FCV-3-401 as necessary to control flow.

GO TO Substep 2.c (AER column).

b. **MONITOR** S/G narrow range levels less than 50%.

b. **CONTROL** feed flow to maintain S/G narrow range levels less than 50%.

c. **MONITOR** S/G narrow range levels greater than 10% [25% ADV].

c. **MAINTAIN** feed flow to affected S/G(s) greater than or equal to 25 gpm UNTIL level greater than 10% [25% ADV].

d. **MONITOR** T-hot indications STABLE or DROPPING.

d. **IF** RCS T-hot is rising, **THEN** **STABILIZE** RCS T-hot:

- **RAISE** feed flow

  OR

- **DUMP** steam.

2. 001 AA2.04 001

Given the following plant conditions:

Unit 1 is at 90% power.

Which ONE (1) of the following sets of parameters will increase during an inadvertent continuous control rod withdrawal event?

A. Reactor Power and Charging Flow

B. RCS Hot Leg Temperature and Departure From Nucleate Boiling Ratio

C. OT Delta T Setpoint and Main Steam Header Pressure

D. RCS Hot Leg Temperature and Reactor Power

A-Incorrect. Charging flow will decrease because pressurizer level will increase due to heatup. Credible because the parameter does change ans reactor power does rise

B-incorrect because DNBR gets lower (Closer to DNB) as temperature rises. Credible because temperature does rise.

C-Incorrect. OT Delta T setpoint will decrease in relation to Tavg increasing. Credible because the parameter changes, and steam pressure does rise.

D-Correct. Hot leg temperature rises, as does reactor power, due to the positive reactivity being added. OT and OP delta T setpoints will lower as power and temperature rise

QUESTIONS REPORT

for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Reactor power and its trend

Question No. 57

Tier 1 Group 2

Importance Rating: RO 4.2

Technical Reference: T&AA

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271CGFES Attachment 16 Objective 20

Question Source: Bank

Question History: Robinson 2007 Editorially Modified

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.5

Comments:

Source:	BANK	Source If Bank:	ROBINSON 2007 NRC
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

PWR INSTRUCTOR GUIDE

VOLUME: REACTOR THEORY **TIME 8 HRS**

INSTRUCTOR GUIDE: REACTOR OPERATIONAL PHYSICS **REV 2**

OBJECTIVES

15. Explain the characteristics to look for when the point of adding heat is reached.

16. Describe reactor power response after reaching the point of adding heat.

17. 18. Describe the monitoring and control of reactor power and primary temperature from 0% to 15% (Babcock & Wilcox Plants).

19. Describe the means by which reactor power will be increased to rated power.

20. Explain the effects of control rod motion or boration/dilution on reactor power.

21. Describe the monitoring and control of T_{ave}, T_{ref}, and power during power operation.

22. Explain the relationship between steam flow and reactor power given specific conditions.

23. Explain reactor response to a control rod insertion.

24. Explain the shape of the curve of reactor power versus time after a reactor trip.

25. Define decay heat.

26. Explain the relationship between decay heat generation and:

    a. Power level history

    b. Power production

    c. Time since reactor shutdown

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INSTRUCTOR GUIDE	KEY POINTS, AIDS, QUESTIONS/ANSWERS
A. Reactor power is maintained at approximately 2% while secondary plant is prepared for power operations 1. When turbine generator is ready for startup, reactor operator withdraws control rods as necessary to establish approximately 7-15% power 2. Steam is bled directly to condenser by steam dump system to maintain steam pressure 3. As turbine generator draws more steam, steam dump system automatically reduces amount of steam being bled to condenser 4. RCS temperature and reactor power are maintained at approximately constant levels 5. When turbine generator load has increased to match reactor power, steam dumps will be fully closed 6. Power escalation continues by gradually opening main turbine governor valves.	
B. When power is increased above 15%, control rods may be placed in automatic control	Objective 18 Objective 19 and 20

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INSTRUCTOR GUIDE

1. The control rods will step out automatically to raise T_{ave} in accordance with ramped T_{ave} versus power program (Figure 8-18)

2. Values shown are for typical 4-loop Westinghouse plant
3. Actual values will vary from plant to plant

C. Figure 8-18 is representative for many Westinghouse plants and is similar to that of CE stations as well

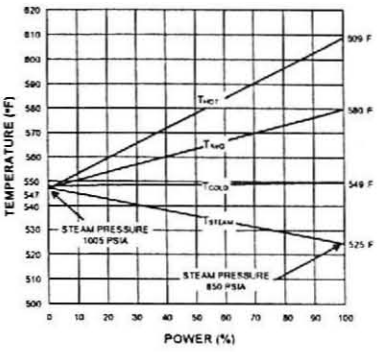
1. In general, CE station will tend to hold T_{cold} as constant as possible, whereas Westinghouse plant will often have T_{cold} drop as function of reactor power
2. However, in some cases, T_{cold} will actually rise somewhat, as denoted in Figure 8-18

D. The key for both Westinghouse and CE stations, however, is that T_{ave} will rise (or slide) as function of reactor power, as shown in Figure 8-18

E. The reason for sliding T_{ave} upward (or holding T_{cold} constant) is to enable steam pressure to remain higher at 100% turbine load

KEY POINTS, AIDS, QUESTIONS/ANSWERS

Figure 8-18 / TP 8-58



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7. 005 AA2.02 001

Given the following plant conditions:

- During a power decrease, ONE (1) Control Bank D rod becomes mispositioned 14 steps out from its group.
- The crew is attempting to realign the rod in accordance with the appropriate procedure.
- The rod has been misaligned for 40 minutes

Assuming the rod can be moved, which ONE (1) of the following is the speed at which the rod will move when it is realigned?

A. 32 steps per minute

B. 48 steps per minute

C. 64 steps per minute

D. 72 steps per minute

A. Incorrect. 32 SPM is part of the variable speed for auto rod control 3-5 deg F mismatch.
B. Correct. Control Bank in Manual or Bank Select will initiate motion at 48 SPM

C. Incorrect. 64 SPM is for Shutdown Banks
D. Incorrect. 72 SPM is maximum variable speed

QUESTIONS REPORT

for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Ability to determine and interpret the following as they apply to the Inoperable / Stuck Control Rod: Difference between jog and run rod speeds, effect on CRDM of stuck rod

Question No. 58

Tier 1 Group 2

Importance Rating: RO 2.5

Technical Reference: Rod Control SD, pg 38

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271AOP-C.01 Objective 5
OPT200RDCNT Objective 4.e

Question Source: New

Question History:

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.6

Comments:

Source:	NEW	Source If Bank:	
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** AOP-C.01, ROD CONTROL SYSTEM MALFUNCTIONS

IV. **LENGTH OF LESSON/COURSE:** 2.0 hour(s)

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate *or* explain, using classroom evaluations and/or simulator scenarios, the requirements of AOP-C.01, ROD CONTROL SYSTEM MALFUNCTIONS

B. Enabling Objectives:

	Objectives
0.	Demonstrate an understanding of NUREG 1122 knowledge's and abilities associated with Continuous Rod Withdrawal, Dropped Control Rod, and Inoperable/Stuck Control Rod that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate position as identified in Appendix A.
1.	State the purpose/goal of this AOP-C.01.
2.	Describe the AOP-C.01 entry conditions.
	a. Describe the setpoints, interlocks, and automatic actions associated with AOP-C.01 entry conditions.
	b. Describe the ARP requirements associated with AOP-C.01 entry conditions.
	c. Interpret, prioritize, and verify associated alarms are consistent with AOP-C.01 entry conditions.
	d. Describe the plant parameters that may indicate rod control failure.
3.	Describe the initial operator response to stabilize the plant upon entry into AOP-C.01.
4.	Upon entry into AOP-C.01, diagnose the applicable condition and transition to the appropriate procedural section for response.
5.	Summarize the mitigating strategy for the failure that initiated entry into AOP-C.01.
6.	Describe the bases for all limits, notes, cautions, and steps of AOP-C.01.

X. LESSON BODY: **INSTRUCTOR NOTES**

mm. ADJUST PLANT TURBINE LOAD AS REQUIRED.

nn. GO TO APPROPRIATE PLANT PROCEDURE — ***This is the endpoint of CASE 2.***

E. Case 3 – Misaligned shutdown/control rod(s) or bank — *Objective 8, Case Study*

Single misaligned control rod, from 60% reactor power.

1. Mitigating Strategy — *Objective 5*
   - If >1 rod misaligned then trip the reactor or shutdown the unit as required
   - If only 1 rod is misaligned, then realign the misaligned rod
   - Stabilize the plant
   - Monitor QPTR within limits
   - Reduce load to <75% power in preparation for re-alignment
   - Correct the initiating cause
   - Realign the misaligned rod or bank
   - Update ICS, P/A converter, and bank overlap as required
   - Restore control rods to AUTO
   - Adjust turbine load as required.

2. Diagnosis

   a. Symptoms - QPTR alarms, Power Range channel deviation alarm. — *Objective 2*

3. Procedure flow path.

   a. Evaluate Tech Specs for applicability — Tech Specs will be discussed later in this lesson

   b. Diagnosis step.

      (1) This step offers little in the form of diagnostic steps, rather directs the crew to the proper section once the failure is determined. — Use diagnostic table in Section 2 of AOP

      (2) Once misaligned rod is diagnosed. **GO TO SECTION 2.3** — *Objective 4*

I. **PROGRAM:** OPERATOR TRAINING

II. **COURSE:** SYSTEMS TRAINING

III. **TITLE:** ROD CONTROL SYSTEM (RDCNT)

IV. **LENGTH OF LESSON:** 2 hour lecture; 1 hour simulator demonstration; 1 hour self-study/workshop

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:
Upon completion of this lesson and others presented, the student should be able to apply the knowledge to support satisfactory performance of the tasks associated with the Rod Control system in the plant and on the simulator.

B. Enabling Objectives:

0. Demonstrate an understanding of NUREG 1122 knowledge's and abilities associated with the Rod Control System that are rated $\geq$ 2.5 during Initial License training for the appropriate license position as identified in Appendix A.
1. State the purpose/functions of the Rod Control System as described in the SQN FSAR.
2. State the design basis of the Rod Control System in accordance with the SQN FSAR.
3. Explain the purpose/function of each major component in the flow path of the Rod Control System as illustrated on the simplified system drawing.
4. Describe the following items for each major component in the Rod Control System as described in this lesson:
   a. Location
   b. Power supply (include control power as applicable)
   c. Support equipment and systems
   d. Normal operating parameters
   e. Component operation
   f. Controls
   g. Interlocks (including setpoints)
   h. Instrumentation and Indications
   i. Protective features (including setpoints)
   j. Failure modes
   k. Unit differences
   l. Types of accidents for which the Rod Control System components are designed
   m. Location of controls and indications associated with the Rod Control System in the control room and auxiliary control room

Pulser, Continued

Process signals

The table below describes the process signals of the two pulsers.

Pulser	Signal	Mode	Description
Variable Rate Pulser	Input	Auto	receives a speed signal from the Reactor Control Unit
		Manual on an individual control bank	receives a speed signal from a manual speed adjust resistor in the Process cabinets set for 48 SPM.
		Shutdown Bank (SBA and SBB only)	receives a speed signal from a manual speed adjust resistor in the Process Cabinet set for 64 SPM.
	Output	Auto	8-72 spm (48-432 pulses/min)
		Manual or individual control bank	48 spm (288 pulses/min)
		Shutdown Bank	64 spm (372 pulses/min)
	Signal	**Description**	
Constant Rate Pulser	Input	receives a speed signal from a speed adjusting resistor in the SCD logic circuit of the Logic Cabinet.	
	Output	64 spm (64 pulses/min)	

Shutdown banks

The first variable-rate pulser controls shutdown banks A and B because they are contained in the same power cabinets as the control banks. The constant rate pulser only controls shutdown banks C and D.

37. 028 AK3.05 001

Given the following plant conditions:

- Unit 1 is at 100% power.
- Load is being reduced to 50% to remove a Main Feedwater Pump from service.
- Pressurizer Level Control is selected to LI-68-339
- The Pressurizer Level Master Controller setpoint fails at its current value.
- The load reduction is initiated.

Which ONE (1) of the following describes the action that will be taken, and the reason for those actions?

A. Change the pressurizer level channel input to the master controller and restore Letdown because the backup level channel will cause a letdown isolation.

B. Take manual control of, and reduce Charging flow because actual pressurizer level will be higher than program level for the actual power level as load is decreased.

C. Take manual control of, and raise Charging flow because actual pressurizer level will be lower than program level for the actual power level as load is decreased.

D. Change the pressurizer level channel input to the master controller and restore Letdown because the controlling level channel will cause a letdown isolation.

A. Incorrect. Changing input will not affect the controller because the setpoint has failed, not the input
B. Correct.
C. Incorrect. Charging flow must be reduces because level will be artificially high
D. Incorrect. Changing input will not affect the controller because the setpoint has failed. Letdown will not isolate because actual level will indicate the same on all channels

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions: Actions contained in EOP for PZR level malfunction

Question No. 59

Tier 1 Group 2

Importance Rating: RO 3.7

Technical Reference: 1-AR-M5-A E-4

Proposed references to be provided to applicants during examination: None

Learning Objective: OPT200.PZRLCS Objective 5.d

Question Source: New

Question History:

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.10

Comments: -

Source:	NEW	Source If Bank:	
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

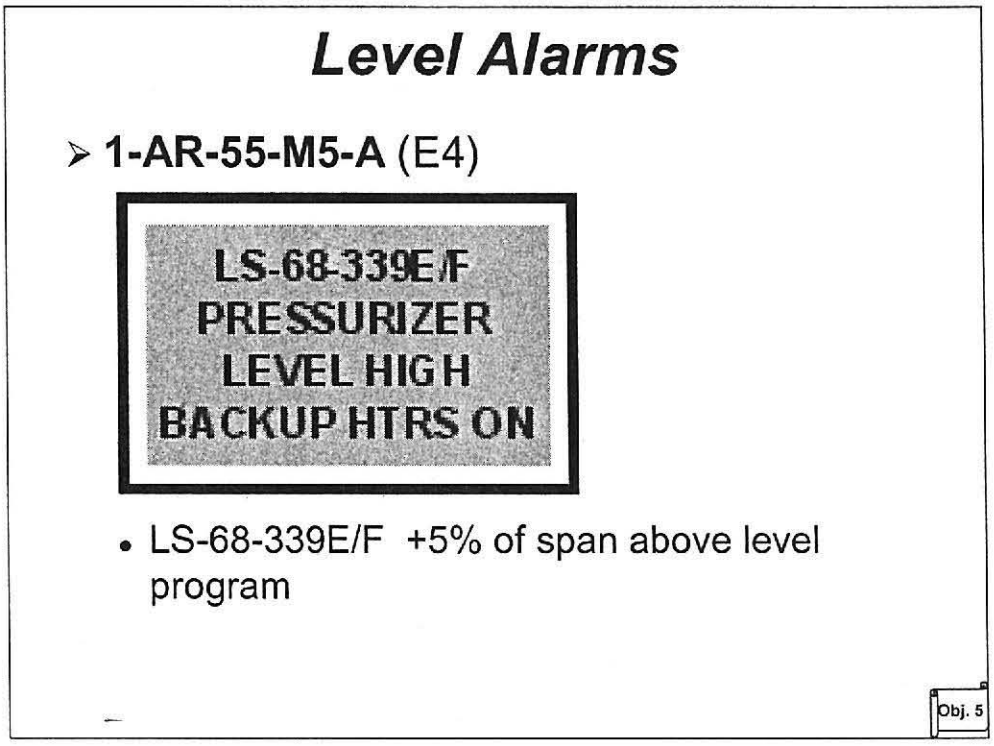
V. TRAINING OBJECTIVES (Cont'd):

B. Enabling Objectives (Cont'd):

5. Describe the operation of the Pressurizer Level Control System as it relates to the following:
   a. Precautions and limitations
   b. Major steps performed while placing the Pressurizer Level Control System in service
   c. Alarms and alarm response
   d. How a component failure will affect system operation
   e. How a support system failure will affect the Pressurizer Level Control System operation
   f. How a instrument failure will affect system operation
6. Describe the administrative controls and limits for the Pressurizer Level Control System :
   a. State Tech Specs/TRM LCOs that govern the Pressurizer Level Control System
   b. State the ≤1 hour action limit TS LCOs
   c. Given the conditions/status of the Pressurizer Level Control System components and the appropriate sections of the Tech Spec, determine if operability requirements are met and what actions are required
7. Discuss related Industry Events:
   a. Event Title: SQ970649PER - U-1 pressurizer was drained below 25% actual level while decreasing level from solid water conditions

VI. TRAINING AIDS:

A. Computer.
B. Computer Display Projector & Controls.
C. Local Area Network (LAN) Access.
D. Simulator (if available)



X. LESSON BODY:

Alarms: Review alarms using the slide above.

- Refer to the appropriate annunciator response procedure for full details including setpoints, alarms sources, and operator actions.

Bases for energizing heaters on +5% level deviation:

- The level deviation-high is assumed to be an insurge produced by a decrease in load, introducing subcooled water enters the pressurizer.
- If a subsequent outsurge were to occur, the subcooled water would not assist in maintaining pressure by flashing to steam.
- It is conservatively assumed that a subsequent outsurge will occur, therefore, the backup heaters are energized as an anticipatory measure.

Source	Setpoint	LS-68-339E/F PRESSURIZER LEVEL HIGH BACKUP HTRS ON
SER 367 1-LS-68-339E/F	5% of span above level program	

Probable Causes

1. Charging and/or letdown flow mismatch.
2. Instrument malfunction of level or Tavg.
3. Load transient condition.

Corrective Actions

[1] **CONFIRM** instrumentation by CHANNEL CHECK

[2] **IF** instrument has failed, **THEN**
GO TO AOP-I.04, Pressurizer Instrument Malfunction.

[3] **IF** instrument has not failed, **THEN**
ENSURE level is returning to program 1-LR-68-339 with appropriate charging and letdown.

[4] **IF** RCS pressure ≥ 2265 psig, **THEN**
DEENERGIZE backup heater 1C. **[C.1]**

[5] **EVALUATE** Technical Specifications (3.3.1 and 3.3.2).

References

45B655-05A-0,
45N657-15,
47B601-68-45

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

1. 059 AK1.02 001
Given the following plant conditions:

- An accidental spill of the Monitor Tank has occurred in the Aux Building.
- Radiation levels in the area of the spill are 40 mr per hour at 30 cm.
- Contamination levels on the floor around the tank are $1.2E^6$ DPM/100 cm^2

Which ONE (1) of the following describes (1) the major radiation concern for the spill, and (2) the postings applied to the area?

A. (1) Area radiation is a gamma concern; Contamination is a gamma concern
(2) Radiation area; Contamination area

B. (1) Area radiation is a gamma concern; Contamination is a beta concern
(2) Radiation area; High Contamination area

C. (1) Area radiation is a beta concern; Contamination is a gamma concern
(2) High Radiation area; Contamination area

D. (1) Area radiation is a beta concern; Contamination is a beta concern
(2) High Radiation area; High Contamination area

A. Incorrect. This area should be posted as a high contamination area
B. Correct. Area radiation is typically gamma, while contamination is beta radiation. Less than 100 mr per hour is a radiation area. Greater than 50,000 DPM/100 cm2 is a contaminated area. Greater than 50,000 dpm/100 cm2 is a high contamination area
C. Incorrect. Concerns for the effects are reversed, and postings are incorrect
D. Incorrect. Concerns for effects of area is incorrect and posting for radiation is incorrect

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the operational implications of the following concepts as they apply to Accidental Liquid Radwaste Release: Biological effects on humans of various types of radiation, exposure levels that are acceptable for nuclear power plant personnel, and the units used for radiation-intensity measurements and for radiation exposure levels

Question No. 60

Tier 1 Group 2

Importance Rating: RO 2.6

Technical Reference: SPP-5.1, RCI-15

Proposed references to be provided to applicants during examination: None

Learning Objective: RWT-010,

Question Source: New

Question History:

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.12

Comments:

Source:	NEW	Source If Bank:	
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

Lens Dose Equivalent (LDE) - Applies to the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm^2).

