Facility: Shearon Harris Task No.: 062008H601

Task Title: Restore Power to Emergency Buses JPM No.: 2009A NRC JPM a

K/A Reference: 062 A4.01 3.3 / 3.1

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: A loss of All AC power and a Reactor trip has occurred. Neither EDG will start manually or from an SI signal.

Initiating Cue: The SCO has directed you to restore offsite power to the emergency buses using EOP-EPP-001 Attachment 1.

The Load Dispatcher has given permission to restore offsite power to HNP's 6.9 KV buses and to reset (if necessary) any tripped Start Up XFMR lockout relays.

Task Standard: Offsite Power restore to BOTH emergency buses

Required Materials: None

General References: EOP-EPP-001 (Rev. 31) Attachment 1

Time Critical Task: No

Validation Time: 10 minutes

SIMULATOR SETUP

For the 2009a ILC NRC exam

***Simulator Operator - Exam Setup**

- **Reset to IC-161**
- **Go to RUN and Delete EPS01 w/o_delay**
- **Silence and Acknowledge annunicators**
- **For the first setup and between candidates move both EDG sync switch keys to EDG A-SA and EDG B-SB positions so the candidate will have to place the sync switch keys in the proper places**
- (**IF NEEDED**) The 86 relays should roll when the simulator is placed in run. If not then run the APP file "Roll 86 Gen" or they can be manually overridden with override LO's
  - XGAO018A GEN LOCKOUT G1A-TRIP COIL ON
  - XGBO017A GEN LOCKOUT G1B-TRIP RELAY ON
- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup has been saved to IC-161 on the Master Portable Hard Drive

- Initial Simulator IC was IC-19
- Insert DSG01 BOTH to fail both EDG's from operating
- Insert EPS01 w/o_delay to actuate a Loss of Offsite Power
- Shut 1CS-7&8, 1CS-1&2
- Manually actuate SI
- After 60 seconds have elapsed reset SI
- Delete EPS01 w/o_delay
- Silence Acknowledge and Reset Annunciators
- Freeze and Snap to IC

START TIME: _____

Simulator Operator: **Go to run when the candidate indicates they are ready.**

Performance Step: 1 OBTAIN PROCEDURE

Standard: Obtains EPP-001 Attachment 1

Comment:

Performance Step: 2 Review CAUTION prior to step 1

Standard: Reads and initials CAUTION: Tripping of a Start Up XFMR lockout relay indicates a major fault on the XFMR. Re-energizing the XFMR may cause additional damage and should NOT be done without dispatcher's permission.

Comment:

Step 1

Performance Step: 3 1. Obtain Load Dispatcher's permission prior to performing the following:
a. Restoring offsite power to 6.9 KV buses
b. Resetting any tripped Start Up XFMR lockout relays

Standard: Reads step and recalls that the Load Dispatcher's permission to restore offsite power and reset any tripped Start Up XFMR lockout relays has been given in initiating cue.

Comment:

Performance Step: 4 Review NOTE prior to step 2

Standard: Reads and initials NOTE: Steps 2 through 8 restore power to Bus A-SA and Steps 9 through 15 restore power to Bus B-SB

Comment:

Step 2

Performance Step: 5 At Start Up XFMR Protective Relay Panel 1A, verify off-site power to Start Up XFMR A:

a. Verify the Start Up XFMR 1A Lockout SU 1A Relay is reset.

Standard: Locates relay and verifies relay is not tripped

Comment:

Step 2.b

✓ **Performance Step: 6** b. Verify closed any of the following switch yard tie breakers to energize Start Up XFMR A:

- Breaker 52-2
- Breaker 52-3

Standard: Locates and CLOSES MCB switch for Breaker 52-2 and/or 52-3

Comment: **Evaluator note: Closing either breaker will energize the Start Up XFMR A.**

Throughout this JPM the Candidate may check MCB winding voltages after closing breakers or energizing a Transformer. It is NOT a required action.

Step 3.a

Performance Step: 7 Restore offsite power to 6.9 KV Aux Bus D:

a. Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to BREAKER 101 position

Standard: Obtains switch and places in Breaker 101 position

Comment:

Step 3.b

✓ **Performance Step: 8**

b. Close Start Up XFMR A To Aux Bus D Breaker 101

Standard: Locates and CLOSES Start Up XFMR A to Aux Bus D Breaker 101.

Comment: **Examiners note: After closing the breaker the candidate may check Start Up XFMR voltages on MCB indicator EI-561**

Step 3.c

Performance Step: 9 Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to OFF.

Standard: Takes Start Up XFMR To Aux Buses A & D Synchronizer control switch to OFF

Comment:

Step 4

✓ **Performance Step: 10** Verify Aux Bus D To Emergency Bus A-SA Breaker 104 – CLOSED

Standard: Locates and CLOSES Aux Bus D To Emergency Bus A-SA Breaker 104

Comment:

Step 5

Performance Step: 11 Verify Diesel Generator A-SA Breaker 106 A SA - OPEN

Standard: Locates and verifies Diesel Generator A-SA Breaker 106 A SA is OPEN

Comment:

Step 6.a

Performance Step: 12 Energize 6.9 KV Bus A-SA:

a. Place Emergency Bus A-SA To Aux Bus D Synchronizer control switch to SYNC.

Standard: Locates and places Emergency Bus A-SA To Aux Bus Synchronizer control switch to the SYNC position

Comment:

Step 6.b

✓ **Performance Step: 13** b.Close Emergency Bus A-SA To Aux Bus D Tie Breaker 105

Standard: Locates and CLOSES Emergency Bus A-SA To Aux Bus D Tie Breaker 105

Comment: **Evaluator note: Candidate may check all 3 phases on MCR bus volts on indicator EI-6956A1 SA**

Step 6.c

Performance Step: 14 Place Emergency Bus A-SA To Aux Bus D Synchronizer control switch to OFF.

Standard: Takes synchronizer control switch to OFF

Comment:

Step 7

✓ **Performance Step: 15** Close the following 6.9 KV breakers:

- Emergency Bus A-SA To XFMR A1 Breaker A1 A-SA

Standard: Locates and CLOSES Emergency Bus A-SA To XFMR A1 Breaker A1 A-SA

Comment:

Evaluator note: MCR lights will come back on when the breaker A3 A-SA is closed in the next step that supplies power to the MCR emergency lights.

Step 7 continued

✓ **Performance Step: 16**

- Emergency Bus A-SA To XFMR A3-SA Breaker A3 A-SA

Standard: Locates and CLOSES Emergency Bus A-SA To XFMR A3-SA Breaker A3 A-SA

Comment:

Step 8

Performance Step: 17 Verify 6.9 KV Emergency Bus A-SA To XFMR A2-SA Breaker A2 A-SA - CLOSED

Standard: Locates and verifies 6.9 KV Emergency Bus A-SA To XFMR A2-SA Breaker A2 A-SA is CLOSED

Comment:

Step 9

Performance Step: 18 On Start Up XFMR Protective Relay Panel 1B, verify off-site power to Start Up Aux XFMR B by performing the following:

a. Verify the Start Up XFMR 1B Lockout SU 1B Relay is reset.

Standard: Locates and verifies the Start Up XFMR 1B Lockout SU 1B Relay is reset

Comment:

Step 9.b

✓ **Performance Step: 19** Verify any of the following switch yard tie breakers are closed to energize Start Up XFMR B:

- Breaker 52-13
- Breaker 52-14

Standard: Locates and CLOSES either/both Breaker 52-13 and Breaker 52-14

Comment:

Step 10

Performance Step: 20 Restore offsite power to 6.9 KV Aux Bus E:

a. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to BREAKER 121 position.

Standard: Locates and places Start Up XFMR To Aux Buses B & E Synchronizer control switch to the BREAKER 121 position.

Comment:

Step 10.b

✓ **Performance Step: 21** b. Close Start Up XFMR B To Aux Bus E Breaker 121.

Standard: Locates and CLOSES Start Up XFMR B To Aux Bus E Breaker 121. **(May check all 3 phases on MCB indicator EI-564)**

Comment:

Step 10.c

Performance Step: 22 c. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to OFF

Standard: Takes Start Up XFMR To Aux Buses B & E Synchronizer control switch to OFF

Comment:

Step 11

✓ **Performance Step: 23** Verify Aux Bus E To Emergency Bus B-SB Breaker 124 - CLOSED

Standard: Locates and CLOSES Aux Bus E To Emergency Bus B-SB Breaker 124

Comment:

Step 12

Performance Step: 24 Verify Diesel Generator B-SB Breaker 126 B SB - OPEN

Standard: Locates and verifies Diesel Generator B-SB Breaker 126 B SB OPEN

Comment:

Step 13.a

Performance Step: 25 Energize 6.9 KV Bus B-SB:

a. Place Emergency Bus B-SB To Aux Bus E Synchronizer control switch to SYNC.

Standard: Locates switch and positions Emergency Bus B-SB To Aux Bus E Synchronizer control switch to SYNC

Comment:

Step 13.b

✓ **Performance Step: 26** b. Close Emergency Bus B-SB To Aux Bus E Tie Breaker 125.

Standard: Locates and CLOSES Emergency Bus B-SB To Aux Bus E Tie Breaker 125

Comment:

Step 13.c

Performance Step: 27 c. Place Emergency Bus B-SB To Aux Bus E Synchronizer control switch to OFF.

Standard: Takes Emergency Bus B-SB To Aux Bus E Synchronizer control switch to OFF

Comment:

Step 14

✓ **Performance Step: 28**

14. Close the following 6.9 KV breakers:
    - Emergency Bus B-SB To XFMR B1-SB Breaker B1 A-SB

Standard: Locates and CLOSES Emergency Bus B-SB To XFMR B1-SB Breaker B1 A-SB

Comment:

Step 14 continued

✓ **Performance Step: 29**

Close 6.9 KV breaker
- Emergency Bus B-SB To XFMR B3-SB Breaker B3 A-SB

Standard: Locates and CLOSES Emergency Bus B-SB To XFMR B3-SB Breaker B3 A-SB **(NOTE: the remainder of MCR emergency lights come on)**

Comment:

Step 15

Performance Step: 30

15. Verify 6.9 KV Emergency Bus B-SB To XFMR B2-SB Breaker B2 A-SB - CLOSED

Standard: Locates and verifies 6.9 KV Emergency Bus B-SB To XFMR B2-SB Breaker B2 A-SB is CLOSED

Comment:

Step N/A

Performance Step: 31

Report to SCO EPP-001 Attachment 1 is completed and Offsite Power is restored

Comment:

Evaluator Cue: **SCO acknowledges completion of Attachment 1 and Offsite Power is restored**

Terminating Cue: **END OF JPM**

STOP TIME: _____

✓ - Denotes Critical Steps

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM a - Restore Power to Emergency Buses

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	A loss of All AC power and a Reactor trip has occurred. Neither EDG will start manually or from an SI signal.

INITIATING CUE:	The SCO has directed you to restore offsite power to the emergency buses using EOP-EPP-001 Attachment 1. The Load Dispatcher has given permission to restore offsite power to HNP's 6.9 KV buses and to reset (if necessary) any tripped Start Up XFMR lockout relays.

REFERENCE

Attachment 1
Sheet 1 of 3
RESTORATION OF OFFSITE POWER TO EMERGENCY BUSES

****

CAUTION

Tripping of a Start Up XFMR lockout relay indicates a major fault on the XFMR. Re-energizing the XFMR may cause additional damage and should NOT be done without dispatcher's permission.

****

1. Obtain Load Dispatcher's permission prior to performing the following:

   a. Restoring offsite power to 6.9 KV buses

   b. Resetting any tripped Start Up XFMR lockout relays

NOTE: Steps 2 through 8 restore power to Bus A-SA and Steps 9 through 15 restore power to Bus B-SB.

---

2. At Start Up XFMR Protective Relay Panel 1A, verify off-site power to Start Up XFMR A:

   a. Verify the Start Up XFMR 1A Lockout SU 1A Relay is reset.

   b. Verify closed any of the following switch yard tie breakers to energize Start Up XFMR A:

      o Breaker 52-2
      o Breaker 52-3

3. Restore offsite power to 6.9 KV Aux Bus D:

   a. Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to BREAKER 101 position.

   b. Close Start Up XFMR A To Aux Bus D Breaker 101.

   c. Place Start Up XFMR To Aux Buses A & D Synchronizer control switch to OFF.

4. Verify Aux Bus D To Emergency Bus A-SA Breaker 104 - CLOSED

5. Verify Diesel Generator A-SA Breaker 106 A SA - OPEN

Attachment 1
Sheet 2 of 3
RESTORATION OF OFFSITE POWER TO EMERGENCY BUSES

6. Energize 6.9 KV Bus A-SA:

   a. Place Emergency Bus A-SA To Aux Bus D Synchronizer control switch to SYNC.

   b. Close Emergency Bus A-SA To Aux Bus D Tie Breaker 105.

   c. Place Emergency Bus A-SA To Aux Bus D Synchronizer control switch to OFF.