Licensee - Means the holder of a license.

Member of the Public - Any individual except when that individual is receiving an occupational dose.

Occupational Dose - The dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation and/or radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include dose received from background radiation, as a patient from medical practices, or from voluntary participation in medical research, or as a member of the public.

On-The-Job Training (OJT) - Performance of duties, commensurate with the level to which the training will be credited, under the direction of appropriately experienced personnel.

Planned Special Exposure (PSE) - An infrequent exposure to radiation, separate from and in addition to the annual dose limits.

RADCON Instrument - Any RADCON instrument used (not including installed facility radiation monitoring system) to measure radiation exposure, exposure rate, dose, dose rate, dose equivalent, or dose equivalent rate or to assess airborne or surface contamination. Instruments utilized in the external and internal dosimetry programs are excluded from this definition.

RADCON Technician - A technician qualified in radiation protection and serving in a responsible position per ANSI N18.1-1971.

Radiation Area - An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem in one hour at 30 cm from the radiation source or from any surface that the radiation penetrates.

Radiation Work Permit (RWP) - A document for controlling the radiological aspects of work.

Radiologically Controlled Area (RCA) - An area within (or that may coincide with) the Restricted Area (defined in 10 CFR 20.1003) boundaries that may have increasing radiological hazards.

Removable Contamination - Contamination which may be easily transferred to personnel or surfaces through casual contact.

Response Check - Exposure of the instrument to radiation in a reproducible geometry such that a reading is obtained for each scale or decade normally used in order to verify that the instrument response is acceptable for performing surveys.

Restricted Area - Any area access to which is limited by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials (10 CFR 20.1003).

Declared Pregnant Woman - Means a woman who has voluntarily informed the licensee, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.

Deep Dose Equivalent (DDE) - Applies to external whole-body exposure. The dose equivalent at a tissue depth of 1 cm (1000 mg/cm^2).

Derived Air Concentration (DAC) - The concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2000 hours under conditions of light work (inhalation rate 1.2 cubic meters of air per hour), results in an intake of one ALI. For modes of intake other than inhalation, an equivalent DAC-hr shall be determined and included as DAC-hrs in the individual's dose tracking record. The equivalent DAC-hr is equal to the number of hours of exposure at the DAC (i.e., DAC-hrs exposure which would result in an equivalent intake of radioactive material as has been observed in a particular exposure incident). This permits the comparison of intake by inhalation with other modes of intake (ingestion, injection, absorption, etc.). 2000 DAC-hr is equal to one ALI.

Dose - A generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent, as defined in applicable sections of 10 CFR 20.

NOTE For purposes of this document and implementing procedures, radiation exposure as expressed in units of R/hr and subunits, thereof, is equivalent to dose (rad) and dose equivalent (rem). Based on ANSI N13.11 development and terminology, any acute dose greater than 10 rem is generally denoted in units of rad, since that level is considered as the accident range of personnel exposure. Any dose less than that level is considered the protective range of personnel exposure.

Experience - As used in this document and ANSI N18.1-1971and ANSI/ANS-3.1 (1981), actual applicable working experience performing duties commensurate with the position. Observation of others is not considered experience. Up to 12 months of OJT may be credited toward experience on a one-for-one basis.

Fixed Contamination - Contamination which is not transferred through casual contact and is not detected by smear survey. It may become removable through operations such as grinding, welding, etc.

High Radiation Area - An area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 100 mrem in 1 hour at 30 centimeters from the radiation source or 30 centimeters from any surface that the radiation penetrates.

Hot Particle - A single discrete object (particle) generally difficult to see (usually <100 micron) with the naked eye, and at least 0.1 microcuries of radioactivity. It is either an activated corrosion/wear product or fuel fragment with high specific activity. For the purpose of an approximate field calculation, any discrete particle surveyed with a standard frisker probe (HP-260, HP-210, etc.) and found to have levels of greater than or equal to 20,000 cpm, shall be considered a hot particle.

Individual Monitoring Devices (individual monitoring equipment) - Means devices designed to be worn by a single individual for the assessment of dose equivalent such as film badges, thermoluminescence dosimeters (TLDs), pocket ionization chambers, and personal ("lapel") air sampling devices.

Screen post6

POSTED AREAS

Screen TCPTV

Radioactive Materials Area

Define and recognize a Radioactive Materials Area.

Any area or room in which radioactive material is used, stored, or transferred. In addition to the yellow and magenta colors and tri-blades, the word CAUTION or DANGER will appear on posting.

Screen TCPTW
trn2 cr 99-0072

All radioactive materials shall be stored in designated radioactive material storage area or room with the posting "Caution, Radioactive Material." All radioactive material shall be labeled with a "Caution, Radioactive Material" tag.

You must notify RADCON prior to placement or removal of radioactive material from a radioactive material storage area.
Unlabeled radioactive material shall not be left unattended.
If you find a radiological material container which is torn, unsealed, unlabeled, or unattended, call RADCON.

Screen TCPTX

All items which have been used in a contaminated area or potentially contaminated system are considered contaminated until surveyed and released by RADCON.

These items shall be placed in a sealed yellow container/bag containing the radioactive material symbol.
Containers with radioactive liquids require special care. RADCON may perform surveys during the movement. These items should be transported in a rigid device such as a bucket, drum or cart if there is potential for the primary container to be damaged and leak.

Screen TCPTY

Radioactive material which is being transported from one RCA to another through a clean area will normally be escorted by RADCON, except when properly bagged hand tools or protective clothing, certain chemistry samples, and materials are transported by other authorized persons.

You must maintain control of radioactive material in your possession while frisking or getting undressed upon exiting a contamination zone.
Ensure you place the radioactive material away from other personnel.

Screen post9

Radiation Area

Define and recognize a Radiation Area.

An accessible area in which a person could receive a deep dose in excess of 5 mrem in one hour (5 mrem/hr) at 30 centimeters (about 1 foot) from the source.

The word "caution" will appear on the radiological posting.

Screen post10

Entry requirements are the same for Radiologically Controlled Area (RCA) entry.

Screen post11
trn2 cr 99-0004

High Radiation Area

Define and recognize a High Radiation Area.

An accessible area in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 100 mrem in 1 hour (100 mrem/hr) at 30 centimeters (about 1 foot) from the radiation source or 30 centimeters from any surface that the radiation penetrates.

Screen post12

The word "caution" or "danger" will appear on the standard radiological posting.

Screen post13

Entry requirements for a High Radiation Area:

Screen post14

- **All RCA entrance requirements apply.**

Screen post15

- **Either a dose warning device, dose rate meter, or RADCON coverage. Any entry into a high radiation area without one of these items will subject the individual and TVAN to an NRC violation!!!!**

Screen post17

Notify the RADCON group prior to ANY entry into a High Radiation Area.

Screen post18

Any entry into a High Radiation Area WITHOUT the ability to keep track of dose rates is a serious violation of plant procedure and may cause an overexposure.

Screen post19
Define and recognize a Locked High Radiation Area

Areas where dose rates are greater than 1000 mrem/hr at 30 cm from the source shall be posted as a Locked High Radiation Area and locked (with a key controlled by RadCon).

- **If the area can not be locked, a continuous attendant (door watch) must be present. The door watch will be briefed in Locked High Radiation Area door watch requirements.**

Screen post19a

- **If it becomes necessary to lock areas that do not have a permanent enclosure, a temporary enclosure may be installed around the area and locked with a High Radiation Area padlock.**

- **Electronic surveillance may also be used to prevent unauthorized entries.**

Screen quiz1
trn2 cr 99-0083

QUESTION: The room you are working in has a dose rate of 50 mrem/hr. It should be posted as a high radiation area.

True or False

Screen quiz1c

ANSWER: False. The room should be posted as a radiation area. A High Radiation Area has dose rates in excess of 100 mrem/hr.

6.0 REQUIREMENTS (Continued)

D. Positive engineering controls may be necessary to ensure that airborne radioactivity does not spread to other plant areas. Ventilation systems in affected rooms should be operable and maintain a negative pressure differential. Items such as glove bags or containment tents may be utilized to confine the source of airborne radioactivity and portable ventilation systems may be used to control the spread of generated airborne radioactivity. Airborne Radioactivity Areas must be promptly posted and necessary precautions taken to ensure that the airborne radioactivity is confined within the posted area.

6.12 Contamination Area

A. **10CFR20** does not define criteria for establishing or posting of a Contamination Area. The criterion of $\geq$ 1,000 dpm/100 cm^2 of transferrable contamination is used to define this establishment and posting.

B. A Contamination Area is an area, accessible to individuals, in which transferrable contamination levels are $\geq$ 1000 dpm/100 cm^2.

C. Each Contamination Area shall be posted with a conspicuous sign or signs bearing the standard radiation symbol and the words **Caution - Contamination Area**.

D. The entrance/exit for a Contamination Area is identified by the use of a step-off-pad (SOP). Directions printed or written on the SOP instruct individuals exiting the area to remove contaminated clothing prior to stepping onto the SOP, to prevent the spread of contamination outside of the posted Contamination Area.

E. It may impractical to post and establish all Contamination Areas as described above. Due to space limitations and physical properties, some areas such as floor drains or sample/instrument panels may be identified with radiation tape and/or radiation caution tags.

6.13 High Contamination Area

A. **10CFR20** does not define criteria for establishing or posting of a High Contamination Area. The criterion of $\geq$ 50,000 dpm/100 cm^2 of transferrable contamination in the general area is used to define this establishment and posting.

B. A High Contamination Area is an area, accessible to individuals, in which transferrable contamination levels in the general area are $\geq$ 50,000 dpm/100 cm^2.

Screen trel d

Characterize the methods of shielding alpha radiation.

Screen trel e

Characterize the exposure hazard of alpha radiation.

Screen trel p

State the four types of radiation found in a commercial nuclear power plant.

Screen trel q

Characterize where gamma radiation is found.

Screen trel r

Characterize gamma radiation by its penetrating ability.

Screen trel s

Characterize the methods of shielding gamma radiation.

Screen trel t

Characterize the exposure hazard of gamma radiation.

Identify the type of radiation that contributes the most too a worker's dose.

Screen trel f

State the four types of radiation found in a commercial nuclear power plant.

Screen trel g

Characterize where beta radiation is found.

α **Alpha particles can be shielded by a piece of paper, by the dead layer of skin on the surface of the body, or by clothing.**

α **However, because alpha particles are highly energetic, they can damage the softer internal tissues if deposited for a period of time.**

We say then, that it is primarily an INTERNAL HAZARD.

γ Gamma Radiation

Gamma radiation has no electrical charge or mass. It's a wave of pure ENERGY!

γ **Sources include fission, fission products, and activation products.**

γ **Gamma radiation is a VERY penetrating form of wave radiation.**

Gamma ray can easily penetrate the walls of piping containing radioactive materials.

γ **Gamma radiation can be REDUCED by shielding the source of the radiation with very dense material such as lead, steel, or concrete.**

γ **Gamma radiation is an extremely penetrating wave that is an external hazard to the whole body. The majority of nuclear plant worker dose is from GAMMA radiation.**

β Beta Radiation

Beta radiation is made up of high speed particles with a negative electrical charge which originate from the nucleus of an atom.

β **Source of most beta particles is from activated corrosion and fission products.**

Screen tre1h

Characterize beta radiation by its penetrating ability.

β **Penetration in air is usually limited to a few feet, but beta particles have more penetrating power than alpha particles.**

Screen tre1l

Characterize the methods of shielding beta radiation.

β **The best shielding for beta is a few layers of lightweight plastic or light metal.**

Screen tre1j

Characterize the exposure hazard of beta radiation.

β **Eyes and skin can be affected by beta radiation, but normally it can only penetrate a few layers of skin.**

Personnel would have to work fairly close to a beta source to receive much exposure.

Screen tre1k

State the four types of radiation found in a commercial nuclear power plant.

η Neutron Radiation

Neutron particles are part of the atomic nucleus that has been freed by either decay or fission. Neutrons have no electrical charge.

Screen tre1l

Characterize where neutron radiation is found.

– η **Fission process creates neutron particles.**

Screen tre1m

Characterize neutron radiation by its penetrating ability.

η **Neutron particles are very penetrating.**

Screen tre1n

Characterize the methods of shielding neutron radiation.

η **They are best shielded by water, concrete, or thick polyethylene.**

Screen tre1o

Characterize the exposure hazard of neutron radiation.

η **Due to the high-penetration capabilities of neutron radiation, it is an external hazard to the whole body.**

Neutron exposure mainly occurs when in close proximity to the reactor only while it is operating.

Screen quiz2
trn2 cr 99-0083

QUESTION: Most ionizing radiation dose at the station is from this type of radiation:

alpha or beta or neutron or gamma

Screen quiz2d

ANSWER: Gamma radiation is very penetrating and is located at various locations in the plant, therefore causing most of our dose.

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

1. 060 AK1.01 001
Which ONE (1) of the following COMPLETELY lists ALL of the exhaust locations monitored for airborne effluents that are potential sources of geaseous waste, and the units that the effluents are measured in?

A. Condenser Vacuum Exhaust for each unit, an Auxiliary Building Exhaust and a Shield Building Exhaust for each unit; measured in counts per minute.

B. Condenser Vacuum Exhaust for each unit, a Service Building Exhaust, an Auxiliary Building Exhaust and a Shield Building Exhaust for each unit; measured in counts per minute.

C. Condenser Vacuum Exhaust for each unit, an Auxiliary Building Exhaust and a Shield Building Exhaust for each unit; measured in mRem per hour.

D. Condenser Vacuum Exhaust for each unit, a Service Building Exhaust, an Auxiliary Building Exhaust and a Shield Building Exhaust for each unit; measured in mRem per hour.

A. Incorrect. Also have a service building exhaust.

B. Correct.

C. Incorrect. Also have a service building exhaust, and measured in CPM

D. Incorrect. Measured in CPM, but all monitors are included

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the operational implications of the following concepts as they apply to Accidental Gaseous Radwaste Release: Types of radiation, their units of intensity, and the location of sources of radiation in a nuclear power plant

Question No. 61

Tier 1 Group 2

Importance Rating: RO 2.5

Technical Reference: OPT200.RM

Proposed references to be provided to applicants during examination: None

Learning Objective: OPT200.RM, Obj 4

Question Source: Modified

Question History: SQN ODCM B.2-2

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.13

Comments: –

Source:	MODIFIED	Source If Bank:	
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

ENABLING OBJECTIVES

4. Describe the following characteristics of each major component in the Radiation Monitoring System:
   - Location
   - Power supply (include control power as applicable)
   - Support equipment and systems
   - Normal operating parameters
   - Component operation
   - Controls
   - Interlocks (including setpoints)
   - Instrumentation and Indications

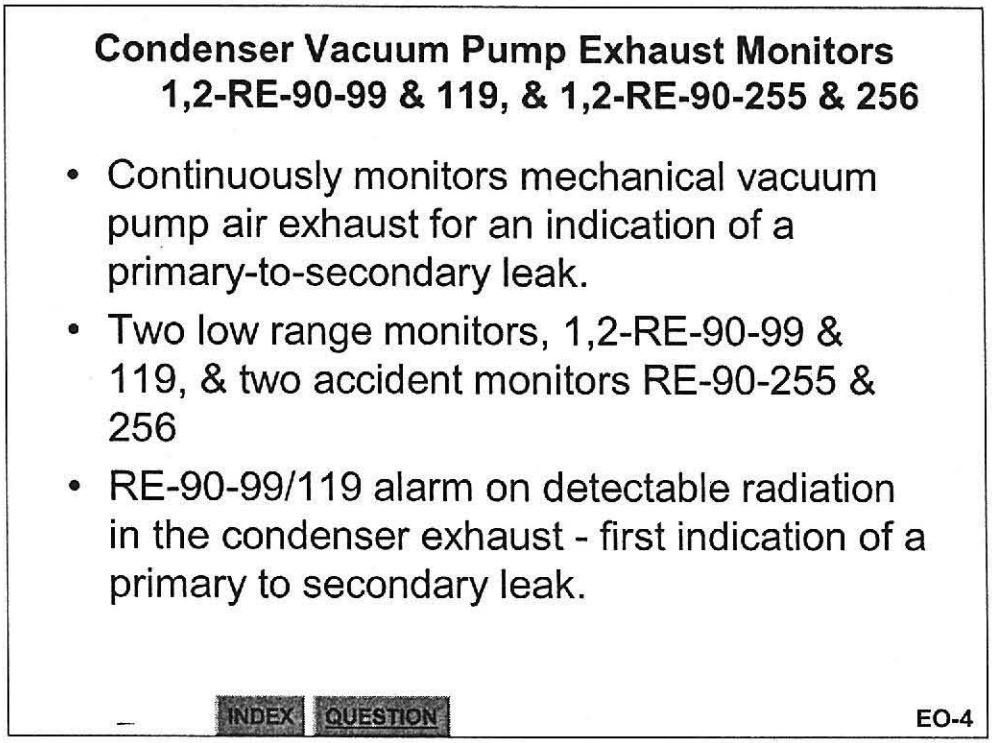
INDEX

I. INTRODUCTION

C. Lesson Purpose and Significance

- This lesson does not include a detail study of all the theory behind radiation and the principles used to measure it.
- Radiation Monitor Student Handout (includes General Background on Radiation Detection Principles) gives information concerning types of radiation, interaction with matter, detection of radiation and types of detectors.

Instructor Note: Have the students refer to this handout if there is a need to review these principles. This handout should be in the students hands a day previous to the class for review.



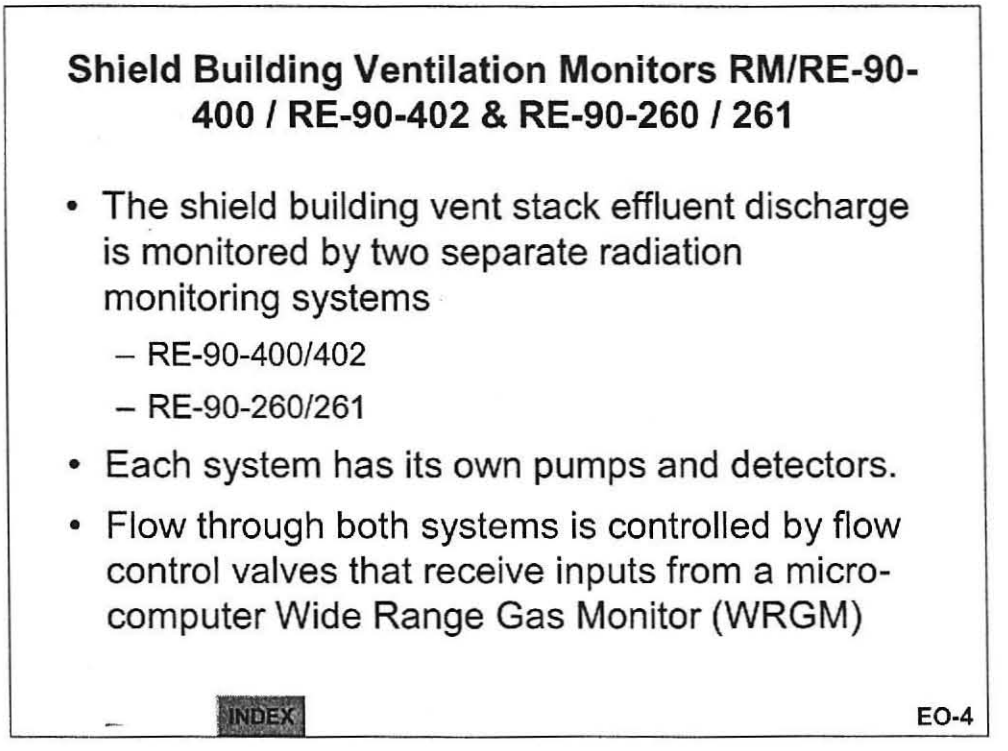
X. LESSON BODY

D. Major Components

4. Process and Effluent *Gas* Monitors

Condenser Vacuum Pump Exhaust Monitors 1, 2-RE-90-119, 1,2-RE-90-99, 1,2-RE-90-255, 1,2-RE-90-256

- Continuously monitor the mechanical vacuum pump air exhaust for an indication of a primary-to-secondary leak.
- Two low range monitors, 1,2-RE-90-99 and 1,2-RE-90-119, and two accident monitors RE-90-255 & 256 (mid & high range) – overlapping ranges
- RE-90-99 or 119 continuously samples the condenser vacuum pump exhaust to monitor noble gas concentrations for indications of primary to secondary leakage and for evaluations of radioactivity released to the environment.
    - Cover the same range of concentrations - both monitors should not be in service at the same time due to flow limitations on the condenser vacuum pump exhaust.
    - alarm on any detectable reading of radiation in the condenser exhaust - first indication of a primary to secondary leak.
- RE-90-255 & 256, provides detection of noble gases over the entire range of concentrations from normal operations to accident conditions.
- 99 & 119 located on el. 732 of the turbine bldg.
    - Power Supply:- 480 V C&A Vent Board
    - Instrumentation: Radiation process & area monitor power dist panel



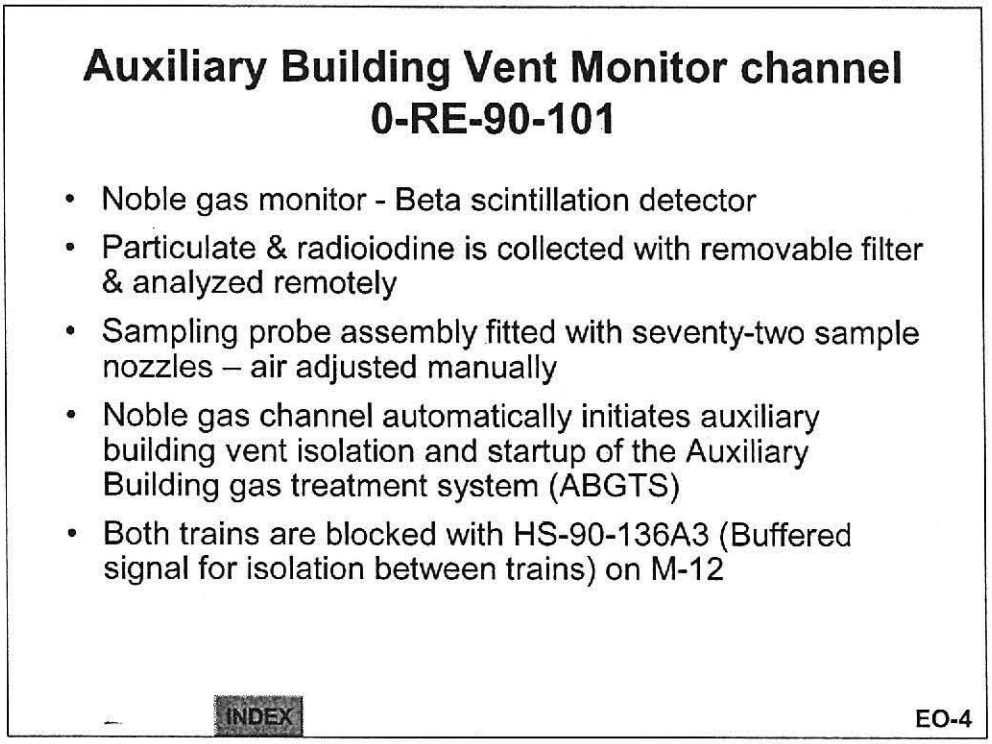
X. LESSON BODY

D. Major Components

4. Process and Effluent *Gas* Monitors

Shield Building Ventilation Monitors RM/RE-90-400, RE-90-402, RE-90-260, RE-90-261

- The shield building vent stack effluent discharge is monitored by two separate radiation monitoring systems, the RE-90-400/402 & RE-90-260/261.
- Each system has its own pumps and detectors.
- Flow through these two systems is controlled by flow control valves which receive inputs from a micro-computer Wide Range Gas Monitor (WRGM).



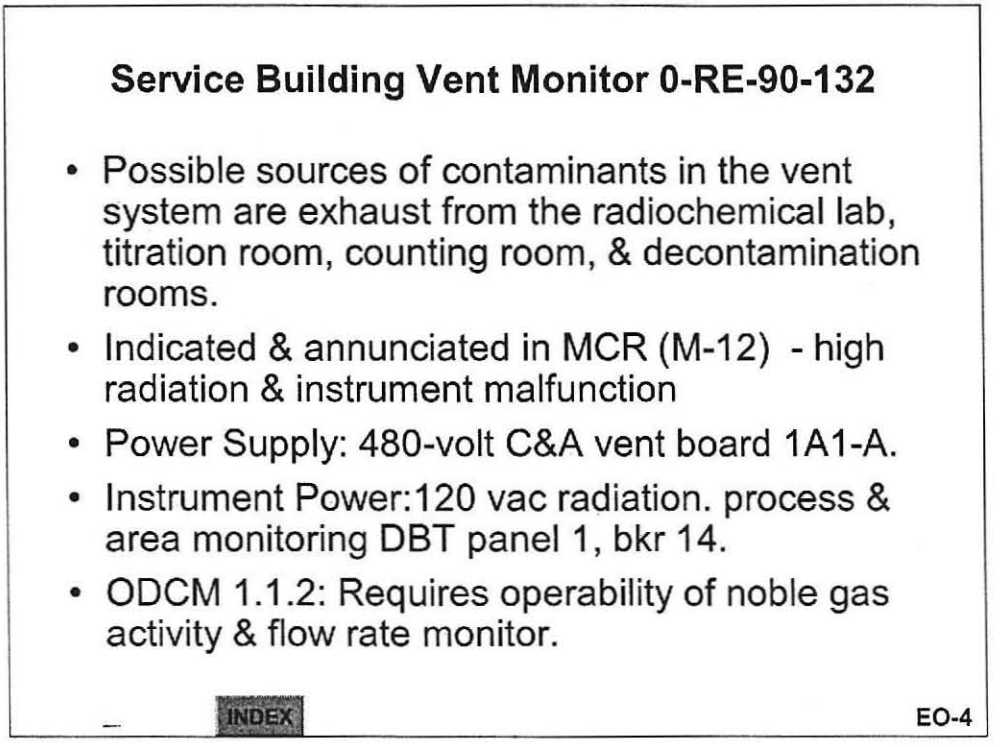
X. LESSON BODY

D. Major Components

4. Process and Effluent *Gas* Monitors

Auxiliary Building Vent Monitor channel 0-RE-90-101

- Monitors for noble gases
- Particulate radioactivity and radioiodine is collected with a removable filter and analyzed remotely.
- Beta scintillation detector
- Utilizes a sampling probe assembly fitted with seventy-two sample nozzles
    - Nozzles geometrically arranged to allow taking a representative sample of effluent
    - Air velocity is manually adjusted to effect isokinetic sampling from the vent
    - The sample taken from the duct is too large to be routed directly to the particulate and iodine filters, therefore a sub-sample is taken from the main sample line.
- At setpoint the noble gas channel automatically initiates auxiliary building vent isolation and startup of the Auxiliary Building gas treatment system (ABGTS)
    - Both trains are blocked with HS-90-136A3 (Buffered signal for isolation between trains) on M-12



X. LESSON BODY

D. Major Components

4. Process and Effluent *Gas* Monitors

Service Building Vent Monitor channel 0-RE-90-132

- Possible sources of contaminants in the vent system are exhaust from the radiochemical lab, titration room, counting room, and decontamination rooms.
- Indicated & annunciated in MCR (M-12) - high radiation & instrument malfunction
- Power Supply: 480-volt C&A vent board 1A1-A.
- Instrument Power:120 vac rad. process & area monitoring DBT panel 1, bkr 14.
- ODCM 1.1.2
- Drawing 47W610-90-1

62. 068 AK2.02 001

Given the following plant conditions:

- Unit 1 is at 100% RTP when a fire occurs in the cable spreading room.
- Due to the large amount of smoke in the main control room, it is decided by the Shift Manager that the main control room must be abandoned.

Which ONE (1) of the following responses below describes the proper operating crew actions for the given conditions?

A. Trip the reactor and verify reactor tripped prior to abandoning the Main Control Room.

B. Place HS-13-204 and 205 (M-15) to TRIP and proceed to the Aux Control Room. Verify the reactor is tripped in the Aux Control Room.

C. Evacuate the Main Control Room and take E-0 to the Aux Control Room. Trip the reactor locally by opening the reactor trip breakers at the MG set room.

D. Announce over the PA to evacuate the Main Control Room and proceed to the Aux Control Room. Trip the reactor locally by opening the control rod MG set breaker at the 480V Unit boards.

A. Correct. Section 2.1 step 1

B. Incorrect. Aux Control Room would have indication of whether reactor is tripped, but the trip would be verified in the MCR

C. Incorrect. EOPs are not applicable when evacuating MCR

D. Incorrect. AOP-C.04 does not have option for tripping reactor from 480V Unit boards

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the interrelations between the Control Room Evacuation and the following: Reactor trip system

Question No. 62

Tier 1 Group 2

Importance Rating: RO 3.7

Technical Reference: AOP C.04

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271AOP-C.04, B.6

Question Source: Bank

Question History: SQN Bank

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

Source:	BANK	Source If Bank:	SQN BANK
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** AOP-C.04, SHUTDOWN FROM AUXILIARY CONTROL ROOM

IV. **LENGTH OF LESSON/COURSE:** 3 hour(s)

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate *or* explain, using classroom evaluations and/or simulator scenarios, the requirements of AOP-C.04, SHUTDOWN FROM AUXILIARY CONTROL ROOM.

B. Enabling Objectives:

	Objectives
0.	Demonstrate an understanding of NUREG 1122 knowledge's and abilities associated with Shutdown from the Auxiliary Control Room that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate position as identified in Appendix A.
1.	State the purpose/goal of this AOP-C.04.
2.	Describe the AOP-C.04 entry conditions.
	a. Describe the setpoints, interlocks, and automatic actions associated with AOP-C.04 entry conditions.
	b. Describe the ARP requirements associated with AOP-C.04 entry conditions.
	c. Interpret, prioritize, and verify associated alarms are consistent with AOP-C.04 entry conditions.
	d. Describe the plant parameters that may indicate a Shutdown from the Auxiliary Control Room is required.
3.	Upon entry into AOP-C.04, diagnose the applicable condition and transition to the appropriate procedural section for response.
4.	Summarize the mitigating strategy for the failure that initiated entry into AOP-C.04.
5.	Describe the actions that must be taken before abandoning the main control room, including a basis for each action.
6.	Explain the staffing requirements for unit abandonment per AOP-C.04.
7.	Describe the types of equipment that are on the various checklists associated with AOP-C.04
8.	Describe the actions that may be necessary if procedure steps are taken before all

	Objectives
	checklists are complete.
9.	Describe the bases for the limits, notes, cautions of AOP-C.04.
10.	Describe actions per AOP-C.04, that are required to: a. Maintain Plant in Hot Shutdown b. Cooldown plant form Aux. Control Room c. Return to Main Control Room
11.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
12.	Given a set of initial plant conditions use AOP-C.04 to correctly:
	a. Recognize entry conditions.
	b. Identify required actions.
	c. Respond to Contingencies.
	d. Observe and Interpret Cautions and Notes.
13.	Describe the Tech Spec and TRM actions applicable during the performance of AOP-C.04.
14.	Discuss the parameters to be considered by the SED when making a REP classification during a control room evacuation.
15.	Apply GFE and system response concepts to the abnormal condition – prior to, during and after the abnormal condition.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.1 Control Room Abandonment

NOTE EOPs are NOT applicable when evacuating MCR.

1. **ENSURE** reactor TRIPPED. [M-4]

2. **ENSURE** MSIVs and MSIV bypass valve handswitches in CLOSE. [M-4]

3. **DISPATCH** CRO with radio and Appendix Z to perform the following:

   a. **GO TO** AOP-C.04 Cabinet. [6.9KV Shutdown Board Rm A]

   b. **ENSURE** personnel dispatched to perform applicable checklists and appendices **USING** Appendix Z, Task Assignment Sheet.

4. **ENSURE** one CCP placed in PULL TO LOCK.

67. 074 EA1.08 001

Given the following plant conditions:

- The crew is responding to a LOCA.
- Due to equipment failures, the crew has entered FR-C.1, Response to Inadequate Core Cooling.

Which ONE (1) of the following methods is the **highest** priority in restoring the Core Cooling CSF?

A. Depressurize the RCS by venting to Containment.

B. Initiate RHR flow to provide maximum cooling flow .

C. Rapidly depressurize the secondary to facilitate RCS depressurization.

D. Start available CCP and SI pumps and align ECCS valves as necessary.

A. Incorrect. Depressurizing the RCS to Cntmt is a last resort.
B. Incorrect. RHR flow would be established after significant depressurization has occurred. Thsi would not be the primary plan to establish core cooling
C. Incorrect. Would perform once it was determined that HPI is unavailable
D. Correct. Top priority is to establish HPI if possible, although HPI failure most likely led to entry to this procedure

Ability to operate and monitor the following as they apply to a Inadequate Core Cooling: HPI System

Question No. 63

Tier 1 Group 2

Importance Rating: RO 4.2

Technical Reference: FR-C.1

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271FR-C.1, B.3

Question Source: Bank

Question History: SQN Bank

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

QUESTIONS REPORT

for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Source:	BANK	Source If Bank:	SQN BANK
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** FR-C.1, INADEQUATE CORE COOLING

IV. **LENGTH OF LESSON/COURSE:** 1 hours

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of FR-C.1, INADEQUATE CORE COOLING.

B. Enabling Objectives

	Objectives
0.	Demonstrate an understanding of NUREG 1122 knowledge's and abilities associated with Inadequate Core Cooling that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate position as identified in Appendix A
1.	State the purpose/goal of this FR-C.1.
2.	Describe the FR-C.1entry conditions.
	a. Describe the plant parameters and setpoints associated with FR-C.1 entry conditions.
	b. Demonstrate an understanding of the use of F-0, Status Trees to indicate when FR-C.1 must be implemented.
3.	Summarize the mitigating strategy for the failure that initiated entry into FR-C.1.
4.	Describe the bases for all limits, notes, cautions, and steps of FR-C.1.
5.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
6.	Given a set of initial plant conditions use FR-C.1 to correctly:
	a. Recognize entry conditions.
	b. Identify required actions.
	c. Respond to Contingencies.
	d. Observe and Interpret Cautions and Notes.
7.	Apply GFE and system response concepts to the abnormal condition – prior to, during and after the abnormal condition.

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

EOI PROGRAM MANUAL

FUNCTION RESTORATION PROCEDURE

FR-C.1

INADEQUATE CORE COOLING

Revision **12**

QUALITY RELATED

PREPARED/PROOFREAD BY: D. A. PORTER

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: TOM MARSHALL

EFFECTIVE DATE: 01/09/2007

REVISION
DESCRIPTION: Revised to update E-1 step number reference.

This procedure contains a Handout Page (2 copies).

HANDOUT

Page 1 of 1

STEP	ACTION
1.	**MONITOR** RWST level greater than 27%.
10.	**MONITOR** if hydrogen igniters and recombiners should be turned on.
10.a.4) RNO	**WHEN** hydrogen analyzers have been in ANALYZE for at least 5 minutes, **THEN PERFORM** substeps 10.b through 10.e.
10.d.	**WHEN** ice condenser AHU breakers have been opened, **THEN ENERGIZE** hydrogen igniters.
11.	**MONITOR** CST level greater than 5%.
12.	**MAINTAIN** Intact S/G narrow range levels between 10% [25% ADV] and 50%.
12.a. RNO	**MAINTAIN** total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one S/G.
14.a.	**WHEN** pressurizer pressure less than 1960 psig, **THEN BLOCK** low steamline pressure SI.
15.	**MONITOR** if CLAs should be isolated. (RCS pressure less than 100 psig)

HANDOUT

Page 1 of 1

STEP	ACTION
1.	**MONITOR** RWST level greater than 27%.
10.	**MONITOR** if hydrogen igniters and recombiners should be turned on.
10.a.4) RNO	**WHEN** hydrogen analyzers have been in ANALYZE for at least 5 minutes, **THEN PERFORM** substeps 10.b through 10.e.
10.d.	**WHEN** ice condenser AHU breakers have been opened, **THEN ENERGIZE** hydrogen igniters.
11.	**MONITOR** CST level greater than 5%.
12.	**MAINTAIN** Intact S/G narrow range levels between 10% [25% ADV] and 50%.
12.a. RNO	**MAINTAIN** total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one S/G.
14.a.	**WHEN** pressurizer pressure less than 1960 psig, **THEN BLOCK** low steamline pressure SI.
15.	**MONITOR** if CLAs should be isolated. (RCS pressure less than 100 psig)

1.0 PURPOSE

This procedure provides actions to restore core cooling.

2.0 SYMPTOMS AND ENTRY CONDITIONS

2.1 ENTRY CONDITIONS

FR-0 Status Trees:

- F-0.2, Core Cooling RED condition:

  Core exit T/Cs greater than 1200°F.

- F-0.2, Core Cooling RED condition:

  Core exit T/Cs less than 1200°F

  AND

  RCS subcooling less than 40°F

  AND

  All RCPs stopped

  AND

  Core exit T/Cs greater than 700°F

  AND

  RVLIS lower range less than 42%.

3.0 OPERATOR ACTIONS

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	**MONITOR** RWST level greater than 27%.	**IF** RHR pumps aligned to RWST, **THEN** **GO TO** ES-1.3, Transfer to RHR Containment Sump.
CAUTION	**Running RHR pumps for greater than 100 minutes with miniflow valves open and NO CCS flow to RHR heat exchangers could result in pump damage.**	
2.	**CHECK** RHR pump status:	
	a. **CHECK** RHR pumps RUNNING.	a. **GO TO** Step 3.
	b. **CHECK** CCS ALIGNED to RHR heat exchangers.	b. **ALIGN** CCS to RHR heat exchangers.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

3. **ENSURE** ECCS valves aligned as appropriate:

   - **REFER TO** EA-63-5, ECCS Injection Mode Alignment

     OR

   - **REFER TO** ES-1.3, Transfer to RHR Containment Sump

     OR

   - **REFER TO** ES-1.4, Transfer to Hot Leg Recirculation.

CAUTION **SI pump operation with miniflow isolated and RCS pressure greater than 1500 psig could result in SI pump damage.**

4. **VERIFY** ECCS flow:

   START pumps and **ALIGN** valves as necessary.

   - **VERIFY** CCP flow through CCPIT.
   - **VERIFY** SI pump flow.
   - **VERIFY** RHR pump flow.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5.	**CHECK** RCP support conditions AVAILABLE: • **REFER TO** EA-68-2, Establishing RCP Start Conditions.	**ESTABLISH** conditions for starting an RCP **USING** EA-68-2, Establishing RCP Start Conditions.
6.	**CHECK** CLA isolation valve status:	
	a. Power to CLA isolation valves AVAILABLE.	a. **DISPATCH** personnel to restore power to CLA isolation valves **USING** EA-201-1, 480V Board Room Breaker Alignments.
	b. CLA isolation valves OPEN.	b. **OPEN** CLA isolation valves UNLESS closed after CLA discharge.
7.	**CHECK** core exit T/Cs less than 1200°F.	**GO TO** Step 10.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

8. **CHECK** RVLIS lower range indication:

   a. **CHECK** NO RCPs RUNNING.

      a. **IF** any RCPs running,
      THEN
      RETURN TO procedure and step in effect.

   b. **CHECK** RVLIS lower range indication greater than 42%.

      b. **IF** RVLIS lower range indication rising,
      THEN
      GO TO Step 3.