7. Close the following 6.9 KV breakers:

   o Emergency Bus A-SA To XFMR A1 Breaker A1 A-SA
   o Emergency Bus A-SA To XFMR A3-SA Breaker A3 A-SA

8. Verify 6.9 KV Emergency Bus A-SA To XFMR A2-SA Breaker A2 A-SA - CLOSED

9. On Start Up XFMR Protective Relay Panel 1B, verify off-site power to Start Up Aux XFMR B by performing the following:

   a. Verify the Start Up XFMR 1B Lockout SU 1B Relay is reset.

   b. Verify any of the following switch yard tie breakers are closed to energize Start Up XFMR B:

      o Breaker 52-13
      o Breaker 52-14

10. Restore offsite power to 6.9 KV Aux Bus E:

    a. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to BREAKER 121 position.

    b. Close Start Up XFMR B To Aux Bus E Breaker 121.

    c. Place Start Up XFMR To Aux Buses B & E Synchronizer control switch to OFF.

11. Verify Aux Bus E To Emergency Bus B-SB Breaker 124 - CLOSED

12. Verify Diesel Generator B-SB Breaker 126 B SB - OPEN

Attachment 1
Sheet 3 of 3
RESTORATION OF OFFSITE POWER TO EMERGENCY BUSES

13. Energize 6.9 KV Bus B-SB:

    a. Place Emergency Bus B-SB To Aux Bus E Synchronizer control switch to SYNC.

    b. Close Emergency Bus B-SB To Aux Bus E Tie Breaker 125.

    c. Place Emergency Bus B-SB To Aux Bus E Synchronizer control switch to OFF.

14. Close the following 6.9 KV breakers:

    - Emergency Bus B-SB To XFMR B1-SB Breaker B1 A-SB
    - Emergency Bus B-SB To XFMR B3-SB Breaker B3 A-SB

15. Verify 6.9 KV Emergency Bus B-SB To XFMR B2-SB Breaker B2 A-SB - CLOSED

Facility: Shearon Harris | Task No.: 061007H101

Task Title: Using ESW System As A Backup Source Of Water To AFW | JPM No.: 2009A NRC JPM b

K/A Reference: 054 AA1.01 4.5 / 4.4

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: A LOCA has occurred and PATH-1 is being implemented. Both A and B Motor Driven AFW pumps are in operation.

Initiating Cue: A leak has developed in the Condensate Storage Tank (CST) and level has decreased to less than 10 percent.

Your directions are to secure the B Motor Drive AFW pump then switch the AFW water supply from the CST to ESW Header A for the A Motor Driven AFW pump and the Turbine Driven AFW pump per OP-137, Section 8.1.

ONLY one Train of ESW will be aligned to the suction of the AFW pumps to prevent both Trains of Containment Fan Coolers from becoming inoperable.

Task Standard: Train A ESW is supplying AFW pumps.

Required Materials: None

General References: OP-137 Rev. 26, OP-169 Rev. 17

Time Critical Task: No

Validation Time: 9 Minutes

SIMULATOR SETUP

For the 2009a ILC NRC exam

***Simulator Operator - Exam Setup**

- **Reset to IC-162**
- **Go to RUN**
- **Silence and Acknowledge annunicators**
- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup has been saved to IC-162 on the Master Portable Hard Drive

- Initial Simulator IC was IC-19
- IMF LT:901a (n 0 0) 8.5 0
  (Level transmitter LI-9010A1 SA should read 8.5 %)
- IMF LT:901b (n 0 0) 8.3 0
  (Level transmitter LI-9010B1 SB should read 8.3%)

  3 Annunciators will be on due to these actions:
  ALB-017-4-5 CST Empty
  ALB-017-5-5 CST Low Minimum Level
  ALB-017-6-5 CST Hi-Hi/Lo-Lo Level

- IMF RCS18A (n 0 0) 15 0
  Small Break LOCA A Loop 15% of 4.5" line

- Implement PATH-1
- Secure the TDAFW Pump
  - Close 1MS-70
  - Close 1MS-72

- Restore power to 1A-1 and 1B-1
- Reduce AFW flow to 300 KPPH total
- Silence, acknowledge and reset annunicators
- GO TO FREEZE and create a snap IC

START TIME: _____

Simulator Operator: **Go to RUN when directed by Lead Examiner**

Evaluator Note: **There isn't a step in OP-137 that directs when to secure the B MDAFW Pump. It will be at the candidate's discretion when to stop the pump. The JPM step to stop the pump is placed after lining up ESW to the A MDAFW Pump just as a place keeper. The candidate can secure the B MDAFW at any time prior to, during, or after the ESW alignment.**

Performance Step: 1 OBTAIN PROCEDURE

Standard: Locates OP-137 and refers to Section 8.1. and reviews initial conditions.

Evaluator Cue: Provide the candidate with OP-137 section 8.1 (**and** a copy of OP-169 section 7.1 when candidate determines the need to secure fans per OP-169)

Initial conditions have been met for OP-137 Section 8.1.

Comment:

Performance Step: 2 Review CAUTIONS prior to step 1

Standard: Reads and initials CAUTIONS:

The Emergency Service Water System serves as a backup source of water to the Auxiliary Feedwater System if the Condensate Storage Tank volume is exhausted or unavailable. Since the Emergency Service Water System uses raw reservoir water, it is only used in extreme emergencies.

Isolating Service Water to the Containment Fan Coolers will make the Coolers inoperable, therefore only one Train of ESW should be aligned to the suction of the AFW pumps unless a determination has been made on the desirability of making both Trains of Containment Fan Coolers inoperable.

Comment:

Step 1

Performance Step: 3 TO SUPPLY AFW PUMP 1A-SA FROM ESW HEADER A:

a. DECLARE A TRAIN CONTAINMENT FAN COOLERS INOPERABLE

Standard: Notifies SCO to declare A Train of Containment Fan Coolers INOPERABLE

Evaluator Cue: **USCO acknowledges 'A' CFCs Inoperable.**

Comment:

Evaluator NOTE:	**After Candidate determines that they need to use OP-169 to perform the next step then provide the candidate with a marked up copy of OP-169 Sect. 7.1** **CUE: The SCO has reviewed OP-169 and has N/A'd the steps that are not required to be performed.**

Step 1.b

Performance Step: 4 Verify A Train Containment Fan Coolers are secured per OP-169

Standard: Obtains copy of OP-169 Rev. 17 and refers to step 2

Locates switch for AH-2 A-SA and positions switch to STOP

Locates switch for AH-3 A-SA and positions switch to STOP

Comment:

Step 1.c

Performance Step: 5 SHUT 1SW-92 SA, CNMT FAN COOLER AH-3 INLET

Standard: Locates switch for 1SW-92. Positions switch to SHUT

Comment:

Step 1.d

Performance Step: 6 SHUT 1SW-97 SA, CNMT FAN COOLER AH-3 OUTLET

Standard: Locates switch for 1SW-97. Positions switch to SHUT

Comment:

Step 1.e

Performance Step: 7 SHUT 1SW-91 SA, CNMT FAN COOLER AH-2 INLET

Standard: Locates switch for 1SW-91. Positions switch to SHUT

Comment:

Step 1.f

Performance Step: 8 SHUT 1SW-109 SA, CNMT FAN COOLER AH-2 OUTLET

Standard: Locates switch for 1SW-109. Positions switch to SHUT

Comment:

Step 1.g

Performance Step: 9 CLOSE 1SW-122, AFW PUMP 1A-SA SW DRAIN ISOLATION.

Standard: Directs AO to SHUT 1SW -122

Booth Operator:	**AO acknowledges direction to shut 1SW-122, AFW Pump 1A-SA SW Drain Isolation.** **Pause 10-15 seconds then report as AO that 1SW-122, AFW Pump 1A-SA SW Drain Isolation has been SHUT**

Comment:

Step 1.h

✓ **Performance Step: 10** OPEN 1SW-121SA, SW HEADER A TO AUX FW MOTOR PUMP A-SA.

Standard: Locates control switch for 1SW-121 and takes it to OPEN.

Comment:

Step 1.i

✓ **Performance Step: 11** OPEN 1SW-123SA, SW HEADER A TO AUX FW MOTOR PUMP A-SA.

Standard: Locates control switch for 1SW-123 and takes it to OPEN.

Comment:

Step 1.j

Performance Step: 12 MONITOR AFW SYSTEM PARAMETERS TO ENSURE PROPER OPERATION.

Standard: Monitors PI-2150A1 A DISCH PRESS and PI-2250A1 A SUCT PRESS/ Monitors Aux Feedwater Flow on FI-2050A1, B1, and C1.

(Candidate may report to SCO that ESW is aligned to A AFW Pump. If so acknowledge information and direct candidate to continue lineup)

Comment:

Performance Step: 13 STOPS B MDAFW PUMP

Standard: Locates control switch for B MDAFW and positions switch to STOP.

Comment:

Performance Step: 14 **CAUTION:** Do NOT cross tie the ESW trains together via the TDAFW pump suction supply from ESW. Crosstie is prevented by performing only Step 8.1.2.3 OR 8.1.2.4.

Standard: **Reviews and initials caution**

Step 3

Performance Step: 15 TO SUPPLY AFW PUMP 1X-SAB FROM ESW HEADER A:

a. DECLARE A TRAIN CONTAINMENT FAN COOLERS INOPERABLE

Standard: No action required (already declared)

Comment:

Step 3.b

Performance Step: 16 VERIFY A TRAIN CONTAINMENT FAN COOLERS ARE SECURED PER OP-169

Standard: No action required (already performed)

Comment:

Step 3.c

Performance Step: 17 VERIFY SHUT 1SW-92 SA, CNMT FAN COOLER AH-3 INLET

Standard: No action required (already performed)

Comment:

Step 3.d

Performance Step: 18 SHUT 1SW-97 SA, CNMT FAN COOLER AH-3 INLET

Standard: No action required (already performed)

Comment:

Step 3.e

Performance Step: 19 VERIFY SHUT 1SW-91 SA, CNMT FAN COOLER AH-2 INLET

Standard: No action required (already performed)

Comment:

Step 3.f

Performance Step: 20 VERIFY SHUT 1SW-109 SA, CNMT FAN COOLER AH-2 OUTLET

Standard: No action required (already performed)

Comment:

Step 3.g

Performance Step: 21 SHUT 1SW-125, AFW PUMP 1X-SAB SW HEADER A DRAIN ISOLATION.

Standard: Contacts AO and tells him to close 1SW-125.

Evaluator Cue: **AO acknowledges direction to shut 1SW-125, AFW Pump 1X-SAB SW Header A Drain Isolation.**

(Pause) AO reports 1SW-125 closed.

Comment:

Step 3.h

✓ **Performance Step: 22** OPEN 1SW-124SA, SW HEADER A TO AUX FW TURBINE PMP.

Standard: Locates control switch for 1SW-124 and takes it to OPEN.

Comment:

Step 3.i

✓ **Performance Step: 23** OPEN 1SW-126SA, SW HEADER A TO AUX FW TURBINE PMP.

Standard: Locates control switch for 1SW-126 and takes it to OPEN.

Comment:

Step 3.j

Performance Step: 24 MONITOR AFW SYSTEM TO ENSURE PROPER OPERATION.

Standard: No action required 1X-SAB AFW pump is not running but TD AFW pump Suction pressure should be seen to increase.

Report to SCO that 'A' ESW Header is supplying the 'A' MDAFW pump and the TDAFW pump.

Evaluator Cue: **SCO acknowledges that 'A' ESW Header is supplying the 'A' MDAFW Pump and the TDAFW Pump.**

End of JPM

Comment:

Terminating Cue: **Completion of ESW line up and report to SCO that 'A' ESW Header supplying both A MDAFW Pump and the TDAFW pump.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM b

Using ESW System As A Backup Source Of Water To AFW

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions: A LOCA has occurred and PATH-1 is being implemented. Both A and B Motor Driven AFW pumps are in operation.

Initiating Cue: A leak has developed in the Condensate Storage Tank (CST) and level has decreased to less than 10 percent.

Your directions are to secure the B Motor Drive AFW pump then switch the AFW water supply from the CST to ESW Header A for the A Motor Driven AFW pump and the Turbine Driven AFW pump per OP-137, Section 8.1.

ONLY one Train of ESW will be aligned to the suction of the AFW pumps to prevent both Trains of Containment Fan Coolers from becoming inoperable.

REFERENCE

8.0 INFREQUENT OPERATIONS

8.1. Using Emergency Service Water System as a Backup Source of Water to Auxiliary Feedwater System

8.1.1. Initial Conditions

R 1. Condensate storage tank unavailable or level less than 10%. (Reference 2.3.2) _____

2. Service Water System in operation per OP-139. _____

8.1.2. Procedural Steps

CAUTION

The Emergency Service Water System serves as a backup source of water to the Auxiliary Feedwater System if the Condensate Storage Tank volume is exhausted or unavailable. Since the Emergency Service Water System uses raw reservoir water, it is only used in extreme emergencies.

CAUTION

Isolating Service Water to the Containment Fan Coolers will make the Coolers inoperable, therefore only one Train of ESW should be aligned to the suction of the AFW pumps unless a determination has been made on the desirability of making both Trains of Containment Fan Coolers inoperable.

1. To supply AFW pump 1A-SA from ESW Header A, **PERFORM** the following:

   a. **DECLARE** A Train Containment Fan Coolers inoperable. _____

   b. **VERIFY** A Train Containment Fan Coolers are secured per OP-169. _____

   c. **SHUT** 1SW-92 SA, CNMT FAN COOLER AH-3 INLET. _____

   d. **SHUT** 1SW-97 SA, CNMT FAN COOLER AH-3 OUTLET. _____

   e. **SHUT** 1SW-91 SA, CNMT FAN COOLER AH-2 INLET. _____

   f. **SHUT** 1SW-109 SA, CNMT FAN COOLER AH-2 OUTLET. _____

   g. **SHUT** 1SW-122, AFWP 1A SW Drain Isol. _____

   h. **OPEN** 1SW-121SA, SW HEADER A TO AUX FW MOTOR PMP A-SA. _____

   i. **OPEN** 1SW-123SA, SW HEADER A TO AUX FW MOTOR PMP A-SA. _____

   j. **MONITOR** AFW system parameters to ensure proper operation. _____

8.1.2 Procedural Steps (continued)

2. To supply AFW pump 1B-SB from ESW Header B, **PERFORM** the following:

   a. **DECLARE** B TRAIN Containment Fan Coolers inoperable. _____

   b. **VERIFY** B Train Containment Fan Coolers are secured per OP-169. _____

   c. **SHUT** 1SW-227 SB, CNMT FAN COOLER AH-4 INLET. _____

   d. **SHUT** 1SW-110 SB, CNMT FAN COOLER AH-4 OUTLET. _____

   e. **SHUT** 1SW-225 SB, CNMT FAN COOLER AH-1 INLET. _____

   f. **SHUT** 1SW-98 SB, CNMT FAN COOLER AH-1 OUTLET. _____

   g. **SHUT** 1SW-131, AFWP 1B SW Drain Isol. _____

   h. **OPEN** 1SW-130SB, SW HEADER B TO AUX FW MOTOR PMP B-SB. _____

   i. **OPEN** 1SW-132SB, SW HEADER B TO AUX FW MOTOR PMP B-SB. _____

   j. **MONITOR** AFW system parameters to ensure proper operation. _____

CAUTION

Do **NOT** cross tie the ESW trains together via the TDAFW pump suction supply from ESW. Crosstie is prevented by performing only Step 8.1.2.3 **OR** 8.1.2.3.h.

3. To supply AFW pump 1X-SAB from ESW Header A, **PERFORM** the following:

   a. **DECLARE** A Train Containment Fan Coolers inoperable. _____

   b. **VERIFY** A Train Containment Fan Coolers are secured per OP-169. _____

   c. **VERIFY SHUT** 1SW-92 SA, CNMT FAN COOLER AH-3 INLET. _____

   d. **VERIFY SHUT** 1SW-97 SA, CNMT FAN COOLER AH-3 OUTLET. _____

   e. **VERIFY SHUT** 1SW-91 SA, CNMT FAN COOLER AH-2 INLET. _____

   f. **VERIFY SHUT** 1SW-109 SA, CNMT FAN COOLER AH-2 OUTLET. _____

   g. **SHUT** 1SW-125, AFWP 1X SW Header A Drain Isol. _____

8.1.2 Procedural Steps (continued)

h. **OPEN** 1SW-124SA, SW HEADER A TO AUX FW TURBINE PMP. _____

i. **OPEN** 1SW-126SA, SW HEADER A TO AUX FW TURBINE PMP. _____

j. **MONITOR** AFW system to ensure proper operation. _____

4. To supply AFW pump 1X-SAB, from ESW Header B, **PERFORM** the following:

a. **DECLARE** B Train Containment Fan Coolers inoperable. _____

b. **VERIFY** B Train Containment Fan Coolers are secured per OP-169. _____

c. **VERIFY SHUT** 1SW-227 SB, CNMT FAN COOLER AH-4 INLET. _____

d. **VERIFY SHUT** 1SW-110 SB, CNMT FAN COOLER AH-4 OUTLET. _____

e. **VERIFY SHUT** 1SW-225 SB, CNMT FAN COOLER AH-1 INLET. _____

f. **VERIFY SHUT** 1SW-98 SB, CNMT FAN COOLER AH-1 OUTLET. _____

g. **SHUT** 1SW-128, AFWP 1X SW Header B Drain Isol. _____

h. **OPEN** 1SW-127SB, SW HEADER B TO AUX FW TURBINE PMP. _____

i. **OPEN** 1SW-129SB, SW HEADER B TO AUX FW TURBINE PMP. _____

j. **MONITOR** AFW system to ensure proper operation. _____

7.0 SHUTDOWN

7.1. Shutdown of Containment Fan Cooler Units (Normal Cooling mode)

7.1.1. Initial Conditions

SCO

1. System in operation as per Section 5.1 of this procedure. N/A

7.1.2. Procedural Steps

> **NOTE:** In winter months, the operating train should be secured prior to starting the idle train, to minimize the potential for opening the Containment Vacuum Breakers.

1. Start idle train fans per Section 5.1 of this procedure prior to removing operating train from service, or monitor CNMT temperature and ensure it remains less than 118°F. N/A SCO

2. Place the control switch for each fan to be removed from service to STOP. _____

Facility: Shearon Harris | Task No.: 301142H601

Task Title: Manually Align SI Equipment After A LOSP | JPM No.: 2009A NRC JPM c

K/A Reference: 006 A4.02 4.0 / 3.8 | **ALTERNATE PATH**

Examinee: _____ | NRC Examiner: _____

Facility Evaluator: _____ | Date: _____

Method of testing:

Simulated Performance: _____ | Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: The plant was operating at 100 % power when a loss of offsite power occurred. The reactor is tripped. The 'A' and 'B' Diesels failed to start. EPP-001 was entered and followed until power could be restored to 1A-SA and 1B-SB from off-site. The crew is continuing efforts to stabilize the plant. The SCO has completed EPP-001 and has transitioned to EPP-003, Loss of All AC Power Recovery With SI Required.

Initiating Cue: The Unit SCO has directed you to manually align SI valves per EPP-003, Step 3 in preparation for establishing SI flow.

Task Standard: SI valves have been manually aligned.

Required Materials: None

General References: EOP-EPP-003 Rev. 20

Time Critical Task: No

Validation Time: 5 minutes

SIMULATOR SETUP

For the 2009a ILC NRC exam

***Simulator Operator - Exam Setup**

- **Reset to IC-163**
- **Go to RUN**
- (**IF NEEDED**) The 86 relays should roll when the simulator is placed in run. If not then run the APP file "Roll 86 Gen" or they can be manually overridden with override LO's
  - XGAO018A GEN LOCKOUT G1A-TRIP COIL ON
  - XGBO017A GEN LOCKOUT G1B-TRIP RELAY ON
- **Silence and Acknowledge annunciators**
- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup has been saved to IC-163 on the Master Portable Hard Drive

- Initialized to IC-19 (100 % power condition)
- Insert a failure of the "A" EDG and "B" EDG to start <IMF DSG01 BOTH>. Then insert a loss of all AC <IMF EPS01 W/O DELAY>.
- Once the plant is stable, initiate an SI and wait 60 seconds. RESET the SI signal. Using Simulator MSC Drawing for EPP01 Open the breakers for the sequencers, remove control power for both CCW pumps, both Containment Spray pumps and 1A and 1B AFW pump.
- Then insert RCS leakage to the extent that a safety injection is needed. <IMF RCS18A 6 0> Allow the Pressurizer to empty and pressure to drop to ≈ 1250 psig.
- Then delete the loss of all AC malfunction <DMF EPS01> and restore power to all buses. Use the EOP-001 Attachment 1 to restore power to 1A-SA and 1B-SB from off-site. Perform actions in EPP-001 after power restoration which includes EPP-001 step 36.c including setting SG PORV set points to 84%, transition to EPP-003, EPP-003 steps 1 & 2 are satisfied.
- Fail 1CS-746 in the OPEN position <ILO XA2O189G OFF and IOL XA2O189R ON>. Acknowledge and reset all alarms and place the simulator in FREEZE. Snap this to an IC
- When you reset to this condition you would want to have the 86 relays rolled.

START TIME: _____

Performance Step: 1 OBTAIN PROCEDURE

Standard: Obtains copy of EPP-003 and goes to Step 3.

Comment:

Step 3.a

✓ **Performance Step: 2**

a. OPEN CSIP SUCTION FROM RWST VALVES:

LCV-115B
LCV-115D

Standard: Locates control switch for LCV-115B and takes switch to OPEN

Locates control switch for LCV-115D and takes switch to OPEN.

Comment:

Step 3.b

✓ **Performance Step: 3**

SHUT VCT OUTLET VALVES:

LCV-115C
LCV-115E

Standard: Locates control switch for LCV-115C and takes switch to SHUT

Locates control switch for LCV-115E and takes switch to SHUT.

Comment:

Step 3.c

✓ **Performance Step: 4** SHUT CHARGING LINE ISOLATION VALVES:

1CS-235
1CS-238

Standard: Locates control switch for 1CS-235 and takes switch to SHUT

Locates control switch for 1CS-238 and takes switch to SHUT.

Comment:

Step 3.d

Performance Step: 5 CHECK RCS PRESSURE LESS THAN OR EQUAL TO 1800 PSIG.

Standard: Checks RCS pressure on ERFIS or MCB indicators and identifies pressure as < 1800 psig.

Comment:

Step 3.e

Performance Step: 6 Check CSIP alternate miniflow isolation valves-SHUT:

1CS-746 (TRAIN A CSIP)
1CS-752 (TRAIN B CSIP)

Standard: Locates control switches for 1CS-746 and 1CS-752 and checks positions

Identifies 1CS-746 is NOT shut

Comment:

Step 3.e RNO

✓ **Performance Step: 7**

Shut the associated block valve:

1CS-745 (Train A CSIP)

Standard: Locates control switch for 1CS-745 and takes switch to SHUT.

Comment:

Step 3.f

✓ **Performance Step: 8**

SHUT NORMAL MINIFLOW ISOLATION VALVES:

1CS-182
1CS-196
1CS-210
1CS-214

Standard: Locates control switches for 1CS-182, 1CS-196, 1CS-210, and 1CS-214 and takes them to SHUT.

Comment:

Step 3.g

✓ **Performance Step: 9**

OPEN BIT OUTLET VALVES:

1SI-3
1SI-4

Standard: Locates control switch for 1SI-3 and takes switch to OPEN

Locates control switch for 1SI-4 and takes switch to OPEN

Reports to SCO that SI valves have been manually aligned to establish SI Injection Mode

Evaluator Cue: **SCO acknowledges that SI valves have been manually aligned to establish SI Injection Mode .**

End of JPM

Comment:

Terminating Cue: BIT outlet valves are aligned.

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM c

Manually Align SI Equipment After A LOSP

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions:	The plant was operating at 100 % power when a loss of offsite power occurred. The reactor is tripped. The 'A' and 'B' Diesels failed to start. EPP-001 was entered and followed until power could be restored to 1A-SA and 1B-SB from off-site. The crew is continuing efforts to stabilize the plant. The SCO has completed EPP-001 and has transitioned to EPP-003, 'Loss of All AC Power Recovery With SI Required'.
Initiating Cue:	The Unit SCO has directed you to manually align SI valves per EPP-003, Step 3 in preparation for establishing SI flow.

REFERENCE

Instructions	Response Not Obtained
3. Manually Align SI Valves To Establish SI Injection Mode:	
a. Open CSIP suction from RWST valves: LCV-115B LCV-115D	
b. Shut VCT outlet valves: LCV-115C LCV-115E	
c. Shut charging line isolation valves: 1CS-235 1CS-238	
d. Check RCS pressure - LESS THAN <u>OR</u> EQUAL TO 1800 PSIG	d. <u>WHEN</u> pressure less than 1800 PSIG, <u>THEN</u> do Step 3e. Continue with Step 3f.
e. Check CSIP alternate miniflow isolation valves - SHUT 1CS-746 (Train A CSIP) 1CS-752 (Train B CSIP)	e. Shut the associated block valve: 1CS-745 (Train A CSIP) 1CS-753 (Train B CSIP)
f. Shut normal miniflow isolation valves: 1CS-182 1CS-196 1CS-210 1CS-214	
g. Open BIT outlet valves: 1SI-3 1SI-4	

Facility: Shearon Harris | Task No.: 004003H101

Task Title: Place Normal Letdown In Service | JPM No.: 2009A NRC JPM d

K/A Reference: 004 A4.06 3.6 / 3.1 | **ALTERNATE PATH**

Examinee: _____ | NRC Examiner: _____

Facility Evaluator: _____ | Date: _____

Method of testing:

Simulated Performance: _____ | Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: The plant is operating at 100 percent power. Letdown was out of service for maintenance. Maintenance has been completed and the clearance has been removed. Excess letdown was in service and was removed from service 1 hour ago. Charging is in service per OP-107, Section 5.3.

Initiating Cue: The SCO instructions are:

- Prior to restoring normal letdown the CVCS Demins will need to be flushed to the RHT to return the Demins to operating temperature
- Establish 105 gpm total letdown flow
- Return charging to automatic

Task Standard: Letdown flow is 105 gpm with Letdown pressure controlled in manual using PK-145.1 additionally, Charging flow is in Automatic.

Required Materials: None

General References: OP-107, Section 5.4 Rev. 77; APP-ALB-007 (3-5) Rev. 14

Time Critical Task: No

Validation Time: 30 Minutes

SIMULATOR SETUP

For the 2009a ILC NRC exam

***Simulator Operator - Exam Setup**

- **Reset to IC-164**
- **Go to RUN**
- **Silence and Acknowledge annunciators**
- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup has been saved to IC-164 on the Master Portable Hard Drive

- Initialize to IC -19
- Isolate letdown by closing all orifice isolation valves (1CS-7, -8, -9), then closing 1CS-1, 1CS-2, and 1CS-11.
- Verify TK-144 in AUTO set to 4.0 and PK-145.1 in AUTO set to 58 percent.
- Place 1CS-231 (FK-122.1) in manual and close.
- Reduce RCP seal injection flow to ~ 8 gpm/RCP
- Insert malfunction < IMF CVC07 0 0 > of PK-145.1 such that the valve fails closed in AUTO.