      IF RVLIS lower range indication stable or dropping,
      THEN
      GO TO Step 9.

   c. **RETURN TO** procedure and step in effect.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

9. **CHECK** Core Exit T/Cs:

a. **CHECK** Core Exit T/C temperatures less than 700°F.

a. **IF** Core Exit T/Cs dropping, **THEN** **GO TO** Step 3.

IF Core Exit T/Cs stable or rising, **THEN** **GO TO** Step 10.

b. **RETURN TO** procedure and step in effect.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

10. **MONITOR** if hydrogen igniters and recombiners should be turned on:

    a. **CHECK** hydrogen concentration measurement AVAILABLE:

    - Hydrogen analyzers have been in ANALYZE for at least 5 minutes.

    a. **PERFORM** the following:

    1) **PLACE** HS-43-200A in ANALYZE [M-10].

    2) **PLACE** HS-43-210A in ANALYZE [M-10].

    3) **RECORD** present time:

    _____

    4) **WHEN** hydrogen analyzers have been in ANALYZE for at least 5 minutes, **THEN** **PERFORM** substeps 10.b through 10.e.

    5) **GO TO** Step 11.

    b. **CHECK** containment hydrogen concentration less than 6%.

    b. **CONSULT** TSC.
    GO TO Step 11.

    c. **DISPATCH** personnel to open ice condenser AHU breakers **USING** EA-201-1, 480 V Board Room Breaker Alignments.

(Step continued on next page.)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10.	d. **WHEN** ice condenser AHU breakers have been opened, **THEN** **ENERGIZE** hydrogen igniters [M-10]: • HS-268-73 ON • HS-268-74 ON.	
	e. **CHECK** containment hydrogen concentration less than 0.5%.	e. **PLACE** hydrogen recombiners in service **USING** EA-268-1, Placing Hydrogen Recombiners in Service. **IF** hydrogen recombiners NOT available, **THEN** **CONSULT** TSC.
11.	**MONITOR** CST level greater than 5%.	**ALIGN** AFW suction to ERCW **USING** EA-3-9, Establishing Turbine Driven AFW Flow, and EA-3-10, Establishing Motor Driven AFW Flow.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION **Use of a Faulted or Ruptured S/G during the following steps should NOT be considered UNLESS no intact S/G is available.**

12. **MAINTAIN** Intact S/G narrow range levels:

    a. Greater than 10% [25% ADV].

    a. **MAINTAIN** total feed flow greater than 440 gpm UNTIL level greater than 10% [25% ADV] in at least one S/G.

    IF total feed flow greater than 440 gpm CANNOT be established, **THEN** **PERFORM** the following:

    1) **CONTINUE** attempts to establish heat sink in at least one S/G **USING** AFW, main feedwater, or condensate system.

    2) **GO TO** Note prior to Step 21.

    b. Between 10% [25% ADV] and 50%.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13.	**CHECK** RCS inventory loss paths:	
	a. Power to pressurizer PORV block valves AVAILABLE.	a. **DISPATCH** personnel to restore power to block valves **USING** EA-201-1, 480 V Board Rm Breaker Alignments.
	b. Pressurizer PORVs CLOSED.	b. **CLOSE** pressurizer PORVs. **IF** any pressurizer PORV CANNOT be closed, **THEN** **CLOSE** its block valve.
	c. At least one block valve OPEN.	c. **OPEN** one block valve UNLESS it was closed to isolate an open PORV.
	d. Normal letdown valves CLOSED: • FCV-62-69 • FCV-62-70 • FCV-62-72 • FCV-62-73 • FCV-62-74	d. **CLOSE** valves.

(Step continued on next page.)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13.	e. Excess letdown valves CLOSED: • FCV-62-54 • FCV-62-55	e. **CLOSE** valves.
	f. Reactor vessel head vent valves CLOSED: • FSV-68-394 • FSV-68-395 • FSV-68-396 • FSV-68-397	f. **CLOSE** valves.
	g. RCS and pressurizer sample valves CLOSED: [status panels 6K and 6L] • FCV-43-3 or FCV-43-2 • FCV-43-12 or FCV-43-11 • FCV-43-23 or FCV-43-22	g. **CLOSE** valves.
	h. Post-accident sample valves CLOSED: [M-10] • FSV-43-250 or FSV-43-251 • FSV-43-309 or FSV-43-310	h. **CLOSE** valves.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTES

- S/G depressurization at the maximum rate may cause S/G narrow range levels to drop to less than 10% [25% ADV]. This is acceptable during an inadequate core cooling condition.
- Blocking low steamline pressure SI as soon as pressurizer pressure is less than 1960 psig will prevent an inadvertent MSIV closure and keep the condenser available for steam dump.
- After the low steamline pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate is exceeded.

14. **DEPRESSURIZE** Intact S/Gs to reduce RCS pressure to less than 100 psig:

    a. **WHEN** RCS pressure less than 1960 psig, **THEN** **PERFORM** the following:

        1) **BLOCK** low steamline pressure SI.

        2) **CHECK** STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive LIT. [M-4A, A4]

(Step continued on next page.)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
14.	b. **DUMP** steam to condenser at maximum achievable rate: 1) **ENSURE** steam dumps in steam pressure mode. 2) **ADJUST** steam dump demand to FULLY OPEN three cooldown valves. 3) **WHEN** T-avg is less than 540°F, **THEN** **BYPASS** steam dump interlock.	b. **DUMP** steam at maximum rate **USING** Intact S/G atmospheric relief(s). **IF** local control of atmospheric relief(s) is necessary, **THEN** **DISPATCH** personnel to dump steam **USING** EA-1-2, Local Control of S/G PORVs.
	c. **CHECK** RCS pressure less than 100 psig.	c. **IF** RCS pressure dropping, **THEN** **GO TO** Caution prior to Step 12. **IF** RCS pressure stable or rising, **THEN** **GO TO** Note prior to Step 21.
	d. **STOP** S/G depressurization.	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15.	**MONITOR** if CLAs should be isolated:	
	a. **CHECK** RCS pressure less than 100 psig.	a. **GO TO** Note prior to Step 21.
	b. **RESET** SI and **CHECK** the following: • AUTO S.I. BLOCKED permissive LIT. [M-4A, C4] — • S.I. ACTUATED permissive DARK. [M-4A, D4]	
	c. **CLOSE** CLA isolation valves.	c. **PERFORM** the following: 1) **RESET** Phase B. 2) **ESTABLISH** control air to containment **USING** EA-32-1, Establishing Control Air to Containment. 3) **VENT** any unisolated CLA **USING** EA-63-1, Venting Unisolated Cold Leg Accumulator. **IF** any CLA CANNOT be isolated or vented, **THEN** **CONSULT** TSC to determine contingency actions.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16.	**STOP** all RCPs.	
17.	**DEPRESSURIZE** Intact S/Gs to atmospheric pressure:	
	a. **DUMP** steam to condenser at maximum rate.	a. **DUMP** steam at maximum rate **USING** Intact S/G atmospheric relief(s). **IF** local control of atmospheric relief(s) is necessary, **THEN** **DISPATCH** personnel to dump steam **USING** EA-1-2, Local Control of S/G PORVs.
18.	**VERIFY** ECCS flow: • CCP flow through CCPIT **OR** • SI pump flow **OR** • RHR pump flow.	**CONTINUE** efforts to establish ECCS flow. **IF** core exit T/Cs less than 1200°F, **THEN** **GO TO** Step 17. **IF** core exit T/Cs greater than 1200°F, **THEN** **GO TO** Note prior to Step 21.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

19. **CHECK** core cooling:

    a. Core exit T/Cs less than 1200°F. — a. **GO TO** Note prior to Step 21.

    b. At least two RCS T-hot indications less than 350°F. — b. **GO TO** Step 17.

    c. RVLIS lower range indication greater than 64%. — c. **GO TO** Step 17.

20. **GO TO** E-1, Loss of Reactor or Secondary Coolant, Step 15.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE RCP damage due to absence or loss of normal support conditions is an acceptable consequence in this procedure.

21. **CHECK** if RCPs should be started:

a. **CHECK** core exit T/Cs greater than 1200°F.

a. **GO TO** Step 22.

b. **CHECK** if idle RCS loop available:

- S/G narrow range level greater than 10% [25% ADV]

  AND

- RCP in associated loop AVAILABLE and STOPPED.

b. **PERFORM** the following:

1) **OPEN** all pressurizer PORVs and block valves.

2) **IF** core exit T/Cs remain greater than 1200°F,
THEN
OPEN reactor vessel head vents:

- FSV-68-394
- FSV-68-395
- FSV-68-396
- FSV-68-397.

3) **GO TO** Step 22.

c. **START** RCP in one idle loop.

d. **GO TO** Substep 21.a.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22.	**DEPRESSURIZE** Intact S/Gs to atmospheric pressure:	
	a. **DUMP** steam to condenser at maximum rate.	a. **DUMP** steam at maximum rate **USING** Intact S/G atmospheric relief(s). **IF** local control of atmospheric relief(s) is necessary, **THEN** **DISPATCH** personnel to dump steam **USING** EA-1-2, Local Control of S/G PORVs. **IF** NO intact SG available, **THEN** **USE** Faulted or Ruptured S/G.
23.	**CHECK** Core Exit T/Cs less than 1200°F.	**IF** core exit T/Cs dropping, **THEN** **GO TO** Note prior to Step 21. **IF** at least 5 core exit T/Cs greater than 1200°F and rising **AND** RCPs running in all available RCS cooling loops, **THEN** **GO TO** SACRG-1, Severe Accident Control Room Guideline Initial Response.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24.	**DETERMINE** if CLAs should be isolated:	
	a. **CHECK** at least intermittent RHR injection flow.	a. **GO TO** Step 26.
	b. **RESET** SI and **CHECK** the following: • AUTO S.I. BLOCKED permissive LIT. [M-4A, C4] • S.I. ACTUATED permissive DARK. [M-4A, D4]	
	c. **CLOSE** all CLA isolation valves.	c. **PERFORM** the following: 1) **RESET** Phase B. 2) **ESTABLISH** control air to containment **USING** EA-32-1, Establishing Control Air to Containment. 3) **VENT** any unisolated CLA **USING** EA-63-1, Venting Unisolated Cold Leg Accumulator. **IF** any CLA CANNOT be isolated or vented, **THEN** **CONSULT** TSC to determine contingency actions.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

25. **DETERMINE** if RCPs should be stopped:

    a. **CHECK** at least two T-hot indications less than 350°F.

    a. **GO TO** Step 26.

    b. **STOP** all RCPs.

26. **VERIFY** ECCS flow:

    - CCP flow through CCPIT

      OR

    - SI pump flow

      OR

    - RHR pump flow.

    CONTINUE efforts to establish ECCS flow.

    GO TO Note prior to Step 21.

27. **CHECK** core cooling:

    a. At least two RCS T-hot indications less than 350°F.

    a. **GO TO** Note prior to Step 21.

    b. NO RCPs RUNNING.

    b. **STOP** all RCPs.

    c. RVLIS lower range indication greater than 64%.

    c. **GO TO** Note prior to Step 21.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
28.	**CHECK** RCS Vent paths ISOLATED:	
	a. Pressurizer PORVs CLOSED.	a. **CLOSE** Pressurizer PORVs. **IF** any Pressurizer PORV CANNOT be closed, **THEN** **CLOSE** its block valve.
	b. Reactor vessel head vent valves CLOSED: • FSV-68-394 • FSV-68-395 • FSV-68-396 • FSV-68-397	b. **CLOSE** valves.
29.	**GO TO** E-1, Loss of Reactor or Secondary Coolant, Step 15.	

END

75. E02 EA1.3 001

Given the following plant conditions:

- A steam break has occurred inside containment.
- Reactor trip and containment high-high pressure have actuated.
- The faulted S/G has completely blown down.
- The crew has entered ES-1.1, SI Termination.
- One containment spray pump is in service.

If containment pressure is 2.5 psig, Which ONE (1) of the following correctly describes the status of the CCPs and Containment Spray pump when the crew transitions from ES-1.1 to the appropriate plant procedure?

	CCP	**Containment Spray Pump**
A.	1 CCP injecting via CCPIT	In Service
B.	1 CCP injecting via CCPIT	Stopped and placed in A-AUTO
C.	1 CCP injecting via seal injection and normal charging	Stopped and placed in A-Auto
D.	1 CCP injecting via seal injection and normal charging	In Service

A. Incorrect. Meet SI termination criteria; therefore, second CCP removed from service and normal charging established.

B. Incorrect. Meet SI termination criteria; therefore, second CCP removed from service and normal charging established. Containment pressure is > 2 psid; therefore, CS is not stopped.

C. Incorrect. Containment pressure is > 2 psid; therefore, CS is not stopped.

D. Correct. Meet SI termination criteria; therefore, second CCP removed from service and normal charging established. Containment pressure is > 2 psid; therefore, CS is not stopped.

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Ability to operate and / or monitor the following as they apply to the (SI Termination) Desired operating results during abnormal and emergency situations.

Question No. 64

Tier 1 Group 2

Importance Rating: RO 3.8

Technical Reference: ES-1.1

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271ES-1.1, Objective 6
OPL273C502C; Obj. 8.i, 8.j

Question Source: Bank

Question History: SQN ES-1.1.B.1-2

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.10

Comments:

Source:	BANK	Source If Bank:	SEQUOYAH BANK
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

X. LESSON BODY: **INSTRUCTOR NOTES**

Knowledge:
No preference is given about which pumps to start to establish ECCS flow although an individual plant may have a preference. The operator has the option of using either an SI pump or a CCP. If the operator selects to use a CCP, then he must align the suction and discharge of the pump to the safety injection mode and isolate the normal charging suction and discharge paths.

Knowledge:
- This step is a continuous action step.
- If conditions deteriorate and the operator is required to manually start ECCS pumps to restore RCCS subcooling or pressurizer level, the operator should leave the ECCS pumps on until the SI reduction criteria is met in the appropriate step.

13. MONITOR if containment spray should be stopped:
    a. CHECK any containment spray pump RUNNING.

        RNO- GO TO Step 14.

    b. CHECK containment pressure less than 2.0 psig

        RNO- GO TO Step 14

    c. RESET containment spray signal.
    d. STOP containment spray pumps and PLACE in A-AUTO.
    e. CLOSE containment spray discharge valves FCV-72-2 and FCV-72-39.

To stop containment spray pumps if running and no longer needed.

Knowledge:
This step is a continuous action step.

Basis:
Spray pumps are automatically actuated on Hi-Hi containment pressure. In E-0, Reactor Trip or Safety Injection, the operator verifies that the Containment Spray System is operating if it is required. During a LOCA, the need for continued operation of the spray system is monitored by this step in ES-1.1. After containment pressure is reduced, the pumps can be stopped to prevent RWST depletion. If at any time the containment pressure increases above the pressure setpoint, the ORANGE path of the Containment Status Tree sends the operator to FR-Z.1, Response to High Containment Pressure, which checks the need for containment spray and verifies that the spray system is operational if it is required.

X. LESSON BODY: **INSTRUCTOR NOTES**

6. CHECK RCS pressure STABLE or RISING.

   RNO - ENSURE pressurizer spray valves CLOSED.
   IF RCS pressure continues to drop, THEN GO TO ES-1.2 Post LOCA Cooldown and Depressurization.

To ensure that control is being maintained after stopping all but one CCP.

Basis:
All but one CCP was stopped in the previous step. RCS pressure stable or increasing confirms that ECCS flow is adequate for the operator to maintain control using one CCP. The operator will then be ready to align the CCP to the normal charging flow path. If RCS pressure is decreasing, then the operator will go to ES-1.2, Post LOCA Cooldown and Depressurization, for additional actions.
If RCS pressure is being reduced by pressurizer spray (initiated in E-1 to assist in increasing pressure level), then the pressure behavior is not a true indication of leak flow versus injection flow. Furthermore, if RCS pressure is decreasing after all but one CCP is stopped, the operator is directed to ES-1.2 on the premise that leak flow cannot be countered by flow from one CCP. This would be an inappropriate transition if pressurizer spray is causing the pressure decrease. The operator should terminate spray flow if necessary to prevent pressure from decreasing.

7. ISOLATE CCPIT:
   a. CLOSE CCPIT inlet valves FCV-63-39 and FCV-63-40.
   b. CLOSE CCPIT outlet valves FCV-63-25 and FCV-63-26.

To stop injection flow to the RCS through the CCPIT.

Basis:
Normal charging and the CCPIT injection lines are parallel flow paths from the discharge of the CCPs. CCPIT isolation enables the normal charging path to be used. Closing the inlet valves first prevents any pressure surge in the CCPIT.

X. LESSON BODY: **INSTRUCTOR NOTES**

8. ESTABLISH charging flow
   a. CLOSE seal water flow control valve FCV-62-89.
   b. OPEN charging isolation valves FCV-62-90 and FCV-62-91.
   c. ENSURE normal or alternate charging isolation valve FCV-62-86 or FCV-62-85 OPEN.
   d. ESTABLISH desired charging flow USING seal water and charging flow control valves FCV-62-89 and FCV-62-93.

To properly establish a charging path and sufficient flow to ensure cooling for the charging pumps.

Basis:
Proper alignment of the charging path allows flow to be controlled in the normal manner. Charging flow is established by closing the charging line hand control valve, opening the charging line isolation valves and then establishing the desired charging flow by adjusting the charging line flow control valve and the charging line hand control valve.
The substeps in this step arranged to maintain seal injection flow and to introduce charging cautiously through the charging line.

9. CONTROL charging flow to maintain pressurizer level

To establish maintenance of pressurizer level as the criteria for adjusting charging flow.

RNO - IF pressurizer level is dropping, THEN PERFORM the following:
   a. IF any S/G is faulted, THEN DO NOT CONTINUE this procedure UNTIL faulted S/G depressurization stops OR pressurizer level can be maintained.

82. E13 EK2.1 001

Given the following plant conditions:

- The crew entered FR-H.2, "Steam Generator Overpressure", due to an overpressure condition on S/G #2.
- SG #2 pressure is 1170 psig.
- S/G #2 narrow range level is 72%.

Which ONE (1) of the following describes the appropriate actions, in sequence, to mitigate this event in accordance with FR-H.2?

A. Verify Feedwater Isolation and initiate SG Blowdown.

B. ✓ Verify Feedwater Isolation and attempt to dump steam from the affected SG.

C. Isolate AFW flow and initiate SG Blowdown.

D. Isolate AFW flow and attempt to dump steam from the affected SG

A. Incorrect. First action is correct, but SG blowdown is a later action, or an action that would be performed in FR-H.3

B. Correct.

C. Incorrect. AFW is isolated later if pressure cannot be brought under control by dumping steam. Additionally, SG blowdown is a later action

D. Incorrect. AFW is isolated later; attempting to dump steam is correct.

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of the interrelations between the (Steam Generator Overpressure) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features

Question No. 65

Tier 1 Group 2

Importance Rating: RO 3.0

Technical Reference: FR-H.2

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271FR-H.2, Obj. 5

Question Source: Bank

Question History: New

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.10

Comments: –

Source:	NEW	Source If Bank:	
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** FR-H.2, STEAM GENERATOR OVERPRESSURE

IV. **LENGTH OF LESSON/COURSE:** .5 hours

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of the FR-H.2, Steam Generator Overpressure.