START TIME: _____

Performance Step: 1 OBTAIN PROCEDURE OP-107.

Standard: Obtains OP-107 and refers to Section 5.4, Initiating Normal Letdown. Reviews and verifies Initial Conditions

Charging flow has been established

Pressurizer level is greater than 17%

The following valves are shut

- 1CS-7, 45 GPM LETDOWN ORIFICE A
- 1CS-8, 60 GPM LETDOWN ORIFICE B
- 1CS-9, 60 GPM LETDOWN ORIFICE C

Comment:

Caution prior to Step 1

Performance Step: 2 If Charging flow was stopped or greatly reduced prior to letdown being secured, there is a possibility that the Letdown line contains voids due to insufficient cooling. This is a precursor to water hammer, and should be evaluated prior to initiating letdown flow.

Standard: Reviews and initials caution

Comment:

Step 1

Performance Step: 3 **VERIFY** 1CC-337, TK-144 LTDN TEMPERATURE, controller is:

- In AUTO

AND

- Set for 110-120°F (4.0 TO 4.7 ON POTENTIOMETER) normal operation

OR

- Set for 90 to 120° (2.67 to 4.7 on potentiometer) if operating per Section 8.11

Standard: Locates TK-144 and observes potentiometer is adjusted to between 4.0 and 4.7.

Comment:

NOTE prior to Step 2

Performance Step: 4 PK-145.1 LTDN PRESSURE, 1CS-38, may have to be adjusted to control at lower pressures.

Standard: Reviews and initials note

Comment:

Step 2

Performance Step: 5 VERIFY 1CS-38 Controller, PK-145.1 LTDN PRESSURE, IN MAN with output set at 50%.

Standard: Locates PK-145.1 and checks indication. Depresses MAN pushbutton and raises output to 50%

Comment:

Step 3

✓ **Performance Step: 6** VERIFY OPEN THE FOLLOWING LETDOWN ISOLATION VALVES:

- 1CS-2, LETDOWN ISOLATION LCV-459
- 1CS-1, LETDOWN ISOLATION LCV-460

Standard: Locates control switch for 1CS-1 and takes switch to OPEN
Locates control switch for 1CS-2 and takes switch to OPEN

Comment:

Step 4

✓ **Performance Step: 7** VERIFY OPEN 1CS-11, LETDOWN ISOLATION.

Standard: Locates control switch for 1CS-11 and takes switch to OPEN

Comment:

NOTE prior to Step 5

Performance Step: 8

The following table gives the minimum charging flow required to keep the regenerative heat exchanger temperature below the high temperature alarm when letdown is established

Letdown flow (to be established)	Min Charging Flow need
45 gpm	20 gpm
60 gpm	26 gpm
105 gpm	46 gpm
120 gpm	53 gpm

If Pressurizer level is above the programmed level setpoint, charging flow should be adjusted to a point above the minimum required to prevent regenerative heat exchanger high temperature alarm but low enough to reduce pressurizer level.

Standard:

Reviews and initials note, from table determines min charging flow needed for the orifice (or combination of orifices) to be placed in service.

Comment:

NOTE: Candidate may select 20 gpm (1CS-7 flow rate is 45 gpm) or 26 gpm (1CS-8 or 1CS-9 flow rate is 60 gpm) OR 46 gpm (combination of 1CS-7 and 1CS-8 or 1CS-9)

Step 5

✓ **Performance Step: 9**

ADJUST controller 1CS-231, FK-122.1 CHARGING FLOW, AS REQUIRED to:

- maintain normal pressurizer level program
- keep regenerative heat exchanger temperature below the high temperature alarm when the desired letdown orifice is placed in service

Standard:

Locates/observes FI-122A.1 and determines charging flow is 0 gpm, raises flow rate using 1CS-231 to $\geq$ (flow rate from table)

Comment:

NOTE prior to Step 6

Performance Step: 10 If CVCS Demins have cooled from normal operating temperature, an increased reactivity affect may be observed. Consideration may be given to increasing CVCS Demins to operating temperature by flushing them to the RHT prior to restoring letdown.

Standard: Reviews and initials note, and per initial instructions determines it is necessary to flush CVCS Demins to the RHT prior to restoring letdown.

Comment:

Step 6

Performance Step: 11 **IF** flushing CVCS Demins to the RHT is desired for increasing temperature, **THEN PERFORM** the following:

a. **NOTIFY** Radwaste Control Room that letdown flow will be diverted to the RHT.
b. **PLACE** 1CS-120, LETDOWN TO VCT/HOLDUP TANK LCV-115A to the RHT position.

Standard: Contacts Radwaste Control Room then locates and places 1CS-120 to the RHT position.

Evaluator Cue: **Radwaste Control operator acknowledges information.**

Step 7

✓ **Performance Step: 12** **OPEN** an Orifice Isolation Valve (1CS-7, 1CS-8, 1CS-9) for the orifice to be placed in service.

Standard: Locates control switch for 1CS-8 OR 1CS-9 and takes switch to OPEN. Observes flow rate on FI-150.1 and pressure changes on PI-145.1

Comment:

Step 8

✓ **Performance Step: 13**

ADJUST 1CS-38 position by adjusting PK-145.1 output as necessary to control LP LTDN Pressure (PI-145.1) at 340 to 360 psig, to prevent lifting the LP Letdown Relief.

Standard:

Locates PK-145.1 and adjusts controller to maintain pressure between 340-360 psig.

Comment:

Step 9

✓ **Performance Step: 14**

WHEN Letdown pressure has stabilized at 340 to 360 psig on PI-145.1, LP LTDN PRESS, **THEN PERFORM** the following:

- **ADJUST** PK-145.1 LTDN PRESSURE setpoint to 58%
- **PLACE** the controller in AUTO

Standard:

Locates PI-145.1 and checks pressure. Adjusts PK-145.1 setpoint to 58%.

Depresses AUTO pushbutton.

Comment:

Step 10

✓ **Performance Step: 15**

VERIFY PK-145.1 LTDN PRESSURE Controller maintains Letdown pressure stable at 340 to 360 psig.

Standard:

Locates PI-145.1 and checks pressure.

Identifies PK-145.1 malfunctioning in AUTO resulting in high letdown pressure. Reports malfunction to SCO

Note:

PK-145.1 can be taken to manual and 1CS-38 operated to lower pressure, utilizing OMM-001, section 5.1.20, directions to control failed Automatic controllers

Comment:

Performance Step: 16 Acknowledges alarm condition and obtains APP-ALB-007.

Standard: Refers to APP-ALB-007-3-5 for "LOW PRESSURE LETDOWN HIGH PRESSURE" and confirms alarm using PI-145.1, LP Ltdn Press.

Determines that 1CS-38 (letdown PCV) can NOT maintain letdown pressure in automatic.

Comment:

✓ **Performance Step: 17** LOWERS LETDOWN PRESSURE

Standard: Removes in-service letdown orifice and uses PK-145.1 in manual to lower pressure **OR**

Places PK-145.1 in MANUAL AND OPENS 1CS-38 to lower letdown pressure (APP-ALB-007 or OMM-001).

Informs SCO that letdown is isolated or PK-145.1 is in manual and controlling pressure

Evaluator Cue: **Acknowledge report: Letdown is isolated (OR) PK-145.1 is in manual and controlling pressure.**

The SCO will generate a Work Request for the malfunction of PK-145.

(IF Letdown was isolated) **You are directed to return to step 2 to restore letdown and N/A steps 9 and 10. Control letdown pressure with a band of 340 to 360 psig and continue to placing Letdown in service at step 11.**

(IF PK-145.1 was placed in manual) **You are directed to maintain Letdown pressure in manual control with a band of 340 to 360 psig. N/A steps 9 and 10 then continue placing Letdown in service.**

NOTE: If candidate requests an initial for the N/A'd steps per PRO-NGGC-0200

CUE: Assume steps are properly initialed.

Comment:

Examiners Note:	If the candidate secured letdown return to procedure step 2 then continue with JPM from here OR start here if candidate has stabilized Letdown pressure with PK-145.1 in manual. AFTER candidate has regrouped and is ready to proceed with step 11:

EVALUATOR CUE:	**The CVCS Demin temperature is now at normal operating temperature.**

STEP 11

✓ **Performance Step: 18** IF Step 5.4.2.6 was performed AND CVCS Demin temperature is at normal operating temperature, THEN PERFORM the following:

a. PLACE 1CS-120, LETDOWN TO VCT/HOLDUP TANK LCV-115A to the AUTO position.

b. NOTIFY Radwaste Control Room that diversion to the RHT has been terminated.

Standard: Locates 1CS-120 and places switch to the AUTO position then Notifies Radwaste Control Room that diversion to the RHT has been terminated.

Comment:

Booth Operator CUE:	**Acknowledge Radwaste Control Room notification.**

STEP 12

✓ **Performance Step: 19** OPEN additional orifice isolation valves (1CS-7, 1CS-8, 1CS-9) as required. (May need to adjust charging flow to ~ 46 gpm accommodate increase in letdown flow per table prior to step 5)

Standard: Opens additional orifice to establish 105 gpm total letdown flowrate.

Comment:

STEP 13

✓ **Performance Step: 19** ADJUST charging flow as necessary to:

- Prevent high temperature alarm (per table above)
- Maintain pressurizer programmed level.

Standard: Opens additional orifice to establish 105 gpm total letdown flowrate.

Comment:

STEP 14

Performance Step: 20 PLACE PRZ level controller, LK-459F, in MAN to cancel any integrated signal.

Standard: Locates and places LK-459F in MAN

Comment:

STEP 15

Performance Step: 21 PLACE PRZ level controller, LK-459F, in AUTO.

Standard: Locates LK-459F AUTO /MAN pushbutton and places controller in AUTO.

Comment:

Evaluator NOTE:	**Due to the length of time that may be required to match the conditions in the next step AFTER the candidate has checked the conditions you can END the JPM and then ask the candidate how to accomplish step 16 for completion credit.**

STEP 16

Performance Step: 22 WHEN the following occurs:

- Program pressurizer level is matching the current pressurizer level

  AND

- Letdown and seal return are balanced with seal injection flow and charging flow

THEN place controller 1CS-231, FK-122.1 CHARGING FLOW, in AUTO.

Standard: When conditions of step 16 are met then locate controller for 1CS-231 and place in AUTO.

Comment:

STEP 17

Performance Step: 23 Complete Section 5.4.3.

Standard: Reviews section 5.4.3 for Normal Letdown Configuration Control Closeout.

Evaluator Cue: **END OF JPM**

Terminating Cue: Letdown flow is 105 gpm with PK-145.1 in manual and pressure maintained between 340 to 360 psig. Additionally, Pressurizer Level Control LK-459F is in AUTO.

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM d

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions: The plant is operating at 100 percent power. Letdown was out of service for maintenance. Maintenance has been completed and the clearance has been removed. Excess letdown was in service and was removed from service 1 hour ago. Charging is in service per OP-107, Section 5.3.

Initiating Cue: The SCO instructions are:

- Prior to restoring normal letdown the CVCS Demins will need to be flushed to the RHT to return the Demins to operating temperature
- Establish 105 gpm total letdown flow
- Return charging to automatic

REFERENCE

5.4. Initiating Normal Letdown

5.4.1. Initial Conditions

1. Charging flow has been established per Section 5.3. _____

2. Pressurizer level is greater than 17%. _____

3. The following valves are shut:

   - 1CS-7, 45 GPM LETDOWN ORIFICE A _____
   - 1CS-8, 60 GPM LETDOWN ORIFICE B _____
   - 1CS-9, 60 GPM LETDOWN ORIFICE C _____

5.4.2. Procedural Steps

CAUTION

If Charging flow was stopped or greatly reduced prior to letdown being secured, there is a possibility that the Letdown line contains voids due to insufficient cooling. This is a precursor to water hammer, and should be evaluated prior to initiating letdown flow.

1. **VERIFY** 1CC-337, TK-144 LTDN TEMPERATURE, controller is:

   - in AUTO _____

   AND

   - set for 110 to 120°F (4.0 to 4.7 on potentiometer) normal operation _____

   OR

   - set for 90 to 120°F (2.67 to 4.7 on potentiometer) if operating per Section 8.11 _____

NOTE: PK-145.1 LTDN PRESSURE, 1CS-38, may have to be adjusted to control at lower pressures.

2. **VERIFY** 1CS-38 Controller, PK-145.1 LTDN PRESSURE, in MAN with output set at 50%. _____

5.4.2 Procedural Steps (continued)

3. **VERIFY** open the following Letdown Isolation Valves:

   - 1CS-2, LETDOWN ISOLATION LCV-459 _____
   - 1CS-1, LETDOWN ISOLATION LCV-460 _____

4. **VERIFY** open 1CS-11, LETDOWN ISOLATION. _____

NOTE: The following table gives the minimum charging flow required to keep the regenerative heat exchanger temperature below the high temperature alarm when letdown is established

Letdown flow (to be established)	Minimum Charging Flow necessary when letdown is established
45 gpm	20 gpm
60 gpm	26 gpm
105 gpm	46 gpm
120 gpm	53 gpm

NOTE: If Pressurizer level is above the programmed level setpoint, charging flow should be adjusted to a point above the minimum required to prevent regenerative heat exchanger high temperature alarm but low enough to reduce pressurizer level. (Reference ESR 9500066)

5. **ADJUST** controller 1CS-231, FK-122.1 CHARGING FLOW, as required to:

   - maintain normal pressurizer level program _____
   - keep regenerative heat exchanger temperature below the high temperature alarm when the desired letdown orifice is placed in service. _____

5.4.2 Procedural Steps (continued)

NOTE: If CVCS Demins have cooled from normal operating temperature, an increased reactivity affect may be observed. Consideration may be given to increasing CVCS Demins to operating temperature by flushing them to the RHT prior to restoring letdown.