B. Enabling Objectives

0.	Demonstrate an understanding of NUREG 1122 Knowledge's and Abilities associated FR-H.2, Steam Generator Overpressure, that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate license position as identified in Appendix A.
1.	Explain the purpose/goal of FR-H.2.
2.	Discuss the FR-H.2 entry conditions. a. Describe the setpoints, interlocks, and automatic actions associated with FR-H.2 entry conditions. b. Describe the requirements associated with FR-H.2 entry conditions.
3.	Summarize the mitigating strategy for the failure that initiated entry into FR-H.2.
4.	Describe the bases for all limits, notes, cautions, and steps of FR-H.2.
5.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
6.	Given a set of initial plant conditions use FR-H.2 to correctly: a. Identify required actions b. Respond to Contingencies c. Observe and Interpret Cautions and Notes
7.	Apply GFE and system response concepts to the performance of FR-H.2 conditions.

X. LESSON BODY: **INSTRUCTOR NOTES**

4. ATTEMPT to dump steam from affected S/G(s):
   - Atmospheric reliefs
     OR
   - MSIV bypass valves
     OR
   - Steam supply valves to TD AFW pump

   RNO - DISPATCH personnel to dump steam USING EA-1-2, Local Control of S/G PORVs.

   GO TO Step 6.

   Basis:
   Releasing steam will result in depressurization of the affected SG. Steam can be released through SG PORVs, main steamline isolation bypass valves, the steam supply valve to the turbine-driven AFW pump, or any other available path. The SG PORVs, main steamline isolation bypass valves, and steam supply valve to the turbine-driven AFW pump each should have sufficient capacity and controllability to depressurize the affected S/G smoothly. If no steam path can be established, the operator is directed to Step 6 to further address the SG overpressure condition.

To attempt depressurization of the affected SG(s) by releasing steam from the affected SG(s).

RNO – IF no release path, available, skip over step to check affected S/G pressure dropping, since steam is not being released

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

3. **CHECK** affected S/G(s) narrow range level less than 84% [80% ADV].

GO TO FR-H.3, Steam Generator High Level.

CAUTION **Releasing steam from an overfilled S/G could result in damage to downstream steamline components. An "overfilled S/G" is any S/G whose narrow range level has exceeded 84% [80% ADV] at any time.**

NOTE MSIV isolation reset may be necessary to open MSIV bypass valves.

4. **ATTEMPT** to dump steam from affected S/G(s):

   - Atmospheric reliefs

   OR

   - MSIV bypass valves

   OR

   - Steam supply valves to TD AFW pump

DISPATCH personnel to dump steam **USING** EA-1-2, Local Control of S/G PORVs.

GO TO Step 6.

86. G2.1.2 001

OPDP-1, Conduct of Operations, describes the " Departure From License Condition" which can be invoked to protect the health and safety of the public.

Which ONE (1) of the following conditions must ALWAYS be met when departing from a license condition or technical specification in accordance with 10 CRF 50.54 (x) and (y)?

A. The action must be approved by a licensed SRO prior to taking the action.

B. The action must be taken in accordance with the provisions of the Emergency Plan.

C. The NRC must be notified prior to the action and must concur with the action to be taken.

D. The action must be necessary to prevent equipment damage or personnel injury AND the Plant Manager must be notified prior to taking the action.

A Correct.
B incorrect. Although the unit is most likely in the E-Plan, it is not a requirement prior to invoking 10CFR50.54(x)
C incorrect. NRC concurrence is not required for the action; they must be notified as soon as possible but no more than 1 hour prior.
D incorrect. Preventing damage or injury is a reason for invoking the rule, but Plant Manager concurrence or approval is not required
Knowledge of operator responsibilities during all modes of plant operation.

Question No. 66

Tier 3 Group 1

Importance Rating: RO 3.0

Technical Reference: OPDP-1, Appendix F

Proposed references to be provided to applicants during examination: None

Learning Objective: OPI271C209, B.8

Question Source: Bank

Question History:

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

QUESTIONS REPORT

for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Source:	BANK	Source If Bank:	WTSI
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING

II. **COURSE:** LICENSED TRAINING & NON LICENSED

III. **LESSON TITLE:** CONDUCT OF OPERATIONS (OPDP-1, SPP-10.0, ODM)

IV. **LENGTH OF LESSON/COURSE:** 4 hours

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of this lesson, the student will have reviewed the "Conduct of Operations" procedures and will demonstrate an understanding of these procedures and other material presented by passing a written examination as outlined by program procedure.

B. Enabling Objectives:

Each student will understand the following

1. Operations department specific duties, organization and administration
2. Operating policies including manipulation of controls that directly affect reactor reactivity or power level.
3. The shift routines (rounds) and operating practices.
4. Control room activities including conduct, access, and control room surveillance areas.
5. The requirements of pre-evolution briefings.
6. The requirements for proper communications including repeat back communications utilizing radios, telephones, and the PA system.
7. Proper Operations notifications requirements.
8. The control of equipment and system status control requirements including equipment status change authorization (maintenance, testing, return to operability, etc.); equipment and system alignments and Technical Specification compliance (Normal and 50.54X).
9. Log keeping requirements to include which records are QA and which are not QA records.
10. The shift turnover requirements and processes.
11. Operations responsibilities relative to plant chemistry including communications with plant chemistry personnel.

12. The required reviews for Operations. Example: Procedure changes; equipment design changes; license changes; industry experience information.

13. Operating orders such as standing orders and shift orders.

14. Plant operating procedures relative to the conventions of use and procedure compliance.

15. Requirements for Surveillance Testing by Operations department.

16. The requirements for operator aids including definitions, examples of operator aids, posting requirements, responsibilities, documenting and processing, and reviews.

17. The requirements for equipment labeling and method for requesting labels be installed.

18. The requirements for Operations teamwork including responsibilities, on-shift team members, response to events, training, and feedback.

19. The requirements for Self-Checking.

20. The requirements for active and inactive licenses (SRO and RO) including how to activate an inactive license to an active license.

21. The requirements for Operations key control.

22. Requirements for record keeping including ability to distinguishing between QA and non QA records.

23. The actions to be taken when an instrument failure is suspected.

24. The differences between the expected response to alarms during steady state conditions and during transients.

25. The conditions resulting in an operator workaround.

Appendix F
(Page 1 of 4)

Plant Operating Procedures

A. Procedure Compliance

1. Plant equipment shall be operated in accordance with written approved procedures as discussed in SPP-2.2, Administration of Site Technical Procedures.

2. Appendix F, section E, contains expectations for procedure usage. Procedure users should use it to evaluate their own conduct.

B. Precautions, Limitations and Initial Conditions

1. All applicable Precautions and Limitations, Initial Conditions, and all procedure sections to be performed SHALL be reviewed prior to performance:

   IF a procedure is in progress to maneuver the plant **AND** the direction of that maneuver is changed, **THEN** all P/Ls of the applicable procedure(s) SHALL be re-reviewed prior to continuing with the evolution.

2. **IF** a procedure in progress is suspended **OR** exited prior to completion, **THEN** the following SHALL be verified prior to recommencement:

   a. Initial conditions

   b. Precautions and limitations

C. Procedure Place keeping

1. Place keeping is an effective tool for reducing human error and maintaining status control by maintaining positive control of steps, especially following delays and interruptions. Place keeping includes the following:

   a. Marking each step of a procedure as it is performed,

   b. Marking steps that are not applicable, and

   c. Marking each step of a clearance order as it is performed.

2. Examples of acceptable methods for marking up a procedure including initialing each step as it is performed, marking off the steps by checking them off, or using the place keeping boxes on those procedures where they have been provided.

3. The following practices may be used to enhance place keeping:

   a. Re-reading the previous several steps after being distracted.

   b. Identifying the last procedure page to be performed by marking it as "LAST PAGE."

Appendix F
(Page 2 of 4)

Plant Operating Procedures

c. Circling a step that is in progress and slashing through the circle when the step is complete.

d. Marking completion of a procedure page in the bottom margin on the page.

e. Marking steps that will not be performed in advance or during the Pre-Job Brief.

4. Place keeping shall be used, unless the procedure classification is "information only."

5. During implementation of the Abnormal or Emergency Operating Procedure, place keeping shall be used (immediate actions and prudent operator actions are exempt when performed. Place keeping shall be used during verification of those actions.).

6. To facilitate place keeping for clearance orders, a separate sheet should be provided for independent verifications.

7. Erasable markers, page protectors or clear cover sheets can be used to facilitate place keeping during routine activities that do not require archival records retention. When the evolution is completed the mark can be wiped off. In cases where procedures require signatures or initials those are used instead of erasable markers.

8. For evolutions that are not completed by the end of shift, the marked up pages shall be included in the shift turnover process for the applicable watch station. The status of procedure completion should be reported to the control room. At the end of the evolution, any procedures not required for retention as archival records may be discarded.

D. Alternative Place Keeping - Reader/Worker

Place keeping via a 'Reader/Worker' method may be used to facilitate place keeping under conditions in harsh environment such as working in a contaminated zone or working in a situation where worker cannot support/hold paper work. In these cases a second person is allowed to sign off a step as completed only when in direct contact with the performer. When a second person is required, the second individual should sign "for" the performer, such as "JCS/TMM."

E. Use of 10 CFR 50.54 (x) and (y)

1. Operations personnel SHALL **NOT** give or accept directions or guidance that conflicts with approved procedures, Technical Specifications, or a License Condition, with the exception of those actions pursuant to 50.54 (x) and (y).

2. All actions that occur per 50.54 (x) and (y) SHALL be approved by a licensed Senior Reactor Operator and those actions SHALL be immediately reported to the Operations Manager, Plant Manager, and Site Vice President and documented via PER.

Appendix F
(Page 3 of 4)

Plant Operating Procedures

3. Operations personnel MAY take responsible action that departs from a License Condition or Technical Specification pursuant to 10 CFR 50.54 (x) and (y), within the limits of the following:

   a. The provision must be invoked in order to take necessary actions.

   b. **IF** an emergency protective action is needed **AND NO** action consistent with the license is immediately apparent that can provide adequate or equivalent protection, **THEN** personnel are obligated to take protective action under this provision.

   c. Use of the provision does **NOT** require NRC concurrence. IF time permits, THEN NRC Operations Center telephone notification should be made before action is taken. IF time does NOT permit, THEN NRC Operations Center telephone notification SHALL be made as soon as possible but not to exceed one hour per SPP-3.5 and NuReg-1022.

   d. Provision does **NOT** apply where time permits NRC amendment to Technical Specifications or License Condition.

   e. Provision SHALL **NOT** be used to prevent damage to the plant or machinery unless such damage is tied to a possible adverse effect on public health and safety.

   f. Provision ONLY applies to emergencies where license compliance poses a barrier to effective protective action, and rapid action is needed to protect public health and safety.

   g. Immediate threat of injury to personnel is appropriate justification for the use of the provision.

   h. Use of the provision is **NOT** tied to the declaration of any emergency classification in the Emergency Plan. Since emergencies can develop rapidly, use of the provision should **NOT** be encumbered by administrative prerequisites.

Appendix F
(Page 4 of 4)

Plant Operating Procedures

F. Expectations

1. Operators may use Appendix "F" to evaluate their own conduct. Supervisors should use the same when evaluating operators against the expectation.

2. During Procedure Use:

   a. Verifies correct procedure and revision is being used (Verifies For Use).

   b. Reviews appropriate portion of procedure, and ensures prerequisites are met before continuing.

   c. Reviews precautions and ensures they are understood by step performers.

   d. Ensures a pre-evolution briefing is conducted IAW pre-job checklist.

   e. Ensures appropriate personnel are available or informed, as necessary, before starting.

   f. Ensures that instruments are checked for calibration and documented as required.

   g. Applies proper usage requirements as denoted on procedure (e.g., continuous use).

   h. Stops and notifies supervisor if it cannot be performed as written and initiates change if needed.

   i. Applies Self Check, QV&V and Touch STAR.

   j. Applies place keeping tools as appropriate.

   k. Meets applicable verification requirements during procedure use.

   l. Initiates appropriate documentation as required for problems in procedures.

   m. Properly completes all steps (e.g., performs action prior to sign off).

   n. All required sign-offs and record pages are completed by appropriate personnel (no blanks).

   o. Stops and notifies supervision if component not aligned per procedure (e.g., valve is to be opened, but found already open).

   p. Does not move on without first signing each completed step as appropriate.

   q. Reviews entire procedure for completeness prior to concluding the task is complete.

85. G2.1.18 001

Which ONE (1) of the following describes when a 'LATE ENTRY' is required in eSOMS, and the procedure used to enter a 'LATE ENTRY'?

A. Required any time required information is not entered at time of event; enter actual time of event, the words 'LATE ENTRY', and the event description.

B. Required any time required information was not entered at time of previous approval of logs; enter actual time of event, the words 'LATE ENTRY', and the event description.

C. Required any time required information is not entered at time of event; enter time of entry, the words 'LATE ENTRY', actual time of event, and event description.

D. Required any time required information was not entered at time of previous approval of logs; enter current time, the words 'LATE ENTRY', actual time of event, and event description.

A. Incorrect. Late entries are only required after they are found when approval has been made without the original entry of event (For instance, after shift turnover it is found that an entry was not made)
B. Incorrect. Partially correct, but the time of entry must also be included
C. Incorrect. Partially correct as far as action is required, but the late entry is only required after an approval of logs has taken place
D. Correct.
Ability to make accurate, clear and concise logs, records, status boards, and reports.

Question No. 67

Tier 3 Group 1

Importance Rating: RO 2.9

Technical Reference: OPDP-1, Appendix E, section E

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271C209 Objective 9

Question Source: New

Question History:

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Source:	NEW	Source If Bank:	
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING

II. **COURSE:** LICENSED TRAINING & NON LICENSED

III. **LESSON TITLE:** CONDUCT OF OPERATIONS (OPDP-1, SPP-10.0, ODM)

IV. **LENGTH OF LESSON/COURSE:** 4 hours

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of this lesson, the student will have reviewed the "Conduct of Operations" procedures and will demonstrate an understanding of these procedures and other material presented by passing a written examination as outlined by program procedure.

B. Enabling Objectives:

Each student will understand the following

1. Operations department specific duties, organization and administration
2. Operating policies including manipulation of controls that directly affect reactor reactivity or power level.
3. The shift routines (rounds) and operating practices.
4. Control room activities including conduct, access, and control room surveillance areas.
5. The requirements of pre-evolution briefings.
6. The requirements for proper communications including repeat back communications utilizing radios, telephones, and the PA system.
7. Proper Operations notifications requirements.
8. The control of equipment and system status control requirements including equipment status change authorization (maintenance, testing, return to operability, etc.); equipment and system alignments and Technical Specification compliance (Normal and 50.54X).
9. Log keeping requirements to include which records are QA and which are not QA records.
10. The shift turnover requirements and processes.
11. Operations responsibilities relative to plant chemistry including communications with plant chemistry personnel.

X. LESSON BODY:	INSTRUCTOR NOTES
F. Control of Equipment, System Status and Clearances.	OPDP-1 Appendix D, Objective 8
1. Status Change Authorization and Reporting.	
2. Equipment and System Alignments.	
3. Clearances	
4. Observations	Form 1&2,
G. Logkeeping.	OPDP-1 Attachment E,
Proper logkeeping is of major importance to every person on shift. Proper logkeeping provides three functions: (1) a record of what was done and if the expected response was obtained, (2) a record for current plant status, and (3) a record for subsequent evaluation of the status of the plant.	Appendix 1, Back To Basic Fundamentals, :Logkeeping Objective 9.
1. Establishment of Operating Logs.	
2. Timeliness of Recordings.	
3. Information to be Recorded.	
4. Legibility.	
5. Corrections.	
6. Log Review.	
7. Observations	Form 1
H. Plant Operating Procedures.	OPDP-1 Attachment F,
1. Procedure Compliance.	Objective 14
2. Precautions, Limitations and Initial Conditions	
3. Procedure Place Keeping.	
4. Use of 10 CFR 50.54 (x) and (y)	Objective 8

Appendix E
(Page 3 of 3)

Log Keeping

2. To aid in event reconstruction, as much significant information as possible should be logged during emergencies and abnormal or unexpected events. However, log keeping should not take precedence over controlling and monitoring the plant.

D. Legibility

Log entries shall be made in a manner such that they can be easily read and understood. Additionally, the log entries should be readily reproducible with standard photocopy machines.

E. Corrections

1. Corrections shall be made by editing the appropriate log entry, or shall be made by placing a single line through the incorrect entry, writing in the correct entry, initialing, and dating in a nearby space.

2. Spell checking and related corrections on eSOMS narrative logs does not require initialing and dating when done before official approval and printing.

3. All corrections to approved computer printed documents shall be initialed and dated and approved by the SM.

4. Late entries (past shift turnover) shall be annotated by placing the current time and the Words "LATE ENTRY", followed by the time the entry should have been made, and then the entry.

F. Log Review

The previous shifts logs shall be reviewed prior to assuming watch. Operating logs shall be reviewed by the SM/US. These reviews normally would occur shortly before shift relief and should ensure that entries are accurate and adequate, and that no open ended entries remain. Additionally, the Operations Superintendent, or his designee should review the operating logs on a daily basis when he is on site.

87. G2.1.21 001

You are preparing to perform a control rod exercise surveillance on your shift.

BSL is not operating.

Which ONE (1) of the following describes the correct location(s) to obtain the current controlled copy revision of the procedure?

Control Room...

A. ONLY

B. and OFO ONLY

C. and WCC ONLY

D. OFO AND WCC

A. Incorrect. WCC also has controlled copies.

B. Incorrect. Copies in the OFO are not controlled

C. Correct.

D. Incorrect. Copies in the OFO are not controlled

Ability to obtain and verify controlled procedure copy.

Question No. 68

Tier 3 Group 1

Importance Rating: RO 3.1

Technical Reference: SPP-2.2
ODM-1.0 Appendix D

Proposed references to be provided to applicants during examination:

Learning Objective: OPL27SPP-2.2 Objective 2 and 5

Question Source: Bank

Question History:

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Source:	NEW	Source If Bank:	
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** SPP-2.2, ADMINISTRATION OF SITE TECHNICAL PROCEDURES

IV. **LENGTH OF LESSON/COURSE:** 1 Hour

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, an understanding of SPP-2.2 "Administration of Site Technical Procedures" and OPDP-1 Attachment F "Plant Operating Procedures."

B. Enabling Objectives:

0.	Demonstrate an understanding of NUREG 1122 Knowledge's and Abilities associated with Rules of Procedure Use that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate license position as identified in Appendix A
1.	Discuss the purpose of SPP-2.2.
2.	Discuss management philosophy for procedure use and adherence.
3.	List the four levels of use for technical procedures including examples of each level.
4	Give examples when a procedure step may be marked not applicable (N/A).
5	Describe the procedure revision process.
6	Briefly define a minor/editorial change.
7	Describe the conditions under which personnel may take reasonable action within the scope of their training that departs from procedure.
8	Explain how to obtain and verify controlled procedure copy.

X. LESSON BODY: | **INSTRUCTOR NOTES**

A. SPP-2.2 Scope:

Procedures which fall under the scope of this SPP are those procedures that involve manipulation, monitoring or analysis of plant equipment or processes. These procedures will be prepared, reviewed, revised and approved in accordance with this SPP.

The Operations Department's Emergency Operating Instruction Program will administer the development, review, and approval for EOI's and supporting documents.

B. Use and Adherence:

Objective #2

1. Procedure users are responsible for:

   a. Following current approved procedures or obtaining approval for necessary changes before proceeding.

   b. Understanding the expected responses before performing actions in a procedure and ensuring these responses occur.

   c. Maintaining safe plant operation. In situations where procedures are inaccurate or inappropriate, safety takes precedence over procedure adherence.

   d. Stop performance if the procedure:

      - Cannot be performed or completed as written.
      - Is determined to be inadequate for the intended use.
      - Is determined to be technically incorrect.
      - Conflicts with another procedure, or would be in violation of approved and controlling documents.
      - Produces unexpected results.

NOTE: Typographical errors do not require stopping procedure performance. These errors should be noted and corrected following performance of the procedure. This does not apply to changes in component identifiers, numerical units, values, limits, work sequence or where the potential exists for improper operation of plant equipment.