6. **IF** flushing CVCS Demins to the RHT is desired for increasing temperature,
THEN PERFORM the following:

   a. **NOTIFY** Radwaste Control Room that letdown flow will be diverted to the RHT. _____

   b. **PLACE** 1CS-120, LETDOWN TO VCT/HOLDUP TANK LCV-115A to the RHT position. _____

7. **OPEN** an Orifice Isolation Valve (1CS-7, 1CS-8, 1CS-9) for the orifice to be placed in service. _____

8. **ADJUST** 1CS-38 position by adjusting PK-145.1 output as necessary to control LP LTDN Pressure (PI-145.1) at 340 to 360 psig, to prevent lifting the LP Letdown Relief. _____

9. **WHEN** Letdown pressure has stabilized at 340 to 360 psig on PI-145.1, LP LTDN PRESS,
THEN PERFORM the following:

   a. **ADJUST** PK-145.1 LTDN PRESSURE setpoint to 58% _____

   b. **PLACE** the controller in AUTO. _____

10. **VERIFY** PK-145.1 LTDN PRESSURE Controller maintains Letdown pressure stable at 340 to 360 psig. _____

11. **IF** Step 5.4.2.6 was performed
AND CVCS Demin temperature is at normal operating temperature,
THEN PERFORM the following:

   a. **PLACE** 1CS-120, LETDOWN TO VCT/HOLDUP TANK LCV-115A to the AUTO position. _____

   b. **NOTIFY** Radwaste Control Room that diversion to the RHT has been terminated. _____

5.4.2 Procedural Steps (continued)

12. **OPEN** additional orifice isolation valves (1CS-7, 1CS-8, 1CS-9) as required. _____

13. **ADJUST** charging flow as necessary to:

    - prevent high temperature alarm (per table above) _____
    - maintain pressurizer programmed level. _____

14. **PLACE** PRZ level controller, LK-459F, in MAN to cancel any integrated signal. _____

15. **PLACE** PRZ level controller, LK-459F, in AUTO. _____

16. **WHEN** the following occurs:

    - Program pressurizer level is matching the current pressurizer level _____

    AND

    - Letdown and seal return are balanced with seal injection flow and charging flow. _____

    THEN place controller 1CS-231, FK-122.1 CHARGING FLOW, in AUTO. _____

17. **COMPLETE** Section 5.4.3. _____

5.4.3. Initiating Normal Letdown Configuration Control Closeout

1. When more than one POSITION is listed, circle the required position. _____

COMPONENT NUMBER	COMPONENT DESCRIPTION	POSITION	CHECK	VERIFY
1CC-337	TK-144 LTDN TEMPERATURE	SETPOINT4.0 - 4.7 (2.67 - 4.7 if Section 8.27 in effect)	_____	_____
1CS-38	PK-145.1 LTDN PRESSURE	SETPOINT 58%	_____	_____
		AUTO	_____	_____
1CS-2	LETDOWN ISOLATION LCV-459	OPEN	_____	_____
1CS-1	LETDOWN ISOLATION LCV-460	OPEN	_____	_____
1CS-11	LETDOWN ISOLATION	OPEN	_____	_____
1CS-7	45 GPM LETDOWN ORIFICE A	OPEN/SHUT	_____	_____
1CS-8	60 GPM LETDOWN ORIFICE B	OPEN/SHUT	_____	_____
1CS-9	60 GPM LETDOWN ORIFICE C	OPEN/SHUT	_____	_____
1CS-120	LETDOWN TO VCT/HOLD UP TANK LCV-115A	AUTO	_____	_____
1CS-231	FK-122.1 CHARGING FLOW	AUTO	_____	_____
LK-459F	Pressurizer Level controller	AUTO	_____	_____

All personnel performing this section for alignment or verification must supply their initials and name below.

Initials	Name (Print)	Initials	Name (Print)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Approved by _____ _____
Unit SCO Date

After receiving the final review signature, this OP Section becomes a QA RECORD.

6.0 NORMAL OPERATIONS

R	Parameter:	VCT Discharge Temp	80 to 115°F
	Inst. No.:	TI-116.1	(Reference 2.3.2)
	Location:	MCB	
	Parameter:	Excess L/D HX Outlet Temp	110 to 170°F
	Inst. No.:	TI-139	
	Location:	MCB	
	Parameter:	Regen. Hx Charging Outlet Temp	450 to 525°F
	Inst. No.:	TI-123	
	Location:	MCB	
	Parameter:	Regen. Hx Letdown Outlet Temp	250 to 350°F
	Inst. No.:	TI-140.1	
	Location:	MCB	
	Parameter:	Letdown Hx Outlet Temp	110 to 120°F
	Inst. No.:	TI-144.1	
	Location:	MCB	
	Parameter:	Excess Letdown HX Outlet Pressure	50 to 140 psig
	Inst. No.:	PI-138	
	Location:	MCB	
R	Parameter:	VCT Pressure	20 to 30 psig
	Inst. No.:	PI-117.1	(Reference 2.3.2)
	Location:	MCB	
	Parameter:	Charging Header Pressure	2200 to 2750 psig
	Inst. No.:	PI-121	
	Location:	MCB	
	Parameter:	Letdown Pressure	340 to 360 psig
	Inst. No.:	PI-145.1	
	Location:	MCB	
	Parameter:	RCP A, B, C Seal No. 1 ΔP	Greater than 200 psid
	Inst. No.:	PI-156A1, PI-155A1, PI-154A1	
	Location:	MCB	
	Parameter:	VCT Level	20 to 70%
	Inst. No.:	LI-115.1	
	Location:	MCB	
	Parameter:	Boric Acid Tank Level	75 to 95%
	Inst. No.:	LI-106 SA, LI-161.1 SB	
	Location:	MCB	

6.0 NORMAL OPERATIONS (continued)

R	Parameter:	RCP A, B, C Seal Injection Flow	8 to 13 gpm *
	Inst. No.:	FI-130A, FI-127A, FI-124A	(Reference 2.3.2)
	Location:	MCB	
	Parameter:	RCP A, B, C Seal No. 1 Leakoff Flow	1 to 4 gpm
	Inst. No.:	FR-0154A	
	Location:	MCR Recorder Panel	
	Parameter:	Letdown Flow	45 to 120 gpm
	Inst. No.:	FI-150.1	
	Location:	MCB	
R	Parameter:	Charging Flow	30 to 105 gpm
	Inst. No:	FI-122A.1	(Reference 2.3.2)
	Location:	MCB	
R	Parameter:	Charging Pump A-SA Current	25 to 50 Amps
	Inst. No.:	EI-221 SA	(Reference 2.3.2)
	Location:	MCB	
R	Parameter:	Charging Pump B-SB Current	25 to 50 Amps
	Inst. No.:	EI-222 SB	(Reference 2.3.2)
	Location:	MCB	
R	Parameter:	Charging Pump C-SA Current	25 to 50 Amps
	Inst. No.:	EI-223 SA	(Reference 2.3.2)
	Location:	MCB	
R	Parameter:	Charging Pump C-SB Current	25 to 50 Amps
	Inst. No.:	EI-224 SB	(Reference 2.3.2)
	Location:	MCB	
	Parameter:	CSIP Gear Drive/Speed Changer Oil Level	Min: 1/4 shutdown
	Inst. No.:	N/A	(1/8 running)
	Location:	Individual CSIP Rooms	Max: 3/4

* Not to exceed 31 gpm total while in applicable modes.
(Reference Tech Spec 3.4.6.2.e)

Facility: Shearon Harris | Task No.: 022001H101

Task Title: Place Containment Cooling to Max Cooling Mode | JPM No.: 2009A NRC JPM e

K/A Reference: 022 A4.01 3.6 / 3.6

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: The reactor is at 100 percent power. Containment entry is required and plant management desires containment cooling in the Maximum Cooling Mode. Train A fans are currently running in high speed, and service water is aligned to both A and B ESW headers.

Initiating Cue: The SCO directs you to place Containment Cooling in the Maximum Cooling Mode per OP-169 Section 8.1.

Task Standard: Containment cooling in the Maximum Cooling Mode.

Required Materials: None

General References: OP-169 Rev 17, Section 8.1

Time Critical Task: No

Validation Time: 8 Minutes

SIMULATOR SETUP

For the 2009a ILC NRC exam (no saved IC is required)

***Simulator Operator - Exam Setup**

- **Reset to IC-19**
- **Go to RUN**
- **Silence and Acknowledge annunciators**
- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

START TIME: _____

Simulator Operator: **Place Simulator in RUN when directed by Lead Examiner**

Performance Step: 1 OBTAIN PROCEDURE

Standard: Obtains OP-169 and refers to Section 8.1

Verifies the initial conditions are met

Fan Cooler Units in operation as per Section 5.1 of this procedure

Both ESW headers are in service

Evaluator Note: (Initial conditions are satisfied)

Comment:

Note Prior to Step 1

Performance Step: 2 **Reviews and initials note**

Standard: Reads and initials Notes:

If at any time, additional CNMT cooling is needed, one or both ESW pumps may be placed in service (preferably after fans have been started).

During this mode of operation, both Train A and Train B are in operation. AH-3 and AH-4 will be discharging to the post accident dampers.

Comment:

Step 1

✓ **Performance Step: 3** With Train A in operation as per Section 5.1 of this procedure, perform the following steps:

a. Place the control switch for one fan cooler in AH-1 to LO-SPD.

Standard: Locates control switch for one fan cooler in AH-1 and places the switch to the LO-SPD position.

Comment:

Note Prior to Step 1.b

Performance Step: 3 Review and initial note

Standard: Read and initial note:

Steps 8.1.2.1.b and 8.1.2.1.c must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

Comment:

Step 1.b

Performance Step: 4 Place control switch for fan started in step 8.1.2.1.a TO STOP.

Standard: Places fan, started in step 8.1.2.1.a, control switch to STOP position.

Comment:

Step 1.c

✓ **Performance Step: 5** Place the control switch for the fan stopped in Step 8.1.2.1.b to HI SPD.

Standard: Locates and places control switch for fan stopped in Step 8.1.2.1.b to HI SPD position.

Comment:

Step 1.d

Performance Step: 6 Stop one fan in AH-2.

Standard: Locates and places one fan in AH-2 switch to the STOP position.

Comment:

Step 1.e

✓ **Performance Step: 7** Place the control switches for fan cooler AH-4 A-SB to LO- SPD.

Standard: Locates and places control switches for AH-4 A-SB to LO SPD

Comment:

Step 1.f

✓ **Performance Step: 8** Place the control switch for fan cooler AH-4 B-SB to LO- SPD.

Standard: Locates and places control switch for AH-4 B-SB to LO-SPD

Comment:

Note prior to step 8.1.2.1.g

Performance Step: 9 Review and initial note

Standard: Read and initials note: Steps 8.1.2.1.g and 8.1.2.1.h must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

Comment:

Step 8.1.2.1.g

Performance Step: 10 Place the control switch for fan cooler AH-4 A-SB to STOP.

Standard: Locates control switch for fan cooler AH-4 A-SB and places switch to STOP

Comment:

Step 8.1.2.1.h

✓ **Performance Step: 11** Place the control switch for fan cooler AH-4 A-SB to HI-SPD

Standard: Locates control switch for fan cooler AH-4 A-SB and places control switch to HI SPD.

(NOTE: expect annunciator ALB 029-4-2 for this fan configuration to occur. The candidate should state it is an expected alarm due to his/her action and review the APP when conditions allow)

Comment:

Note prior to Step 8.1.2.1.i

Performance Step: 12 Reviews and initials note

Standard: Reads and initials note:

Steps 8.1.2.1.i and 8.1.2.1.j must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

Comment:

Step 8.1.2.1.i

Performance Step: 13 Place the control switch for fan cooler AH-4 B-SB to STOP.

Standard: Locates control switch for AH-4 B-SB and places switch to STOP

Comment:

Step 8.1.2.1.j

✓ **Performance Step: 14** Place the control switch for fan cooler AH-4 B-SB to HI-SPD.

Standard: Locates control switch and places AH-4 B-SB control switch to HI SPD.

(Annunciator ALB-028-5-1 'Containment Air High Vacuum' will come in shortly after placing cooling in max cooling mode due to additional cooling that has been aligned. The candidate should acknowledge the alarm and review the APP. A one hour TS action is identified in the APP. TS 3.6.1.4 this should be reported to the SCO and the time that the alarm occurred should be recorded.)

Comment:

Step 8.1.2.1.k

Performance Step: 15 Verify CV-D5 is OPEN on Status Light Box 5.

Standard: Locates indications for CV-D5 and verifies damper is OPEN

Comment:

Step 8.1.2.1.l

Performance Step: 16 Verify CV-D7 is OPEN on Status Light Box 6.

Standard: Locates indications for CV-D7 and verifies damper is OPEN

Comment:

Step 8.1.2.1.l

Performance Step: 17 Report to SCO that Containment Cooling is in Maximum Cooling Mode.

Standard: Report to SCO that Containment Cooling is in Maximum Cooling Mode.

Evaluator Cue: **SCO acknowledges that Containment Cooling is in Maximum Cooling Mode.**

End of JPM

Comment:

Terminating Cue: After completion of SCO report and verification that CV-D5 is open on SLB-5 and CV-D7 is open on SLB-6.

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM e

Place Containment Cooling to Max Cooling Mode

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions: The reactor is at 100 percent power. Containment entry is required and plant management desires containment cooling in the Maximum Cooling Mode. Train A fans are currently running in high speed, and service water is aligned to both A and B ESW headers.

Initiating Cue: The SCO directs you to place Containment Cooling in the Maximum Cooling Mode per OP-169 Section 8.1.

REFERENCE

5.0 STARTUP

NOTE: Where the Operator has a choice between Train A or Train B, this procedure will list Train A number and letter identification first with Train B in parentheses.

5.1. Start Up of Fan Cooler Units (Normal Cooling mode)

5.1.1. Initial Conditions

1. Attachments 1 and 2 are completed. TR

2. ESW train is in service which corresponds to the AH unit train to be started. TR

5.1.2. Procedural Steps

1. Place the control switches for both fans in each Containment cooler unit AH-2 A-SA (AH-1 B-SB) and AH-3 A-SA (AH-4 B-SB) to LO-SPD. TR

NOTE: Steps 5.1.2.2 and 5.1.2.3 must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

2. Place the control switch for the fans started in Step 5.1.2.1 to STOP. TR

3. Place the control switches for the fans stopped in Step 5.1.2.2 to HI-SPD. TR

8.0 INFREQUENT OPERATIONS

8.1. Start Up of Fan Cooler Units (Maximum Cooling mode)

8.1.1. Initial Conditions

1. Fan Cooler Units in operation as per Section 5.1 of this procedure. _____

2. Both ESW headers are in service. _____

8.1.2. Procedural Steps

NOTE: If at any time, additional CNMT cooling is needed, one or both ESW pumps may be placed in service (preferably after fans have been started).

NOTE: During this mode of operation, both Train A and Train B are in operation. AH-3 and AH-4 will be discharging to the post accident dampers.

1. With Train A in operation as per Section 5.1 of this procedure, perform the following steps:

   a. Place the control switch for one fan cooler in AH-1 to LO-SPD. _____

NOTE: Steps 8.1.2.1.b and 8.1.2.1.c must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

   b. Place the control switch for the fan started in Step 8.1.2.1.a to STOP. _____

   c. Place the control switch for the fan stopped in Step 8.1.2.1.b to HI-SPD. _____

   d. Stop one fan in AH-2. _____

   e. Place the control switch for fan cooler AH-4 A-SB to LO-SPD. _____

   f. Place the control switch for fan cooler AH-4 B-SB to LO-SPD. _____

8.1.2 Procedural Steps (continued)

> **NOTE:** Steps 8.1.2.1.g and 8.1.2.1.h must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

g. Place the control switch for fan cooler AH-4 A-SB to STOP. _____

h. Place the control switch for fan cooler AH-4 A-SB to HI-SPD. _____

> **NOTE:** Steps 8.1.2.1.i and 8.1.2.1.j must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

i. Place the control switch for fan cooler AH-4 B-SB to STOP. _____

j. Place the control switch for fan cooler AH-4 B-SB to HI-SPD. _____

k. Verify CV-D5 is OPEN on Status Light Box 5. _____

l. Verify CV-D7 is OPEN on Status Light Box 6. _____

2. With Train B in operation as per Section 5.1 of this procedure, perform the following steps:

a. Place the control switch for one fan cooler in AH-2 to LO-SPD. _____

> **NOTE:** Steps 8.1.2.2.b and 8.1.2.2.c must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

b. Place the control switch for the fan started in Step 8.2.2.1.a to STOP. _____

c. Place the control switch for the fan stopped in Step 8.2.2.1.b to HI-SPD. _____

d. Stop one fan in AH-1. _____

e. Place the control switch for fan cooler AH-3 A-SA to LO-SPD. _____

f. Place the control switch for fan cooler AH-3 B-SA to LO-SPD. _____

8.1.2 Procedural Steps (continued)

> **NOTE:** Steps 8.1.2.2.g and 8.1.2.2.h must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

g. Place the control switch for fan cooler AH-3 A-SA to STOP. _____

h. Place the control switch for fan cooler AH-3 A-SA to HI-SPD. _____

> **NOTE:** Steps 8.1.2.2.i and 8.1.2.2.j must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

i. Place the control switch for fan cooler AH-3 B-SA to STOP. _____

j. Place the control switch for fan cooler AH-3 B-SA to HI-SPD. _____

k. Verify CV-D5 is OPEN on Status Light Box 5. _____

l. Verify CV-D7 is OPEN on Status Light Box 6. _____

> **NOTE:** Performing the following steps will place both trains in service with all fans running in fast speed with nozzle dampers closed and discharging to the concrete air shaft.

3. If containment average temperature continues to rise or if additional cooling is desired, perform the following steps:

   a. Place the control switch for the spare fan cooler in AH-1 to LO-SPD. _____

> **NOTE:** Steps 8.1.2.3.b and 8.1.2.3.c must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

   b. Place the control switch for the fan started in Step 8.1.2.3.a to STOP. _____

8.1.2 Procedural Steps (continued)

c. Place the control switch for the fan stopped in Step 8.1.2.3.b to HI-SPD. _____

d. Verify CV-D1 and CV-D7 are SHUT on Status Light Box 6. _____

e. Place the control switch for the spare fan cooler in AH-2 to LO-SPD. _____

NOTE: Steps 8.1.2.3.f and 8.1.2.3.g must be done without delay. The fan should not be allowed to coast down before being started in fast speed.

f. Place the control switch for the fan started in step 8.1.2.3.e to STOP. _____

g. Place the control switch for the fan stopped in Step 8.1.2.3.f to HI-SPD. _____

h. Verify CV-D3 and CV-D5 are SHUT on Status Light Box 5. _____

4. If needed, ESW Pumps may be started for additional cooling. (Otherwise N/A) _____

Facility: Shearon Harris | Task No.: 301058H401

Task Title: Take corrective action for Loss of Both CCW Pumps | JPM No.: 2009A NRC JPM f

K/A Reference: 008 A2.01 3.3 / 3.6 | **ALTERNATE PATH**

Examinee: _____ | NRC Examiner: _____

Facility Evaluator: _____ | Date: _____

Method of testing:

Simulated Performance: _____ | Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: The plant is at 100 percent power

The following equipment is under clearance:

- Component Cooling Water Pump "B"
- Heater Drain Pump "A"
- Reactor Makeup Water Pump "B"

Initiating Cue: You are the RO. Maintain current plant conditions.

Task Standard:

- Specified CCW loads isolated.
- Charging isolated.
- Reactor tripped and all RCP's stopped (in that order).

Required Materials: None

General References: AOP-014, LOSS OF COMPONENT COOLING WATER, Rev. 31

Time Critical Task: NO

Validation Time: 8 minutes

SIMULATOR SETUP

For the 2009a ILC NRC exam

***Simulator Operator - Exam Setup**

- **Reset to IC-165**
- **Go to RUN**

  Place CIT's on:
  - **'A' HD Pump**
  - **'B' RMUW Pump**
  - **'B' CCW Pump**
    - **Place a protected Train placard on 'A' CCW Pump switch**

- **Silence and Acknowledge annunciators**
- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup information is how IC-165 was developed.

- Initialize to a 100 percent steady-state condition (IC-19).
- Secure "A" HDP
- Place IMF CCW01A on trigger 1
- IRF CCW076 CP_OFF CCW Pump B is under clearance
- IRF CCW 039 RACK_OUT CCW Pump B is under clearance
- IRF CND065 RACK_OUT HDP A is under clearance
- IRF MCS022 BKR_OFF RMUW Pump B is under clearance

  Placed clearance tags on the following to mask upcoming fault:

  - CCW Pump "B"
  - HD Pump "A"
  - RMUW Pump "B"

START TIME: _____

Simulator Operator: **Actuate trigger for IMF CCW01A when directed by the Lead Evaluator (approximately 15-30 seconds after the candidate assumes the watch)**

Performance Step: 1 Respond to multiple CCW alarms

Standard: Announce entry conditions for AOP-014 and enters AOP-014. Reads purpose and enters at Section 3.0.

Comment:

Evaluator Note:	**Candidate may contact Maintenance for support in restoring CCW "B" acknowledge request.**

Step 3.1

Performance Step: 2 Refer to PEP-110, Emergency Classification and Protective Action Recommendations, and enter the EAL Network at Entry Point X.

Standard: Informs S-SO.

Evaluator Cue:	**The S-SO acknowledges.**

Comment:

Step 3.2

Performance Step: 3 Evaluate Plant Conditions and go to appropriate section.

Standard: Identifies condition as Loss of CCW Pump and goes to Section 3.3.

Comment:

Note prior to Step 3.3.1

Performance Step: 4 Reviews note

Standard: Reviews and initials note: The standby CCW pump starts at 52 psig discharge pressure

Comment:

Step 3.3.1

Performance Step: 5 **CHECK** the Standby CCW Pump has STARTED.

Standard: Determines no CCW Pump running and none available.

Comment:

Step 3.3.2

Performance Step: 6 **CHECK** CCW Header Pressure greater than 52 psig.

Standard: Determines CCW header pressure is less than 52 PSIG and proceeds to RNO column.

Comment:

Step 3.3.2.a RNO Column (ALTERNATE PATH begins)

Performance Step: 7 **IF** CCW is lost, **THEN PREFORM** the following:

VERIFY the following valves SHUT:

Evaluator Note:	**Valve operation/verification may be performed in any order.**

√ **Performance Step: 8**

- 1CS-7, 45 gpm Letdown Orifice A.

Standard: Locates control switch for 1CS-7 and takes switch to SHUT.

Comment:

√ **Performance Step: 9** • 1CS-8, 60 gpm Letdown Orifice B.

Standard: Locates control switch for 1CS-8 and takes switch to SHUT.

Comment:

Performance Step: 10 • 1CS-9, 60 gpm Letdown Orifice C.

Standard: Locates and verifies 1CS-9 is shut.

Comment:

Performance Step: 11 • 1CS-460, EXCESS LETDOWN

Standard: Locates and verifies 1CS-460 is shut.

Comment:

Performance Step: 12 • 1CS-461, EXCESS LETDOWN

Standard: Locates and verifies 1CS-461 is shut.

Comment:

√ **Performance Step: 13** • 1SP-948, RCS LOOPS B&C HOT LEG CNMT ISOL

Standard: Locates control switch for 1SP-948 and takes switch to SHUT.

Comment:

√ **Performance Step: 14** • 1SP-949, RCS LOOP B&C HOT LEG CNMT ISOL

Standard: Locates control switch for 1SP-949 and takes switch to SHUT.

Comment:

Performance Step: 15 • 1SP-40, SB PRESSURIZER LIQUID SAMPLE ISOL

Standard: Locates and verifies 1SP-40 SB is shut.

Comment:

Performance Step: 16 • 1SP-41 SA, PRESSURIZER LIQUID SAMPLE CNMT ISOL

Standard: Locates and verifies 1SP-41 SA is shut.

Comment:

Performance Step: 17 • 1SP-59 SB, PRESSURIZER STM SPACE SAMPLE ISOL

Standard: Locates and verifies 1SP-59 SB is shut.

Comment:

Performance Step: 18 • 1SP-60 SA, PRESSURIZER STM SPACE SAMPLE ISOL

Standard: Locates and verifies 1SP-60 SA is shut.

Comment:

Step 3.3.2.b RNO Column

√ **Performance Step: 19** ISOLATE CHARGING FLOW AS FOLLOWS:

1. Place controller FK-122.1 in MANUAL and shut.
2. SHUT 1CS-235 SB, Charging Flow Line Isolation.
3. SHUT 1CS-238 SA, Charging Flow Line Isolation.

Standard:

- Places FK-122.1 in MANUAL and adjusts to ZERO demand and/or SHUT light lit.
- Locates control switch for 1CS-235 and turns to SHUT.
- Locates control switch for 1CS-238 and turns to SHUT.

Comment:

Step 3.3.2.c RNO Column

Performance Step: 20 If the RCS is solid, then stop the running CSIP.

Standard: Determines RCS NOT solid.

Comment:

Step 3.3.2.d RNO Column

Performance Step: 21 If RHR is in service, then shut 1CS-28, RHR LETDOWN (HC-142.1)

Standard: Determines RHR NOT in service.

Comment:

Step 3.3.2.e.1 RNO Column

Performance Step: 22

If CCW is expected to be lost for greater than or equal to 10 minutes, then perform the following:

1. Check the reactor is tripped.

Standard:

Reports/identifies reactor not tripped.

Evaluator Cue:

After the step "If CCW is expected to be lost for greater than or equal to 10 minutes, then perform the following" is read:

No CCW Pump will be available for at least 15 minutes

Comment:

Step 3.3.2.e.2 RNO Column

√ **Performance Step: 23**

If CCW is expected to be lost for greater than or equal to 10 minutes, then perform the following:

2. **IF** the reactor is not tripped, **THEN TRIP** the reactor **AND TO TO** EOP PATH-1 (Continue with this procedure as time permits).

Standard:

Locates MCB Reactor Trip switch and Initiates a MANUAL reactor trip.