X. LESSON BODY: **INSTRUCTOR NOTES**

2. Procedure changes are normally processed in Business Support Library(BSL). If BSL is not available or the change is urgent, a description of the change or a marked up copy of the procedure and form SPP-2.2-1, "Procedure Control Form (PCF)" should be forwarded to the organization responsible for the procedure (sponsor).

   NOTE: Hard copy PCFs are not required when using BSL to process the procedure. BSL controls and the audit trail generated by BSL serve as the documentation that appropriate reviews and approvals have occurred.

Objective #5

PCFs are required for other situations where BSL audit trails are not available to document review and approval requirements and for any handwritten changes.

3. The sponsor shall evaluate and determine the disposition of requested changes as appropriate:

   a. If change not needed, returns the request with an explanation of why not needed.

   b. If the change is needed, assign a responsible individual to prepare the draft in accordance with this procedure, or ....

   c. Place the request in a revision file to be incorporated at next revision.

4. The preparer shall:

   a. Obtain a number for a new procedure from the responsible organization or Management Services (MS).

   b. Ensure the procedure number has not been used previously.

   c. Determine if the revision to the procedure is minor or editorial using the guidelines of Section 3.5.

   d. Determine with plant management if the revision must be processed as an urgent change.

NOTE N/A is NOT to be used to bypass steps that are inadequately or improperly written or to be used in lieu of a procedure change.

Section Manager or Designee of Responsible Organization

3.3.7 Procedure steps which do not meet criteria 3.3.1 through 3.3.6 and are not required to be performed because of plant conditions or are controlled by another procedure previously fulfilled may be N/A'd by the Section Manager or Designee of the responsible organization. Concurrence is documented by initialing and dating the N/A'd steps. The Section Manager's or Designee's decision to N/A steps shall be based on evaluation of whether the procedure still fulfills all intended objectives.

3.4 New Procedures, Revisions, and Cancellations (See Appendix A and B)

3.4.1 Anyone can request a new procedure, revision, or cancellation. Cancelled procedures must follow same process as revised procedures.

3.4.2 Procedure changes are normally processed in Business Support Library (BSL). If BSL is not available or the change is deemed urgent by plant management, a description of the changes or a marked up copy of the procedure and Form SPP-2.2-1, "Procedure Control Form (PCF)" should be forwarded to the organization responsible for the procedure (sponsor).

NOTE Hard copy PCFs are not required when using BSL to process the procedure. BSL controls and the audit trail generated by BSL serve as the documentation that appropriate reviews and approvals have occurred.

PCFs are required for other situations where BSL audit trails are not available to document review and approval requirements and for any handwritten changes.

3.4.3 The sponsor shall evaluate and determine the disposition of requested changes as appropriate:

A. If the change is not needed, return the request and explain the reason.

B. If the change is needed, assign a responsible individual to prepare the draft in accordance with this procedure, or

C. Place the request in a revision file awaiting the next appropriate revision.

3.4.4 The preparer shall, as appropriate:

A. Obtain a number for a new procedure from the responsible organization or Management Services (MS). It is the responsibility of the preparer to ensure the procedure number has not been used previously.

B. Determine if the revision to the procedure is minor or editorial using the guidelines in Section 3.5.

89. G2.2.12 001

You have been directed to perform a Surveillance Test that is part of a Post Maintenance Test.

Which ONE (1) of the following describes a condition where a step in the test may be marked "N/A" in accordance with SPP-2.2, Administration of Site Technical Procedures?

A. To designate change of conditions or intent of the test.

B. To change incorrect procedure step descriptions that do NOT change intent.

C. To designate procedure sections that are not being used as part of the PMT.

D. To identify or change faulted procedure step logic or incorrect procedure guidance in relation to the performance of the PMT.

A Incorrect. using N/A to change conditions or ignore precautions is forbidden. Procedure Rev required.
B Incorrect. Using N/A to change step descriptions is forbidden.
C Correct. N/A may be used when performing partial PMTs to designate components that will not be used in the test.
D Incorrect. Specifically forbidden to N/A incorrect sequence
Knowledge of surveillance procedures.

Question No. 69

Tier 3 Group 2

Importance Rating: RO 3.0

Technical Reference: SPP-2.2, section 3.3

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271SPP-2.2 Objective 4

Question Source: Bank

Question History: Harris 2005 Editorially Modified

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

QUESTIONS REPORT

for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Source:	BANK	Source If Bank:	HARRIS 2005 NRC
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** SPP-2.2, ADMINISTRATION OF SITE TECHNICAL PROCEDURES

IV. **LENGTH OF LESSON/COURSE:** 1 Hour

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, an understanding of SPP-2.2 "Administration of Site Technical Procedures" and OPDP-1 Attachment F "Plant Operating Procedures."

B. Enabling Objectives:

0.	Demonstrate an understanding of NUREG 1122 Knowledge's and Abilities associated with Rules of Procedure Use that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate license position as identified in Appendix A
1.	Discuss the purpose of SPP-2.2.
2.	Discuss management philosophy for procedure use and adherence.
3.	List the four levels of use for technical procedures including examples of each level.
4	Give examples when a procedure step may be marked not applicable (N/A).
5	Describe the procedure revision process.
6	Briefly define a minor/editorial change.
7	Describe the conditions under which personnel may take reasonable action within the scope of their training that departs from procedure.
8	Explain how to obtain and verify controlled procedure copy.

X. LESSON BODY: **INSTRUCTOR NOTES**

- Periodically referenced during task performance to verify that each segment of the procedure has been performed.
- When required, appropriate sign-offs are completed to verify that each segment of the procedure has been completed

A segment is a portion of a procedure that accomplishes a complete function, such as alignment of a pump to a system, or disassembly of a pump.

3. Information Use procedures direct activities with the following characteristics:

Example: GOI-6

- Frequently performed or not complex.
- Entire activity can normally be performed from memory.
- The task is within the knowledge and skills of experienced individuals and/or task qualified personnel.

Rules of Use:

- When performing procedures from memory, procedures should be reviewed periodically (for example, before performance or during continuing training).
- The procedure shall be reviewed following revisions that affect the performance of the activity.
- The procedure user is responsible for results obtained when not referring to the procedure.

4. Multiple Usage Level procedures:

Example: Various Maintenance Procedures

If different sections of the procedure require different levels of use, the procedure is identified as multiple use and the classification of the individual sections is identified on the cover sheet or in the procedure.

F. Use of Not Applicable (N/A):

Objective #4

1. When performing technical procedures, performers may use N/A in lieu of sign-off required by Section 3.2 (SPP-2.2) only when it is clearly appropriate.

X. LESSON BODY: | **INSTRUCTOR NOTES**

2. N/A is NOT to be used to bypass steps that are inadequately or improperly written or to be used in lieu of a procedure change.

3. The following criteria shall be applied to determine when a step may be marked N/A:

   - The procedure specifically allows a step(s) to be marked N/A under specified conditions.

   - For procedures used to accomplish activities like post-maintenance tests, exact steps to be performed will often be specified. When specific steps are specified, all other steps may be marked N/A.

   - Nonapplicable unit steps in a multiple unit procedure shall be marked N/A.

   - Procedures providing alternate steps dependent on specified conditions allow the steps not required to be N/A'd.

Example: If the acceptance criteria was met, go to step 3.7. If the acceptance criteria was not met, continue with step 3.3. In this example, N/A Steps 3.3 through 3.6 if the acceptance criteria was met.

   - QC (witness/notification) holdpoints cannot be N/A'd without Nuclear Assurance approval.

   - When using only specific sections of an instruction as delineated in the controlling work document, then unused sections may be N/A'd.

   - Procedure steps which are obviously not required to be performed may be N/A'd with concurrence of the supervisor (management or engineering supervisory level) responsible for conduct of the activity or procedure.

Concurrence is documented by initialing and dating the N/A'd steps.

G. New Procedures, Revisions and Cancellations:

1. Anyone can request a new procedure, revision, or cancellation. Cancelled procedures must follow the same process as revised procedures.

- Entire activity can normally be accomplished from memory,
- Within the knowledge and skills of experienced individuals and/or task qualified personnel.
- When performing procedures from memory, procedures should be reviewed periodically (for example, before performance or during continuing training). Also, the procedure shall be reviewed following revisions that affect the performance of the activity. These reviews ensure that the activities are being performed correctly and that no procedure revisions have been overlooked.
- The procedure user is responsible for results obtained when not referring to the procedure.

3.2.4 Multiple Usage Levels Procedure

If different sections of the procedure require different levels of use, the procedure is identified as multiple use and the classification of the individual sections is identified on the cover sheet or in the procedure.

3.3 Use of Not Applicable (N/A)

When performing technical procedures, performers may use N/A in lieu of sign-off required by Section 3.2 only when it is clearly appropriate. The following criteria shall be applied to determine when a step may be marked N/A.

Performer

3.3.1 The procedure specifically allows a step(s) to be marked N/A under specified conditions.

3.3.2 For procedures used to accomplish activities like post-maintenance tests, exact steps to be performed will often be specified. When specific steps are specified, all other steps may be marked N/A.

3.3.3 Non-applicable unit steps in multiple unit procedures shall be marked N/A.

3.3.4 Procedures providing alternative steps dependent on specified conditions allow the steps not required to be N/A'd.

EXAMPLE If the acceptance criteria was met, go to Step 3.7. If the acceptance criteria was not met, continue with Step 3.3.

In this example, N/A Steps 3.3 through 3.6 if the acceptance criteria is met.

3.3.5 Quality Control (QC) (witness/notification) holdpoints cannot be N/A'd without Nuclear Assurance approval in accordance with NADP-1, Conduct of Quality Assessment and Inspection.

3.3.6 When using only specific sections of an instruction as delineated in the controlling work document, then unused sections may be N/A'd.

90. G2.2.23 001

Which ONE (1) of the following describes the requirement for LCO tracking in accordance with OPDP-8, Limiting Conditions for Operations Tracking?

The official log for LCOs is the...

A. Unit Log. All LCO entries are also required to be documented in the LCO Tracking Log.

B. Unit Log. ONLY LCO entries that will remain in effect past the assigned shift are required to be documented in the LCO Tracking Log.

C. LCO Tracking Log. All LCO entries are also required to be documented in the Unit Log.

D. LCO Tracking Log. ONLY LCO entries that will remain in effect past the assigned shift are required to be documented in the Unit Log.

A incorrect. LCO may entries may be put in LCO Tracking log but the only ones required are the entries that will go past the end of the shift
B Correct
C incorrect. The Unit Log is required at all times for all entries as the primary log.
D incorrect. The Unit Log is required as the official log
Ability to track limiting conditions for operations.

Question No. 70

Tier 3 Group 2

Importance Rating: RO 2.6

Technical Reference: OPDP-8

Proposed references to be provided to applicants during examination: None

Learning Objective: OPS271OPDP-8 Objective 6

Question Source: New

Question History:

Question Cognitive Level: Lower

10 CFR Part 55 Content: 41.10

Comments:

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Source:	NEW	Source If Bank:	
Cognitive Level:	LOWER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** LIMITING CONDITIONS FOR OPERATIONS TRACKING

IV. **LENGTH OF LESSON/COURSE:** 1 hour(s)

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of OPDP-8, LIMITING CONDITIONS FOR OPERATIONS TRACKING.

B. Enabling Objectives:

0.	Demonstrate an understanding of NUREG 1122 Knowledge's and Abilities associated with Limiting Conditions For Operations Tracking that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate license position as identified in Appendix A.
1.	Describe purpose of this procedure.
2.	Describe Precautions and Limitations listed in this procedure.
3	What are the requirements of the responsibilities section in this procedure.
4.	Describe requirements for TS LCO Evaluations.
5.	Describe requirements for LCO Tracking Logs.
6.	What are the documentation requirements for LCO entries and exits.
7.	Describe the difference between an Active LCO vs an Information ONLY LCO.
8.	Describe the information that must be entered into the LCO Tracking Logs.

X. LESSON BODY	INSTRUCTOR NOTES
F. Require Documentation - Review the following:	*Objective 6* Refer to Section 3.5
1. What determines whether an LCO entry is made in the Unit Log ONLY or the Unit Log and LCO Tracking Log? 2. What information is required to be entered into the Unit Log, when an LCO is entered? 3. During performance of SIs for which a status sheet is provided, what acceptable method may be used in lieu of logging each individual LCO in the Unit Log?	Refer to Section 3.5.1
G. Definitions- review the definitions in this section.	Refer to Section 5.0
1. Describe the difference between an Active LCO vs an Information ONLY LCO?	*Objective 7*
H. Appendix A and LCO Tracking LOG - Review the following:	Refer to Appendix A and Form OPDP-8-1
1. For LCOs which have an indefinite expiration date, what is entered into the expiration date column.?	*Objective 8* Refer to Appendix A Section 2.3

3.4 LCO Tracking Log

A. Each unit shall maintain a Unit LCO Tracking Log. Each unit shall also track Common LCOs for common equipment that affects operability. The US is responsible for maintaining the LCO Tracking Log(s).

B. Each LCO Tracking Record shall be assigned a unique identification number.

C. Active LCOs shall be tracked and passed from shift to shift as part of the shift turnover.

3.5 Requirements for Documentation

Detailed requirements for documentation related to this procedure are contained in attachments, as identified below:

3.5.1 Unit Log

For short-term LCO entries, the associated Unit Log will be used for documenting LCO entry provided the LCO is exited before the end of the assigned shift. LCO entries in the Unit Log should contain the LCO reference number, component description, a brief description of the activity requiring the LCO entry, and compensatory measures required while the LCO is in effect.

For performance of surveillance instructions for which a status sheet is provided, the US/designee may track individual component out-of-service times and corresponding LCOs on the provided attachment in lieu of logging each individual LCO in the Unit Log. The individual performing the procedure is responsible for notifying the US/designee when equipment is made inoperable and when it is placed back in service. Active LCOs that will extend past the end of the shift shall be entered in the LCO Tracking Log.

4.0 RECORDS

4.1 QA Records

The Unit Log referenced in this procedure is a QA record.

4.2 Non-QA Records

Form OPDP-8-1, "LCO Tracking Log"

5.0 DEFINITIONS

Active Limiting Condition for Operation (LCO) - A condition specified in the plant Technical Specifications (TS) which limits unit operations. An LCO may be entered by equipment malfunction or a change in a unit parameter. An LCO implies all LCOs contained in the plant's TS, Offside Dose Calculation Manual (ODCM), Technical Requirements Manual (TR) and the Fire Protection Report (FPR), if applicable. If an LCO is not met, the associated ACTION requirements shall be met.

Information Only LCO - A method of tracking an equipment malfunction or change in plant parameter which would restrict unit operation in another plant condition. An INFORMATION LCO may prevent a change in plant state/mode or may become an ACTIVE LCO for the current plant condition should other TS-related equipment or redundant safety-related equipment become inoperable.

91. G2.2.26 001

Given the following timeline for Unit 1 operation:

- 4/22 @ 0900 Entered HOT STANDBY (reactor was tripped from 20% power during shutdown)
- 4/22 @ 1100 Entered HOT SHUTDOWN
- 4/23 @ 0600 Entered COLD SHUTDOWN
- 4/23 @ 2300 Entered REFUELING

Which ONE (1) of the following times would be the earliest time that irradiated fuel movement in the reactor vessel is allowed?

A. 4/26 @ 1300

B. 4/26 @ 1500

C. 4/27 @ 0800

D. 4/28 @ 0100

A. Correct. TS 3.9.3 specifies 100 hours from critical. In this case, achieving Hot Standby.

B. Incorrect. This is 100 hrs from Hot Shutdown.

C. Incorrect. This is 100 hrs from Cold Shutdown.

D. Incorrect. This is 100 hours from Refueling.

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of refueling administrative requirements.

Question No. 71

Tier 3 Group 2

Importance Rating: RO 2.5

Technical Reference: TS 3.9.3

Proposed references to be provided to applicants during examination: None

Learning Objective: OPT200.FH Objective 6.a

Question Source: Bank

Question History: Sequoyah FH-B.5.C-11,
Developed from Kewaunee NRC 2000 exam

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.10, 43.2

Comments:

Source:	BANK	Source If Bank:	SEQUOYAH BANK
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

V. TRAINING OBJECTIVES (Cont'd):

B. Learning Objectives (Cont'd):

5. Describe the operation of the Fuel Handling system as it relates to the following:
   a. Precautions and limitations
   b. Major steps performed while refueling.
   c. Alarms and alarm response
   d. How a component failure will affect system operation
   e. How a support system failure will affect Fuel Handling system operation
6. Describe the administrative controls and limits for the Fuel Handling system as explained in this lesson:
   a. State Tech Specs/TRM LCOs that govern the Fuel Handling Systems.
   b. State the ≤1 hour action limit TS LCOs
   c. Given the conditions/status of the Fuel Handling system components and the appropriate sections of the Tech Spec, determine if operability requirements are met and what actions are required
7. Discuss related Industry Events:
   a. SQN LER93016 Tilted Fuel Assembly
   b. SQN-LER 2-93-3 Equipment Hatch not closed during Fuel Movement
   c. SQN-NOV 94-11 Non-conservative Fuel Handling Practices
   d. SOER 85-01 Reactor Cavity Seal Failure, Connecticut Yankee
   e. OE8112 Movement of irradiated fuel with Ventilation system inop, Dresden 2
   f. SOER 94-2 Boron dilution Events in PWRs

VI. TRAINING AIDS:

A. Classroom Computer and Local Area Network (LAN) Access
B. Computer projector

Administrative Topics

- State Tech Specs/TRM LCOs that govern the Fuel Handling System
  - Section 9 Refueling Operations
- State the TS LCOs that have an "Immediately Suspend Core Alterations" action limit

Enabling Objective 6

X. **LESSON BODY:**

- Point out to students the Section 9 of TS and TRM
- Refer to a copy of SQN Technical Specifications for the details of the LCO, applicability, action(s), surveillance(s) and basis for each

Tech Specs	The following is a listing of Tech Specs identified for the FH system.
3.9.1	Boron concentration *
3.9.2	Source Range Monitors *
3.9.3	Subcritical 100 hrs.
3.9.4	Containment Penetrtions *
3.9.8.1	RHR operation
3.9.8.2	2 RHR Operable *
3.9.9	Containment Vent
3.9.10	23 ft. of water Reactor vessel flange*
3.9.11	23 ft. wate in storage racks
3.9.12	One ABGTS
TRM	
3.9.5	Direct communication
3.9.6	Manipulator Crane

Core loading will be suspended, pending evaluation by the Refueling SRO/FHS and Reactor Engineering under the following circumstances:

If there occurs on any one *responding* nuclear channel an unexpected increase in count rate by a factor of five.
An unexpected increase in count rate by a factor of two on all *responding* channels.
If RCS temperature drops below 50°F.
Communication between the control room, containment or the SFP is lost.
If water clarity prevents the operator from viewing the Bottom Core Plate during core reload

REFUELING OPERATIONS

3/4 9.3 DECAY TIME

LIMITING CONDITION FOR OPERATION

3.9.3 The reactor shall be subcritical for at least 100 hours.

APPLICABILITY: During movement or irradiated fuel in the reactor pressure vessel.

ACTION:

With the reactor subcritical for less than 100 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.3 The reactor shall be determined to have been subcritical for at least 100 hours by verification of the date and time of subcriticality prior to movement of irradiated fuel in the reactor pressure vessel.

95. G2.3.2 001

Given the following plant conditions:

- Dose rate at job location is 90 mrem/hr.
- Airborne Radioactivity Area from particulates due to weld grinding:
    - Total Internal dose for the job if respirator is worn is 0 mrem.
    - Total Internal dose for the job if no respirator is worn is 65 mrem.
    - Time to complete job while wearing a respirator is 3.5 hours.
    - Time to complete job without wearing a respirator is 2.5 hours.

Which ONE (1) of the following describes whether a respirator will be worn, and why?

A. No, wearing a respirator will raise total exposure.

B. Yes, wearing a respirator will lower total exposure.

C. No, a respirator is not required unless the internal dose will exceed 40 DAC.

D. Yes, a respirator must be worn anytime particulate airborne radiation is present due to grinding.

A Correct. 290 total mRem
B incorrect. 315 total mRem
C incorrect. Respirators are worn to minimize dose. 40 DAC hours is not a restriction or requirement for their use
D incorrect. Although respirators may be worn for grinding, it would not be worn if it results in extra dose.

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of facility ALARA program.

Question No. 72

Tier 3 Group 3

Importance Rating: RO 2.5

Technical Reference: RCI-04

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271C260 Objective 8, 9

Question Source: Modified

Question History: Various WTSI Exams

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.12

Comments:

Source:	MODIFIED	Source If Bank:	
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

8. Identify the requirements for the implementation of a successful ALARA program.

9. Identify the responsibilities of the following concerning the ALARA program:

   a. Rad Protection Management.

   b. Plant Supervision.

   c. Plant Employee.

10. Identify the process for preparing a Radiation Work Permit (RWP)

The following list contains knowledge and ability statements (K/As) from The Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors (PWR) NUREG-1122, Revision 2 that are applicable to the Initial Licensed Candidate training program. As such, questioning in these areas will be included on any testing in preparation of, or included in obtaining either RO or SRO NRC license.

K/A #	K/A Statement	10CFR55 Sect. Link(s)	IMPORTANCE RO/SRO
G 2.3.1	Knowledge of 10CFR20 and related facility radiation protection requirements.	41.12 / 43.4. 45.9 / 45.10	2.6/3.0
G 2.3.2	Knowledge of facility ALARA program.	41.12 / 43.4 / 45.9 / 45.10	2.5/2.9
G 2.3.4	Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	43.4 / 45.10	2.5/3.1
G 2.3.5	Knowledge of use and function of personnel monitoring equipment.	41.11 / 45.9	2.3/2.5
G 2.3.7	Knowledge of the process for preparing a radiation work permit.	41.10 / 45.12	2.0/3.3
G 2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	43.4 / 45.10	2.9/3.3

XI. LESSON BODY: **INSTRUCTOR NOTES**

c) Allows the pinpointing of high dose jobs so that concentrated efforts can be used to reduce them in the future.

d) Provides data for managers and engineers to compare benefits of modification versus the cost in person-rem for a plant modification.

b. Need for ALARA is based on the following assumptions:

1) Any change in the body brought on by ionizing radiation is potentially detrimental.

2) Any dose in any amount is a potential hazard.

3) Every molecule in every cell is part of a delicate system, in balance with others, that is easily disrupted by radiation.

c. Implementation of a successful ALARA program requires: **Obj. 8**

1) Management commitment and support.

2) Careful design of facilities and equipment.

3) Well-trained, committed, and aware workers.

d. Organizational responsibility

1) Plant Rad Protection Manager (Staff) Responsibilities **Obj. 9**

a) Takes the lead in implementing ALARA and insures that goals and performance against those goals, as assessed periodically are made available.

b) Is responsible for an effective program as required by procedure.

c) Maintains awareness of location, operation and jobs that give radiation dose.

d) Participates in job planning and procedural development.

e) Ensures that respiratory protection, protective clothing and survey equipment are specified for each job.

f) Provides for training in radiation protection.

2) Plant Supervision **Obj. 9**

XI. LESSON BODY: **INSTRUCTOR NOTES**

a) Implements procedures within their respective areas to minimize radiation dose.

b) Ensures that employees follow procedures and work orders (First line supervisors are of utmost importance in creating the proper attitude among their crews and greatly influence the achievement of ALARA).

3) Individual Employee – Most Important

Obj. 9
Stress: No program can work without individual commitment

a) Responsible for reducing his/her own radiation dose.

b) Follows all plant procedures and Rad Protection instructions.

c) Reports all radiation hazards and any suggestions for reducing hazards to Rad Protection or their supervisor.

e. ALARA Program details

1) Key Components.

a) ALARA policy and management commitment.

b) Worker and line management commitment.

c) Collective dose database system.

d) ALARA job reviews.

e) ALARA design review.

f) ALARA coordinator.

g) Goals and associated tracking system.

Review latest annual ALARA Report

2) Employee incentives to reduce dose.

These have been successful in the industry.

a) Awareness of risk to promote safety.

b) Recognition.

c) Prestige.

d) Sense of involvement.

e) Receiving feedback (positive/negative).

f) Managements concern.

Appendix C

Air and Loose Surface Radioactive Contamination Levels for Evaluating Respiratory Protection (Recommended)

Air

Concentration Levels (μCi/cc Air) Alpha and Beta-Gamma[A,B]	Recommended Action[D]
< 1 DAC	Respirators are to be considered when entering an identified Airborne Radioactivity Area
1 to 20 DAC	Full face respirator required or complete evacuation of personnel from area
> 20 to 700 DAC	Supplied air devices or complete evacuation of personnel from area
> 700 DAC[C]	SCBA

Notes

A Only supplied air and SCBA provide protection for halogens.

B Gamma scan for radionuclide determination is recommended.

C In this concentration range, the immersion dose rate may be significant.

D A TEDE evaluation is required when the criteria of **RCI-14** for a TEDE evaluation are met. This evaluation considers total dose to an individual due to use or non-use of respirators.

Loose Surface

Concentration Levels (dpm/100 cm^2) Beta-Gamma	Recommended Action
1,000 to 50,000	Normally none; however unique or special cases may arise and will require evaluation.
> 5,000 dpm total (fixed and transferrable activity)	Evaluate each welding, grinding, burning, or cleaning task using volatile liquid for respiratory protection.
50,000 to 100,000[E]	Evaluate each non-inspection (physical maintenance) task for respiratory protection. Inspections or similar tasks normally will not require a protection method.
> 100,000[A]	Inspections and physical maintenance normally require a protection method or engineering controls.

Notes

E Additional considerations, such as the condition of the surface (e.g., dry versus oil, grease, etc.) and data gathered by air sampling while personnel are within the area will affect respiratory protection determinations.

TEDE ALARA Worksheet

RWP Number(s) _____

Estimated Dose With Respiratory Protection

A.	Number of hours in work area per day by a single individual		_____	hours
B.	(Hours) × (Work area dose rate _____ mrem/hr)	External Dose	_____	mrem
C.	(External dose in mrem) × (1.15 IF [A])	Corrected External Dose	_____	mrem
D.	Measured DAC or anticipated DAC		_____	DAC
E.	[(Hours) × (DAC)] ÷ (Respirator APF [B])		_____	DAC-hrs
F.	(DAC-hrs) × (2.5 mrem/DAC-hr)	Internal Dose	_____	mrem
G.	TEDE = (Step C) + (Step F)		_____	**mrem**

Estimated Dose Without Respiratory Protection or Engineering Controls

H.	[Hours (Step A)] × [DAC (Step D)]		_____	DAC-hrs
I.	[DAC-hrs (Step H)] × [2.5 mrem/DAC-hr]	Internal Dose	_____	mrem
J.	TEDE = (Step B) + (Step I)		_____	**mrem**

Estimated Dose Without Respiratory Protection and With Engineering Controls

K.	List feasible engineering controls for this application: _____			
L.	Estimated DAC after application of engineering controls		_____	DAC
M.	[Hours (Step A)] × [DAC (Step L)]		_____	DAC-hrs
N.	[DAC-hrs (Step M)] × [2.5 mrem/DAC-hr]	Internal Dose	_____	mrem
O.	Estimated dose to single individual per day to implement engineering controls (_____ mrem) ÷ (Number of days for the task)		_____	mrem
P.	[mrem (Step I)] – [mrem (Step N)]	Internal Dose Saved	_____	mrem
Q.	TEDE = [(Step B) + (Step N) + (Step O)] – [Step P]		_____	**mrem**

TEDE Selection: **Step G** **Step J** **Step Q** (Circle one)

Identify items which override TEDE selection: Hot particle presence - Heat stress - Industrial contaminants _____
Visibility - Confined space - High elevation - Comms - Other _____

TEDE Selection Override: Yes / No (Circle one)

_____ Prepared By / Date

_____ Approved By / Date

NOTES

A Work Inefficiency Factor (IF) due to use of respiratory protection

B Assigned Protection Factors (APF): Air purifying respirator - 100 Airline mask/hood - 1,000 SCBA - 10,000

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

1. G2.3.10 001
Given the following plant conditions:

- A rapid load reduction from 100% power to 60% power was performed on Unit 1 approximately 3 hours ago.
- Indication on Auxiliary Building Area Radiation Monitors, 1-RR-90-1A, and 0-RR-90-1B are rising.
- Chemistry confirms that RCS I-131 activity exceeds Technical Specification limit of acceptable operation.
- The US directs a plant shutdown to be performed.

Which ONE (1) of the following post shutdown actions is subsequently performed to limit the release of activity?

A. MSIVs are closed

B. RCS temperature is reduced below 500°F

C. S/G PORV setpoints are raised

D. Maximum Condensate Polishers are placed in service

A is incorrect because closing MSIVs does not prevent rad release from SG ADVs
B is correct. Raise letdown to clean up RC system, and reduce temp IAW TS
C is incorrect. Would not stop a release from SV
D is incorrect. Cation Demin may be placed in service on Letdown, but placing Condensate Demins in service would still not minimize a release off-site if SV or SG ADV lifted

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

Question No. 73

Tier 3 Group 3

Importance Rating: RO 2.9

Technical Reference: TS 3.4.8, AOP R.06

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271AOP-R.06 Objective 6 and 9

Question Source: Bank

Question History: WTSI Bank

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.10

Comments:

Source:	BANK	Source If Bank:	WTSI
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** AOP-R.06 HIGH RCS ACTIVITY

IV. **LENGTH OF LESSON/COURSE:** 1.0 hour(s)

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of AOP-R.06 HIGH RCS ACTIVITY.

B. Enabling Objectives:

0.	Demonstrate an understanding of NUREG 1122 Knowledge's and Abilities associated with High RCS Activity that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate license position as identified in Appendix A.
1.	Explain the purpose/goal of AOP-R.06.
2.	Discuss the AOP-R.06 entry conditions. a. Describe the setpoints, interlocks, and automatic actions associated with AOP-R.06 entry conditions. b. Describe the ARP requirements associated with AOP-R.06 entry conditions. c. Interpret, prioritize, and verify associated alarms are consistent with AOP-R.06 entry conditions. d. Describe the Administrative conditions that require Turbine Trip/ Reactor trip due to Reactor Coolant Pump Malfunctions.
3.	Describe the initial operator response to stabilize the plant upon entry into AOP-R.06.
4.	Upon entry into AOP-R.06, diagnose the applicable condition and transition to the appropriate procedural section for response.
5.	Summarize the mitigating strategy for the failure that initiated entry into AOP-R.06.
6.	Describe the bases for all limits, notes, cautions, and steps of AOP-R.06.

7.	Describe the conditions and reason for transitions within this procedure and transitions to other procedures.
8.	Given a set of initial plant conditions use AOP-R.06 to correctly: a. Recognize entry conditions b. Identify required actions c. Respond to Contingencies d. Observe and Interpret Cautions and Notes
9.	Describe the Tech Spec and TRM actions applicable during the performance of AOP-R.06.
10.	Apply GFE and system response concepts to the abnormal condition – prior to, during and after the abnormal condition

A. Purpose

Objective 1

1. These instructions provide the actions necessary to mitigate the effects of high RCS activity or failed fuel.

B. Overview - Symptoms and Entry Conditions

Objective 2

1. Annunicators may indicate a fuel cladding or high activity in the RCS

   See AOP for listing of annunicators

The crew may be made aware of an increasing trend in RCS activity condition through reports from the Chem Lab

2. Deviations or unexpected indications on any of the following may indicate fuel cladding failure or high activity in the RCS
   a. Rising radiation monitor indications
   b. Rising activity in Chem Lab reactor coolant sample
   c. Simultaneous increases in Condenser Vacuum Exhaust and Lower Containment radiation monitor count rates

3. No entry conditions from other procedures

4. AOP only has one Operator Action section

Objective 5

Big picture is identification of activity, ensuring compliance with T/S and REP, making notifications, protecting personnel and initiating cleanup.

C. Section 2.0, Operator Actions

Objectives 3, 4, 6, 8

1. Section 2.0, Step 1 - Evaluate Tech Specs for applicability.

   - 3.4.8, Specific Activity

Step performance should ensure that Tech Specs are satisfied or that sufficient compensatory actions are taken.

2. Section 2.0, Step 2. EVALUATE EPIP-1, Emergency Plan Initiating Matrix.

EAL designator 2.4, Fuel Clad Degredation, addresses NOUE on RCS activity exceeding LCO and designator 1.1, Fuel Clad Barrier, addresses RCS activity in 1.1.2
Serves as a warning to personnel drawing samples

CAUTION:

RCS sample may have high activity

X. LESSON BODY:	INSTRUCTOR NOTES
9. Section 2.0, Step 8. GO TO appropriate plant procedure	*Objective 7* *The crew is directed back to whatever procedure was in effect prior to detection of the high activity condition.* ***It should be noted that the evaluation of TS 3.4.8 MAY STILL RESULT IN A PLANT SHUTDOWN.***
D. Technical Specifications *TS 3.4.8, Specify Activity*	Objective 9

3/4.4.8 SPECIFIC ACTIVITY

LIMITING CONDITION FOR OPERATION

3.4.8 The specific activity of the primary coolant shall be limited to:

a. Less than or equal to 0.35 microcuries/gram DOSE EQUIVALENT I-131, and

b. Less than or equal to $100/\overline{E}$ microcuries/gram.

APPLICABILITY: MODES 1, 2, 3, 4 and 5

ACTION:

MODES 1, 2 and 3*

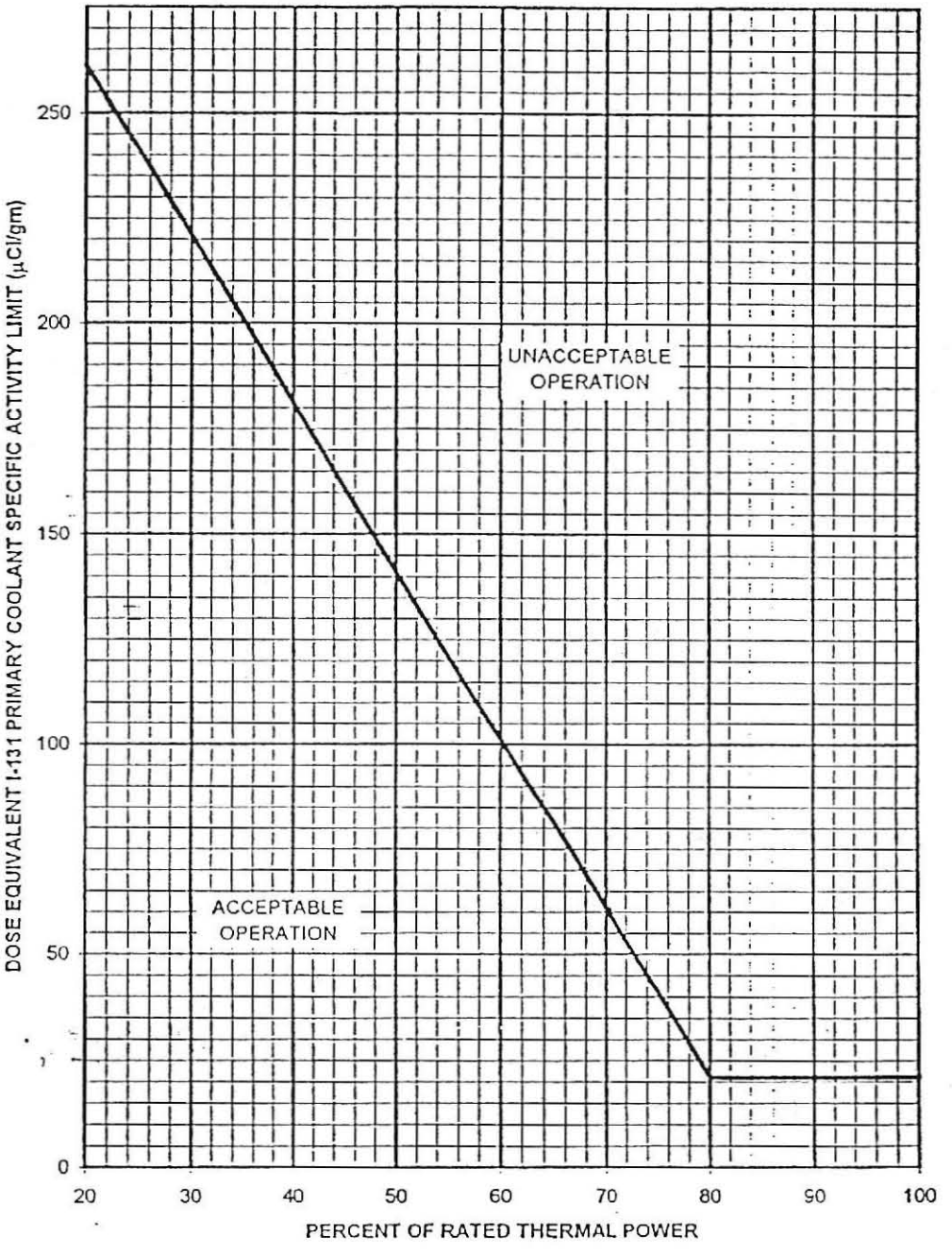
a. With the specific activity of the primary coolant greater than 0.35 microcuries/gram DOSE EQUIVALENT I-131 for more than 48 hours during one continuous time interval or exceeding the limit line shown on Figure 3.4-1, be in at least HOT STANDBY with T_{avg} less than 500°F within 6 hours. LCO 3.0.4.c is applicable.

b. With the specific activity of the primary coolant greater than $100/\overline{E}$ microcuries/gram, be in at least HOT STANDBY with T_{avg} less than 500°F within 6 hours.

MODES 1, 2, 3, 4 and 5

a. With the specific activity of the primary coolant greater than 0.35 microcuries/gram DOSE EQUIVALENT I-131 or greater than $100/\overline{E}$ microcuries/gram, perform the sampling and analysis requirements of item 4a of Table 4.4-4 until the specific activity of the primary coolant is restored to within its limits.

*With T_{avg} greater than or equal 500°F.



R241

FIGURE 3.4-1
DOSE EQUIVALENT I-131 Primary Coolant Specific Activity Limit Versus Percent of RATED THERMAL POWER with the Primary Coolant Specific Activity > 0.35 μCi/gram Dose Equivalent I-131

R241

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.0 OPERATOR ACTIONS

1. **EVALUATE** the following Tech Spec and Technical Requirement for applicability:
   - TS 3.4.8, Specific Activity

2. **EVALUATE** EPIP-1, Emergency Plan Classification Matrix.

CAUTION: RCS sample may have high activity.

3. **REQUEST** Chem Lab to perform following:

   a. **SAMPLE** for activity levels:

      - Initial RCS
      - RCS at 4 hour intervals until activity levels are stable.
      - Outlet of mixed bed

      AND

   b. **REQUEST** Chem Lab recommendations based on sample results.

4. **NOTIFY** Reactor Engineering to implement 0-TI-NUC-000-003.0, Fuel Integrity Assessment Program, due to possible failed fuel.

97. G2.4.25 002

Given the following plant conditions:

- Unit 1 is in a refueling outage; Unit 2 is at 100% power
- Weld repairs scheduled on 2A-A charging pump.