Evaluator Cue:

(After candidate verifies Reactor has Tripped and starts to perform the other PATH-1 immediate actions)

Another operator will perform EOP PATH-1 immediate actions. Continue performing AOP-014.

Comment:

Step 3.3.2.e.3 RNO Column

√ **Performance Step: 24** If CCW is expected to be lost for greater than or equal to 10 minutes, then perform the following:

3. **STOP** all running RCP's.

Standard: Stops each RCP (3).

Comment:

Step 3.3.2.e.4 RNO Column

Performance Step: 25 If CCW is expected to be lost for greater than or equal to 10 minutes, then perform the following:

4. **SHUT** 1RC-107, PRZ Spray Loop A

Standard: Locates control for 1RC-107 and takes to SHUT

Comment:

Step 3.3.2.e.5 RNO Column

Performance Step: 26 If CCW is expected to be lost for greater than or equal to 10 minutes, then perform the following:

5. **SHUT** 1RC-103, PRZ Spray Loop B

Standard: Locates control for 1RC-103 and takes to SHUT

Comment:

Evaluator Cue:	**When the candidate reads AOP-014 "Go to Step 4"** **END OF JPM.**

Terminating Cue: **When the candidate reads AOP-014 "Go to Step 4": Evaluation on this JPM is complete.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM f

Take corrective action for Loss of Both CCW Pumps

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- The plant is at 100 percent power.
- The following equipment is under clearance:
  - Component Cooling Water Pump "B"
  - Heater Drain Pump "A"
  - Reactor Makeup Water Pump "B"

INITIATING CUE: You are the RO. Maintain current plant conditions.

Reference

Note: This is NOT provided to candidate.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

NOTE

- This procedure contains no immediate actions.
- Loss of CCW may require implementation of the SHNPP Emergency Plan. **[C.1]**

☐1. **REFER TO** PEP-110, Emergency Classification And Protective Action Recommendations, AND **ENTER** the EAL Network at entry point X.

2. **EVALUATE** plant conditions AND **GO TO** the appropriate section:

	Malfunction	Section	Page
☐	Leakage Into CCW System	3.1	5
☐	Leakage From CCW System	3.2	14
☐	Loss of a CCW Pump	3.3	32

--END OF SECTION 3.0 --

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.3 Loss of a CCW Pump

NOTE

The standby CCW pump starts at 52 psig discharge pressure.

☐1. **CHECK** the standby CCW pump has STARTED.	☐1. **START** the standby CCW pump.
✱☐2. **CHECK** CCW header pressure greater than 52 psig.	2. **IF** CCW is LOST, **THEN PERFORM** the following: a. **VERIFY** the following valves SHUT ☐ • 1CS-7, 45 gpm Letdown Orifice A ☐ • 1CS-8, 60 gpm Letdown Orifice B ☐ • 1CS-9, 60 gpm Letdown Orifice C ☐ • 1CS-460, Excess Letdown ☐ • 1CS-461, Excess Letdown ☐ • 1SP-948, RCS Loop B & C Hot Leg Cnmt Isol ☐ • 1SP-949, RCS Loop B & C Hot Leg Cnmt Isol ☐ • 1SP-40 SB, Pressurizer Liquid Sample Isol ☐ • 1SP-41 SA, Pressurizer Liquid Sample Cnmt Isol ☐ • 1SP-59 SB, Pressurizer Stm Space Sample Isol ☐ • 1SP-60 SA, Pressurizer Stm Space Sample Isol **(Continued on Next Page)**

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.3 Loss of a CCW Pump

2. **(continued)**

   b. **ISOLATE** Charging flow as follows:

   ☐ (1) **PLACE** controller FK-122.1, Charging Flow, in MANUAL AND SHUT.

   ☐ (2) **SHUT** 1CS-235 SB, Charging Line Isolation.

   ☐ (3) **SHUT** 1CS-238 SB, Charging Line Isolation.

   ☐ c. **IF** the RCS is SOLID, **THEN STOP** the running CSIP.

   ☐ d. **IF** RHR is operating, **THEN SHUT** 1CS-28, RHR Letdown (HC-142.1).

   e. **IF** CCW is expected to be lost for greater than 10 minutes, **THEN PERFORM** the following:

   ☐ (1) **CHECK** the Reactor is TRIPPED.

   ☐ (2) **IF** the reactor is NOT TRIPPED, **THEN TRIP** the Reactor **AND GO TO** EOP PATH-1. (Continue with this procedure as time permits.)

   ☐ (3) **STOP** ALL running RCPs.

   (4) **SHUT** 1RC-107, PRZ Spray Loop A.

   (5) **SHUT** 1RC-103, PRZ Spray Loop B.

   ☐ f. **GO TO** Step 4.

INSTRUCTIONS	RESPONSE NOT OBTAINED
3.3 Loss of a CCW Pump	
☐3. **VERIFY** adequate ESW cooling water flow to the associated CCW heat exchanger.	
☐4. **CHECK** RHR operating.	☐4. **GO TO** Step 7.
☐5. **VERIFY** the affected RHR pump STOPPED.	
☐6. **REFER TO** AOP-020, Loss of RCS Inventory or Residual Heat Removal While Shutdown. (Continue with this procedure, as time permits.)	
☐7 **REFER TO** Technical Specification 3.7.3.	
☐8. **CONTACT** Maintenance to determine the cause of the CCW pump failure, AND **INITIATE** corrective action.	
☐9. **CHECK** with Operations Staff to determine the desirability of using the swing CCW pump.	☐9. **GO TO** Step 11.
☐10. **PLACE** the swing CCW pump in service per OP-145, Component Cooling Water.	
✱☐11. **CHECK** CCW flow RESTORED to the affected train.	☐11. **WHEN** CCW flow can be RESTORED to the affected train, **THEN PLACE** the desired CCW train in service per OP-145, Component Cooling Water.
☐12. **DOCUMENT** component manipulations per OPS-NGGC-1308, Plant Status Control.	
☐13. **EXIT** this procedure.	

--END OF SECTION 3.3 --

Facility: Shearon Harris | Task No.: 301074H401

Task Title: High RCS Pressure while Solid | JPM No.: 2009A NRC JPM g

K/A Reference: 010 A1.07 3.7 / 3.7

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: The plant is in Mode 4

- Water solid
- RCS temperature ~ 208˚F
- RCS pressure ~ 300 psig
- All three RCPs are running
- "A" CSIP in operation
- Both RHR Pumps are in service
- Normal charging and letdown are aligned

Initiating Cue: You are the RO. Maintain current plant conditions.

Task Standard: "A" CSIP is stopped per immediate actions from memory.

Required Materials: None

General References: AOP-019, Rev. 21

Time Critical Task: No

Validation Time: 5 Minutes

SIMULATOR SETUP

For the 2009a ILC NRC exam

***Simulator Operator - Exam Setup**

- **Reset to IC-166**
- **Go to RUN**
- **Set Source Range Audio Multiplier to 1000 to establish audible counts**
- **Silence and Acknowledge annunciators**
- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup information is how IC-166 was developed.

- **Initialize to IC-1**
- **Plant should be in Mode 4 and water solid consistent with GP-007**
- **CSIP "A" is in service; both RHR Pumps in service**
- **All three RCPs in service**
- **Normal charging and letdown are in service**
- **RCS temperature at ~208°F and RCS pressure at ~300 psig**
- **Trigger 1 Fail PCV-145 shut, IMF CVC07 (1 00:00:00 00:00:00) 0.0 00:00:00**

EVALUATOR NOTE: THIS JPM contains an immediate. During implementation of the immediate actions NO procedure should be referenced.

The start time should be logged when the trigger is activated.

START TIME: _____

Simulator Operator: **Actuate trigger for IMF CVC07 when directed by the Lead Evaluator (approximately 15-30 seconds after the candidate assumes the watch)**

Performance Step: 1 **Multiple annunciators associated with RCS high pressure**

Standard: Identifies multiple annunciators associated with RCS high pressure with the plant in solid conditions and announces that AOP-019 entry conditions are met. Performs the immediate actions of AOP-019, Malfunction of RCS Pressure Control.

Comment:

Performance Step: 2

Step 1

NOTE prior to step 1
Steps 1 through 3 are immediate actions.

CAUTION prior to step 1
A pressure transmitter or indicator malfunction may exist. When referred to throughout this procedure, actual RCS pressure should be obtained by cross-checking of diverse instrumentation, such as PI-455.1, PI-456, and PI-457.

1. **CHECK** that a bubble exists in the PRZ.

Standard: States plant is "water solid" (per given Initial Conditions) or locates PZR level indicators to verify no bubble in the PRZ.

Comment:

Step 1 RNO (ALTERNATE PATH begins)

✓ **Performance Step: 3**

1. **PERFORM** the following:
   a. IF PRZ pressure is GREATER THAN 360 PSIG, **THEN STOP** the running charging pump.

Standard: Determines RCS pressure > 360 psig, locates CSIP "A" control switch and takes it to STOP.

Comment:

Performance Step: 4 **Enter AOP-019, Malfunction of RCS Pressure Control.**

Standard: Announces immediate actions are complete and enters AOP-019, Malfunction of RCS Pressure Control

Comment:

Performance Step: 5 **Obtains AOP-019, Malfunction of RCS Pressure Control.**

Standard: Obtains AOP-019 and reads note and caution prior to step 1. Then reads step 1 and RNO 1.a

RNO step 1.b GO TO Section 3.2, Pressure Control Malfunctions During Solid Plant Operation.

Comment:

Performance Step: 6 **Transitions to AOP-019, Section 3.2 (Page 13)**

NOTE prior to Step 1

When LTOP is enabled, the nominal PORV lift setpoint is 400 psig.

Standard: Reviews and initials NOTE

Comment:

STEP 1

Performance Step: 7 **VERIFY** ALL PRZ PORVs **AND** associated block valves properly positioned for current PRZ pressure and plant conditions.

Standard: Verifies PRZ PORVs are SHUT and associated block valves are OPEN

Comment:

STEP 2

Performance Step: 8 **STOP** ALL running RCPs

Standard: Locates MCR switches and secures ALL RCPs

Comment:

STEP 3

Performance Step: 9 **VERIFY** ALL charging pumps STOPPED

Standard: Locates MCR switches for ALL charging pumps and verifies that they are STOPPED

Comment:

STEP 4

Performance Step: 10 Prior to continuing, **ADJUST** 1CS-38 (PCV-145), Letdown Pressure Control Valve, to reduce RCS pressure to minimum.

Standard: Locates controls for 1CS-38 and reduces RCS pressure to minimum.

Comment:

STEP 5

Performance Step: 11 **SHUT** BOTH of the following to isolate letdown:

- 1CS-38 (PCV-145), Letdown Pressure Control Valve
- 1CS-28 (HCV-142), RHR Letdown Control Valve

Standard: Locates controls for 1CS-38 and places to SHUT

Locates controls for 1CS-28 and places to SHUT

Comment:

Evaluator Cue: **After candidate completes isolation of Letdown**

END OF JPM

STOP TIME: _____

Terminating Cue: RCS pressure is at minimum for the plant conditions with CSIP's and RCP's secured and letdown isolated.

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM g

High RCS Pressure While Solid

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions: The plant is in Mode 4

- Water solid
- RCS temperature ~ 208˚F
- RCS pressure ~ 300 psig
- All three RCPs are running
- "A" CSIP in operation
- Both RHR Pumps are in service
- Normal charging and letdown are aligned

Initiating Cue: You are the RO. Maintain current plant conditions.

Reference

Note: This is NOT provided to candidate.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

NOTE

Steps 1 through 3 are immediate actions.

CAUTION

A pressure transmitter or indicator malfunction may exist. When referred to throughout this procedure, actual RCS pressure should be obtained by cross-checking of diverse instrumentation, such as PI-455.1, PI-456, and PI-457.

☐ 1. **CHECK** that a bubble exists in the PRZ.	1. **PERFORM** the following: ☐ a. **IF** PRZ pressure is GREATER THAN 360 PSIG, **THEN STOP** the running charging pump. ☐ b. **GO TO** Section 3.2, Pressure Control Malfunctions During Solid Plant Operation. **NOTE** Failure of a PRZ PORV to fully reseat after operation may require initiation of the Emergency Plan.
☐ 2. **VERIFY** ALL PRZ PORVs **AND** associated block valves properly positioned for current PRZ pressure and plant conditions.	☐ 2. **IF** ANY PRZ PORV will NOT shut when required, **THEN SHUT** its associated block valve.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Pressure Control Malfunctions During Solid Plant Operation

NOTE

When LTOP is enabled, the nominal PORV lift setpoint is 400 psig.

INSTRUCTIONS	RESPONSE NOT OBTAINED
✱☐ 1. **VERIFY** ALL PRZ PORVs **AND** associated block valves properly positioned for current PRZ pressure and plant conditions.	✱☐ 1. **IF** ANY PRZ PORV will not shut when required, **THEN SHUT** its associated block valve.
☐ 2. **STOP** ALL running RCPs.	
☐ 3. **VERIFY** ALL charging pumps STOPPED.	
☐ 4. Prior to continuing, **ADJUST** 1CS-38, PK-145.1 Letdown Pressure, to reduce RCS pressure to minimum.	
5. **SHUT** BOTH of the following to isolate letdown:	
☐ • 1CS-38 (PCV-145), Letdown Pressure Control Valve	
☐ • 1CS-28 (HCV-142), RHR Letdown Control Valve	
✱☐ 6. **MAINTAIN** RHR temperature STABLE.	
☐ 7. **REFER TO** Tech Spec 3.4.9.4 **AND IMPLEMENT** action where appropriate.	