The following lines are observed on the 0-M-29 "Blue Goose" and printer:

- 2D43 A 50 IN 07-Nov-02 09:15 ZONE 85 CHARGING PUMP ROOM 2A CROSS ZONE W/ZONE 82 ACTUATES FSV-26-191;
- 2D46 A 50 IN 07-Nov-02 09:16 ZONE 82 U2 SI & CHARGING PUMP ROOMS CROSS ZONE W/ZONES 83, -84, -85, 86, & 87 ACTUATES FSV-26-191 ZN LOCATED IN PNL 0-L-606;
- 2H38 A 50 IN 07-Nov-02 09:16 PNL 0-L-670/ELECTRIC FIRE PUMP A RUNNING ZONE 528 FIRE PUMP HOUSE RM A NOT OPERATIONALLY REQUIRED ZONE SEND OPERATOR TO PUMP.

No other alarms or reports from the field are received.

0-FCV-26-191 is Aux Building el 669' Pre-action Valve.

Which ONE (1) of the following is the probable cause of the alarms and the correct action to tak

A. Alarms consistent with taking fire protection out of service to perform work on 1A-A charging pump.	No actions required.
B. Trouble in 2A charging pump room fire protection but no actuation has occurred.	Dispatch AUO/Fire Ops to confirm Alarm is real; If no fire confirmed in area, notify Fire Ops of condition and have alarms, electric driven fire pump, and FSV-26-191 returned to normal.
C. Conditions in 2A charging pump room have caused cross-zone operation and actuated FSV-26-191 which started the electric driven fire pump.	Dispatch AUO/Fire Ops to confirm Alarm is real; If no fire confirmed in area, notify Fire Ops of condition and have alarms, electric driven fire pump, and FSV-26-191 returned to normal.
D. Conditions in 2A charging pump room have caused cross-zone operation and actuated FSV-26-191 and caused water spray into the room.	Notify the fire brigade to respond to the fire. Notify Shift Manager to evaluate the REP.

A. Incorrect. Fire detection would normally not be taken out of service for welding activities.
B. Incorrect. Actuation has occurred.
C. Correct.
D. Incorrect. Sprinkler heads did not actuate as indicated by Alarm 2H38.

Knowledge of fire protection procedures.

Question No. 74

Tier 3 Group 4

Importance Rating: RO 2.9

Technical Reference: 0-SO-13-1
0-AR-M-29

Proposed references to be provided to applicants during examination: Applicable drawings

Learning Objective: OPT200.HPFP B.16.c, 17.a, c, 18.b

Question Source: Bank

Question History: Sequoyah FPS-3

Question Cognitive Level: HIgher

10 CFR Part 55 Content: 41.10

Comments:

Source:	BANK	Source If Bank:	SEQUOYAH BANK
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

a. High pressure service water (086K1.01)
b. Raw service water (086K1.02)
c. AFW system (086K1.03)

* 10 State the electrical and/or control air supplies to high pressure fire protection system's components. (K/A 086K2)

11 Given a high pressure fire protection system/component malfunction, analyze its affect on the plant systems listed. (K/A 086K3)
a. Shutdown capability with redundant equipment (086K3.01)

* 12 Explain the following high pressure fire protection system design features and/or interlocks. (K/A 086K4)
a. Adequate supply of water for FPS (086K4.01)
b. Maintenance of fire header pressure (086 K4.02)
c. Detection and location of fires (086K4.03)
d. Personnel safety (086K4.04)
e. CO_2 (086K4.06)
f. Main Turbine/Generator Protection (086K4.07)

13 Explain the following operational implications as they apply to high pressure fire protection system. (K/A 086K5)
a. Effect of CO_2 on fire (078 K5.01)
b. Effect of water spray on electrical components (086K5.03)
c. Hazards to personnel as a result of fire type and methods of protection (086K5.04)

14 Given a malfunction of listed plant systems/components, analyze its effect on the high pressure fire protection system. (K/A 086K6)
a. Pumps (086K6.01)
b. Valves (086K6.02)
c. Motors (086K6.03)
d. Fire, smoke, and heat detectors (086K6.04)

15. Given a plant situation, prevent exceeding operational design limits by predicting and/or monitoring, as applicable, changes in parameters that are associated with the operating controls of the high pressure fire protection system. (K/A 086A1)
a. Fire header pressure (086.A1.01)
b. Fire water storage tank level (086.A1.02)
c. Fire doors (086.A1.03)
d. Fire dampers (086.A1.04)
e. FPS lineups (086.A1.05)

16. Given a plant situation for the high pressure fire protection system, (i) predict the impact on plant operation, and (ii) based on the impact, apply procedural guidance to correct, control, or mitigate the consequence of the situation. (K/A086A2)
a. Manual shutdown of the FPS (086.A2.01)
b. Low FPS header pressure (086.A2.02)
c. Inadvertent actuation of the FPS due to circuit failure or welding (086.A2.03)
d. Failure to actuate the FPS when required, resulting in fire damage (086.A2.04)

17. Given a plant situation, demonstrate the ability to monitor the automatic operation of the high pressure fire protection system. (K/A 086A3)
a. Starting mechanisms of fire water pumps (086.A3.01)
b. Actuation of the FPS (086.A3.02)
c. Actuation of the fire detectors (086.A3.03)

18. Given a plant situation for the high pressure fire protection system, demonstrate the ability to monitor and, as appropriate, perform manual operation of the system in the control room. (K/A086A4)

a. Fire water pumps (086.A4.01)
b. Fire detection panels (086.A4.02)
c. Fire alarms switch (086.A4.03)
d. Fire water storage tank makeup pumps (086.A4.04)
e. Deluge valves (086.A4.05)

X. LESSON BODY: **INSTRUCTOR NOTES**

11. Given a high pressure fire protection system/component malfunction, analyze its affect on the plant systems listed. (K/A 086K3)
    a. Shutdown capability with redundant equipment (086K3.01)

Objective 11
Student handout, drawings, FSAR, AOPs

12. Explain the following high pressure fire protection system design features and or interlocks. (K/A 086K4)
    a. Adequate supply of water for FPS (086K4.01)
    b. Maintenance of fire header pressure (086 K4.02)
    c. Detection and location of fires (086K4.03)
    d. Personnel safety (086K4.04)
    e. CO_2 (086K4.06)
    f. Main Turbine/Generator Protection (086K4.07)

Objective 12
FSAR, Student Handout

13. Explain the following operational implications as they apply to high pressure fire protection system. (K/A 001K5)
    a. Effect of CO_2 on fire (078 K5.01)
    b. Effect of water spray on electrical components (086K5.03)
    c. Hazards to personnel as a result of fire type and methods of protection (086K5.02)

Objective 13
Student Research, FSAR, Student Handout, Attachment 7

14. Given a malfunction of listed plant systems/components, analyze its effect on the high pressure fire protection system. (K/A 086K6)
    d. Pumps (086K6.01)
    e. Valves (086K6.02)
    f. Motors (086K6.03)
    g. Fire, smoke, and heat detectors (086K6.04)

Objective 14
FSAR, Student Handout, Student Research, AOPs

15. Given a plant situation, prevent exceeding operational design limits by predicting and/or monitoring, as applicable, changes in parameters that are associated with the operating controls of the high pressure fire protection system. (K/A 086A1)
    a. Fire header pressure
    a. Fire water storage tank level
    a. Fire doors
    a. Fire dampers
    a. FPS lineups

Objective 15
System Description, Drawings Procedures

16. Given a plant situation for the high pressure fire protection system, (i) predict the impact on plant operation, and (ii) based on the impact, apply procedural guidance to correct, control, or mitigate the consequence of the situation. (K/A 086A2)
    a. Manual shutdown of the FPS
    a. Low FPS header pressure
    a. Inadvertent actuation of the FPS due to circuit failure or welding

Objective 16
System Description, Drawings Procedures

X. LESSON BODY: **INSTRUCTOR NOTES**

a. Failure to actuate the FPS when required, resulting in fire damage

17. Given a plant situation, demonstrate the ability to monitor the automatic operation of the high pressure fire protection system. (K/A 086A3)
    a. Starting mechanisms of fire water pumps
    b. Actuation of the FPS
    c. Actuation of the fire detectors

Objective 17
System Description, Drawings

18. Given a plant situation for the high pressure fire protection system, demonstrate the ability to monitor and, as appropriate, perform manual operation of the system in the control room. (K/A 086A4)
    a. Fire water pumps
    b. Fire detection panels
    c. Fire alarms switch
    d. Fire water storage tank makeup pumps
    e. Deluge valves

Objective 18
System Description, Drawings
Procedures

B. Review evolutions in 0-SO-13/26 series procedures that address tasks required for program by task checklist.

Student Handout, 0-SO-13-1, 0-SO-26-1, 2, Obj #7

C. If applicable, present any recent industry events.

Student Handout

4

Source	Setpoint	0-M-29 CRT *ZONE #* MCR PRINTER *CROSS ZONE*
CROSS ZONE	Alarm message in **RED** on CRT.	

Probable Causes

1. Potential FIRE condition exists.
2. Fire detector senses an 'alarm' condition.
3. Equipment malfunction (e.g. dust, humidity, jarring).

Corrective Actions

[1] **WHEN** 0-M-29 console is in 'ALARM', **THEN**

ACKNOWLEDGE alarm by depressing the **SEND** key.

[2] **READ** the PRINTER message in its **ENTIRETY**.

[3] **IF** a CROSS ZONE alarm is received, **THEN**

[a] **IMMEDIATELY DISPATCH** the Fire Brigade in accordance with **AOP-N.01**.

[b] **CONFIRM** alarm is **REAL**.

[c] **ENSURE** Fire alarm is **LOCKED-IN**.

[d] **ANNOUNCE** location of fire over the paging system.

[4] **IF** a Diesel Generator Room CO_2 CROSS ZONE alarm is received and the Diesel Generator is running from a non emergency condition, **THEN**

EMERGENCY STOP the effected Diesel Generator.

Continued

Source	Setpoint	0-M-29 CRT *ZONE #* MCR PRINTER *CROSS ZONE*
CROSS ZONE	Alarm message in **RED** on CRT.	

CONTINUED

NOTE 1 An Auxiliary Building Ventilation shutdown due to smoke detector cross zone is not an ABI or ESF. It only stops AB Supply, Exhaust and Fuel Handling Exhaust Fans.

NOTE 2 Do *NOT* manually actuate ABI per Engineering recommendation due to potential for damaging charcoal filters.

NOTE 3 AB Ventilation fans can not be started if either Unit's smoke detection cross zones are actuated.
FIRE OPS must bypass zone modules to allow reset with **[1-HS-30-102D]**.

[5] **IF** a Auxiliary Building Supply Duct CROSS ZONE alarm is received, **THEN**

[a] **PLACE** all AB Ventilation Fans in PTL until 1-HS-30-102D can be reset.

[b] **RESET** zones.

[c] **IF** zones will not reset, **THEN**

NOTIFY Fire Ops to bypass zone modules using 0-PI-FPU-013-001.0.

[d] **RESTORE** normal AB Ventilation using 0-SO-30-10, Section 8.3.

[6] **GO TO** 0-SO-13-1 Section **[6.0]**.

References 47W611-13-1 through 7, 47W611-30-5 and 6, 45W657-31 and 32

100. G2.4.9 001

Given the following plant conditions:

- Unit 1 is in Mode 5.
- RCS temperature is 195°F.
- RCS pressure is 325 psig.
- Train "A" RHR in service.
- Train "B" RHR out of service for surveillance testing.
- SGs #2 and #3 are intact and at 33% NR.
- RCS is intact.
- Pressurizer level at 30% cold cal.

Which ONE (1) of the following is the preferred method of core cooling if a loss of RHR shutdown cooling occurs with RCS temperature rising?

A. RWST fill to RCS; bleed through cold leg manway.

B. Normal charging to RCS; bleed through hot leg manway.

C. Natural or forced RCS flow while steaming intact S/Gs.

D. Normal charging to RCS; bleed through the PZR PORVs.

A. Incorrect; With RCS intact, steaming will be the preferred method. Cold leg manway will not be open.

B. Incorrect; Hot leg manway not open if in Mode 5 with RCS pressure higher than atmospheric.

C. Correct. AOP-R.03 Section 2.3 will transition to Section 2.6 due to the inability to restore RHR shutdown cooling. The stem states that the RCS is intact. With one RHR train operable, TS 3.4.1.4 requires the two-SG level requirement to meet TS heat sink requirements. #s 2 and 3 SGs satisfy the TS requirement as stated. Therefore, Section 2.3 Step 7 RNO transitions to Section 2.6 since forced flow cannot be re-established. Section 2.6 steps 5, 6, and 9.a are satisfied. Pzr level greater than 20% cold cal satisfies step 7. Whether forced flow is established or not, step 9 uses steaming from intact SGs.

D. Incorrect; Could potentially be used if required but would be an alternate heat removal, not preferred .

QUESTIONS REPORT
for SEQUOYAH 2007 - NRC EXAM REV DRAFT

Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.

Question No. 75

Tier 3 Group 4

Importance Rating: RO 3.3

Technical Reference: AOP-R.03

Proposed references to be provided to applicants during examination: None

Learning Objective: OPL271C358, Obj. B.2
OPL271AOP-R.03; 4

Question Source: Bank

Question History: Sequoyah AOP R.02.B.2-4

Question Cognitive Level: Higher

10 CFR Part 55 Content: 41.10

Comments:

Source:	BANK	Source If Bank:	SEQUOYAH BANK
Cognitive Level:	HIGHER	Difficulty:	
Job Position:	RO	Plant:	SEQUOYAH
Date:	4/2007	Last 2 NRC?:	NO

I. **PROGRAM:** OPERATOR TRAINING - LICENSED

II. **COURSE:** LICENSE TRAINING

III. **LESSON TITLE:** AOP-R.03, RHR SYSTEM MALFUNCTION

IV. **LENGTH OF LESSON/COURSE:** 2 hours

V. **TRAINING OBJECTIVES:**

A. Terminal Objective:

Upon completion of License Training, the participant shall be able to demonstrate or explain, using classroom evaluations and/or simulator scenarios, the requirements of AOP-R.03, RHR SYSTEM MALFUNCTION.

B. Enabling Objectives

	Objectives
0.	Demonstrate an understanding of NUREG 1122 knowledge's and abilities associated with RHR SYSTEM MALFUNCTIONs that are rated ≥ 2.5 during Initial License Training and ≥ 3.0 during License Operator Requalification Training for the appropriate position as identified in Appendix A.
1.	State the purpose/goal of this AOP-R.03.
2.	Describe the AOP-R.03 entry conditions.
	a. Describe the setpoints, interlocks, and automatic actions associated with AOP-R.03 entry conditions.
	b. Describe the ARP requirements associated with AOP-R.03 entry conditions.
	c. Interpret, prioritize, and verify associated alarms are consistent with AOP-R.03 entry conditions.
	d. Describe the plant parameters that may indicate an RHR System Malfunction.
3.	Describe the initial operator response to stabilize the plant upon entry into AOP-R.03.
4.	Upon entry into AOP-R.03, diagnose the applicable condition and transition to the appropriate procedural section for response.
5.	Summarize the mitigating strategy for the failure that initiated entry into AOP-R.03.
6.	Describe the bases for all limits, notes, cautions, and steps of AOP-R.03.

X. LESSON BODY:	INSTRUCTOR NOTES
3. CHECK at least one 6.9 KV Shutdown board ENERGIZED on this unit. a. Refer to AOP for Substeps	*Objective 7* Transition to section 2.8 for RCS alternate heat sink without power
NOTE: Refer to NOTE in AOP	Describes availability of hydrogen igniters and containment air return fans
4. EVALUATE placing one train of Hydrogen Igniters and one Air Return Fan in service: a. Refer to AOP for Substeps	SRO decision to place igniters and air return fans on as necessary to prevent explosive concentrations
NOTE: Refer to NOTE in AOP	If needed for containment cooling, ERCW containment isolation valves may be re-opened as necessary if ERCW piping is intact
5. START starting available upper and lower compartment coolers USING Appendix B.	Review Appendix B
6. CHECK RCS INTACT: a. Refer to AOP for Substeps b. Refer to AOP for RNO	Checks to determine if RCS can be refilled so S/G can be used as heat sink. If RCS cannot be refilled GO TO step 11 for RCS feed and bleed cooling mode
7. VERIFY secondary heat sink AVAILABLE: a. Refer to AOP for Substeps b. Refer to AOP for RNO	Checks to determine if S/G can be used as heat sink. If S/G cannot be used GO TO step 11 for RCS feed and bleed cooling mode
CAUTION: Refer to CAUTION in AOP	Informs operator of potential effect of steam on RCS level indications if RCS temperature is >200°F
8. REFILL RCS UNTIL either of the following conditions satisfied: a. Refer to AOP for Substeps	RCS refill stop criteria

X. LESSON BODY:	INSTRUCTOR NOTES
NOTE: Refer to NOTE in AOP	Gives preferred starting order of RCPs for PZR spray
9. ATTEMPT to start one RCP: a. Refer to AOP for Substeps b. Refer to AOP for RNO	Forced RCS flow is preferred over natural circulation if RCP can be started. If NOT then GO TO step 10 for natural circulation cooling
10. ESTABLISH secondary heat sink: a. Refer to AOP for Substeps b. Refer to AOP for RNO	If feed and bleed cooling of S/G can be established GO TO step 15 to prepare for exit of procedure. If NOT continue attempts establish feed and bleed
11. DETERMINE proper step to initiate a feed and bleed cooling method: a. Refer to AOP for Substeps b. Refer to AOP for RNO	*Objective 7* Three options for feed and bleed of RCS. If feed and bleed cannot be established, consider dumping CLA and IF the RX vessel head is removed GO TO section 2.7, RCS alternate heat sink using Spent Fuel Pool Cooling
12. PERFORM the following to cool RCS via S/G cold leg man way: a. Refer to AOP for Substeps b. Refer to AOP for RNO	*Objective 7* If feed and bleed is successful GO TO step 15 to prepare for exit of procedure. If NOT, go back to step 11 and select another feed and bleed method
13. PERFORM the following to cool RCS via SG hot leg man way: a. Refer to AOP for Substeps b. Refer to AOP for RNO c. If CCPIT flow or SI flow is established then GO TO step 14.d to ensure suction available to CCPS	*Objective 7* If feed and bleed is successful GO TO step 15 to prepare for exit of procedure. If NOT, go back to step 11 and select another feed and bleed method

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.6 RCS Alternate Heat Sink Using Steam Generators (continued)

6. **CHECK** RCS INTACT:

   - Reactor vessel HEAD ON and bolts TENSIONED.

     AND

   - RCS and pressurizer vent paths ISOLATED.

   GO TO Step 11.

7. **VERIFY** secondary heat sink AVAILABLE:

   - All S/G nozzle dams REMOVED
   - All S/G manways CLOSED
   - Two S/Gs capable of maintaining narrow range level

   GO TO Step 11.

CAUTION **Boiling in RCS could result in false high level indication due to steam flow through surge line. RCS makeup flow should NOT be terminated based upon high level if core exit T/Cs are greater than 200°F.**

8. **REFILL** RCS UNTIL either of the following conditions satisfied:

   - RHR cooling RESTORED.

     OR

   - Pressurizer level greater than 50% cold cal (el. 733').

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

2.6 RCS Alternate Heat Sink Using Steam Generators (continued)

NOTE: To optimize normal pressurizer spray, the preferred RCP starting order is: 2,1,4,3.

9. **ATTEMPT** to start one RCP:

   a. **ESTABLISH** RCP start conditions **USING** 1(2)-SO-68-2, Reactor Coolant Pumps.

   b. **START** one RCP.

   a. **GO TO** Step 10.

10. **ESTABLISH** secondary heat sink:

    a. **ENSURE** at least two S/G narrow range levels greater than 10%.

    b. **CONTROL** S/G atmospheric relief valves to maintain RCS temperature.

    c. **USE** AFW and SGBD to feed and bleed AVAILABLE S/Gs.

    d. **VERIFY** Core Exit T/Cs DROPPING or STABLE.

    e. **GO TO** Step 15.

CONTINUE attempts to establish secondary heat sink.

GO TO Step 11.