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Pressure Control Malfunctions During Solid Plant Operation

CAUTION

Whenever RCS pressure is below 100 psig with no seal injection water being supplied, seal leak-off valves must be shut. This will prevent the backflow of unfiltered water from the VCT.

INSTRUCTIONS	RESPONSE NOT OBTAINED
✱☐ 8. **CHECK** RCS pressure 100 PSIG OR ABOVE.	8. **SHUT** the following RCP seal leak-off valves: ☐ • 1CS-355 RCP A #1 Seal Water Return ☐ • 1CS-396, RCP B #1 Seal Water Return ☐ • 1CS-437, RCP C #1 Seal Water Return
9. **PERFORM** the following: ☐ a. **REFER TO** Attachment 4, Pressure Control Malfunction Symptoms—Solid Plant. ☐ b. **DIRECT** Maintenance to investigate and repair the pressure control failure. ☐ c. **CHECK** repairs complete before continuing.	
10. **VERIFY** the following: ☐ • 1RC-118 (PCV-445A SA) PORV—IN AUTO ☐ • 1RC-114 (PCV-444B SB) PORV—IN AUTO ☐ • 1RC-117, PORV block for PCV-445A SA—OPEN ☐ • 1RC-113, PORV block for PCV-444B SB—OPEN	

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Pressure Control Malfunctions During Solid Plant Operation

11. VERIFY the following SHUT:

☐ • 1CS-38 (PCV-145), Letdown Pressure Control Valve

☐ • 1CS-28 (HCV-142), RHR Letdown Control Valve

☐ • 1CS-243 (HCV-186), Seal Injection Flow Control Valve

☐ • 1CS-231 (FCV-122), Charging Flow Control Valve

12. REFER TO OP-107, Chemical and Volume Control System, **AND PERFORM** the following:

☐ **a. START** a charging pump using Section 5.1, Starting a Charging Pump.

b. VERIFY OPEN RCP seal leak-off valves

☐ • 1CS-355 RCP A #1 Seal Water Return

☐ • 1CS-396, RCP B #1 Seal Water Return

☐ • 1CS-437, RCP C #1 Seal Water Return

☐ **c. VERIFY** RCP seal Injection has been established between 8 and 13 gpm.

☐ **13. WHEN** seal injection is established, **THEN ADJUST** letdown flow using 1CS-38, PK-145.1 Letdown Pressure, in manual or automatic, as necessary to balance seal injection flow.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Pressure Control Malfunctions During Solid Plant Operation

☐ **14. REFER TO** OP-111, Residual Heat Removal System, **AND VERIFY** that a RHR low pressure letdown alignment is still established.

15. ESTABLISH solid plant pressure control as follows:

☐ **a. ADJUST** setpoint of 1CS-38, PK-145.1 Letdown Pressure, to desired RCS pressure.

☐ **b. THROTTLE** 1CS-28 (HCV-142) HC-142.1, RHR Letdown, to approximately 20% open.

☐ **c. THROTTLE** 1CS-231, FK-122.A1 Charging Flow, in MANUAL, until the following are achieved:

- 1CS-38, PK-145.1 Letdown Pressure, is positioned at midrange
- Desired charging flow is established
- Desired letdown flow is established

NOTE

During solid plant operations, 1CS-28 should be full open.

☐ **d. SLOWLY OPEN** 1CS-28 (HCV-142) HC-142.1, RHR Letdown, to full open. **[F.2]**

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.2 Pressure Control Malfunctions During Solid Plant Operation

NOTE

The RCP No. 1 seal may be damaged during an LTOPS event if the RCP was running during the event. The System Engineer should be contacted prior to restarting.

☐ **16. IF** RCS temperature is above 160°F,
THEN REFER TO OP-100, Reactor Coolant System,
AND START a Reactor Coolant Pump using Section 5.1, Reactor Coolant Pump Startup. **[C.2]**

☐ **17. EXIT** this procedure.

—END OF SECTION 3.2—

Facility: Shearon Harris | Task No.: 003001H101

Task Title: Start An RCP | JPM No.: 2009A NRC JPM h

K/A Reference: 003 A2.02 3.7 / 3.9

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: A GP-002 heat-up is in progress. Two hours ago the "C" RCP was removed from service for maintenance. Maintenance has been completed and the 'C' RCP is ready for operation.

Initiating Cue: The SCO has instructed you to start "C" RCP in accordance with OP-100 Section 5.1.

Task Standard: Start an RCP and secure the RCP when vibrations exceed RCP trip limits per AOP-018, Reactor Coolant Pump Abnormal Conditions.

Required Materials: None

General References: OP-100, Rev. 28 and AOP-018, Rev. 34

Time Critical Task: No

Validation Time: 17 minutes

SIMULATOR SETUP

For the 2009a ILC NRC exam

***Simulator Operator - Exam Setup**

- **Reset to IC-167**
- **Go to RUN**
- **Set Source Range Audio Multiplier to 1000 to establish audible counts**
- **Silence and Acknowledge annunciators**
- **GO TO FREEZE** and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

The following setup information is how IC-166 was developed.

- **Initialize to IC-2 Mode 4 HSD conditions. RCS 335°F and ~355 psig.**
- **Secure the "C" RCP and operate Pressurizer sprays as necessary to stabilize RCs pressure.**
- **Adjust RHR if needed to stabilize RCS temperature.**
- **Place RCP 'C' high vibrations (30 mils with 60 second ramp on Trigger 1 – IMF RCS09C (1 00:00:00 00:00:00) 28.0 00:00:60**

Simulator Operator:	**Actuate Trigger 1 for IMF RCS09C when directed by the Lead Evaluator (After the RCP oil lift pump is secured)**

Evaluator Note:	The candidates should be briefed outside of the Simulator prior to performing this JPM. Provide them with a copy of the procedure and inform them that ALL initial conditions are satisfied. This will allow them to review the Precautions and Limitations associated with OP-100 and have time for a task preview of the steps to accomplish starting the RCP. Expect that the candidates will take about 20 minutes to complete this review. **During the performance of the JPM the candidate may use either MCB indication or ERFIS indications when reviewing RCP pump indications.**

START TIME: _____

Performance Step: 1 Procedure obtained and begins the task of starting the RCP

Standard: Obtained OP-100 and reviews P & L's and Section 5.1 for 'C' RCP startup. Reviews and verifies initial conditions are satisfied.

Comment:

Section 5.1.2 Caution prior to Step 1

Performance Step: 2 Only one RCP is to be started at any one time. If the motor is allowed to coast to a stop between starts, two successive starts are permitted. A third start may be made when the winding and the core have cooled by running for 20 minutes, or by standing idle for 45 minutes.

Standard: Reviews and initials caution prior to step 1.

Comment:

Performance Step: 3

Steps 1a, b

1. **VERIFY** the following before pump start:

   a. **IF** jogging RCPs per GP-001, **THEN VERIFY** RCS Pressure is greater than 325 psig.

   b. **VERIFY** # 1 Seal ΔP is greater than 200 psid.

Standard:

Step 1a is N/A

Step 1b – Locates PI-154A1 and verifies that the 'C' RCP #1 Seal ΔP is greater than 200 psid.

Comment:

Performance Step: 4

Note prior to Step 1.c

Reviews note prior to step 1.c

Standard:

Reads and initials note:

VCT Outlet Temp TE-116 should be used for seal injection water temperature.

Comment:

Performance Step: 5

Step 1.c

c. **VERIFY** Seal Injection flow is between 8 and 13 gpm at a temperature between 60 and 130°F.

Standard:

Locates seal injection flow indication FI-154A and verifies flow between 8-13 gpm and also verifies temperature indicator TI-116.1 reading between 60-130°F.

Comment:

Step 1.d

Performance Step: 6 d. **VERIFY** # 1 Seal Leakoff is in the normal operating range of Attachment 3.

Standard: Locates #1 Seal Leakoff flow indicator FR-154A and verifies that it meets Attachment 3 requirements.

Comment:

Caution prior to Step 2

Performance Step: 7 Reviews caution

Standard: Reviews and initials caution.

RCPs shall not be started with one or more of the RCS cold leg temperatures less than or equal to 325°F unless the secondary water temperature is less than 50°F above each of the RCS cold leg temperatures. This caution is only applicable to the first RCP to be started.

Understands the caution is N/A.

Comment:

Step 2

Performance Step: 8 **START** the RCP Oil Lift Pump.

✓ **Standard:** Locates 'C' RCP Oil Lift Pump switch and starts the oil lift pump.

Comment: **START Time** _____

Step 3

Performance Step: 9 **VERIFY** the amber permissive light on the lift pump control switch is lit indicating proper lift oil pressure has been achieved.

Standard: Locates amber permissive light on the 'C' RCP Oil Lift Pump Switch and verifies it is lit.

Comment:

Step 4

Performance Step: 10 **ALLOW** the RCP Oil Lift Pump to run for a minimum of 2 minutes before starting an RCP.

Standard: Waits minimum of 2 minutes after starting the oil lift pump prior to starting the 'C' RCP.

Comment:

Note prior to Step 5

Performance Step: 11 When an RCP is started, the RCP ammeter will go off scale high, and then decrease to the normal hot or cold running amps after 15 to 25 seconds.

Standard: Reads and initials Note.

Comment:

Step 5

Performance Step: 12 **START** the RCP.

✓ **Standard:** Locates control switch for 'C' RCP and starts 'C' RCP

Comment: **START Time _____ (≥ 2minutes since lift pump start)**

Step 6

Performance Step: 13 **VERIFY** the following normal operating parameters:

- Running amps: Hot 460 to 540 amps Cold 715 amps
- RCS flow: Greater than or equal to 98%
- # 1 Seal ΔP Greater than 200 psid
- # 1 Seal leakoff in the normal operating range of
- Attachment 3
- Motor Winding temperature <300°F

Standard: Locates and verifies each parameter is in the normal operating range (ERFIS or MCB indications may be used)

Comment:

Booth Operator: When the oil lift pump is secured in this next step insert Trigger 1 to start 'C' RCP vibrations to increase.

Note prior to Step 7

Performance Step: 14 The oil lift pump should be run at least 1 minute after starting an RCP.

Standard: Waits at least 1 minute then secures the 'C' RCP oil lift pump.

Comment: **Secure Time _____ (≥ 1 minute since RCP start)**

Performance Step: 15 **Identifies 'C' RCP Trouble alarm ALB-010 window 3-5 and enters AOP-018 based on RCP vibration indicators YT 439A 'C' RCP Shaft Vibration and YT 439B 'C' RCP Frame Vibration indicator increase**

✓ **Standard:** Acknowledges alarm, reviews APP (may note increase in 'C' RCP vibrations) and performs immediate action of AOP-018.

- **CHECK** ANY CSIP RUNNING.

(CHECKS 'A' CSIP is running – voices immediate actions complete)

Comment:

Enters AOP-018 NOTE prior to Step 1

Performance Step: 16

- Step 1 is an immediate action
- RCP abnormal conditions may require implementation of the SHNPP Emergency Plan.

Standard: Reads and initials Note.

Comment:

AOP-018 Step 1

Performance Step: 17 **CHECK** ANY CSIP RUNNING.

Standard: Check has been completed during immediate action.

Comment:

AOP-018 Step 2

Performance Step: 18 **REFER TO** PEP-110, Emergency Classification And Protective Action Recommendations, AND **ENTER** the EAL Network at entry point X.

Standard: Informs SCO or S-SO to Refer to PEP-110 and enter EAL Network at entry point X.

Evaluator Cue: **SCO (S-SO) understands Refer to PEP-110 and enter EAL Network at entry point X.**

Comment:

AOP-018 NOTE prior to Step 3

Performance Step: 19 Review note prior to step 3

Standard: Reads and initials note

NOTE: Minimum allowable flow for a CSIP is 60 gpm which is provided by normal miniflow during normal operation and alternate miniflow during safety injection. Maintaining CSIP flow greater than or equal to 60 gpm also satisfies this requirement.

Comment:

AOP-018 Step 3

Performance Step: 20 **EVALUATE** plant conditions AND **GO TO** the appropriate section: High Reactor Coolant Pump Vibration Section 3.2

Standard: Reads step and goes to section 3.2

Comment:

AOP-018 Section 3.2 High RCP Vibration Step 1

Performance Step: 21 **CHECK** ALL RCPs operating within the limits of Attachment 1 Refers to Attachment 1 step 5 for RCP vibrations

Standard: Reads RCP Trip Limits associated with RCP vibrations (step 5) and checks vibration readings

Comment:

Performance Step: 22 **Identify 'C' RCP vibrations are above the trip limits of AOP-018 Attachment 1**

Standard: Informs SCO that 'C' RCP vibrations are above the trip limits of AOP-018 Attachment 1

Evaluator Cue: **SCO acknowledges report**

Comment:

Step 1 RNO (Alternate Path)

Performance Step: 23 **GO TO** Step 3

Standard: Reads Step 1 RNO and goes to step 3

Comment:

Step 3

Performance Step: 24 **CHECK** Rx Power is greater than P-8 (49%)

Standard: Checks NO Rx Power is not greater than P-8 (49%)
RNO Step 3 **GO TO** Step 5

Comment:

Step 5

Performance Step: 25 **CHECK** more than ONE RCP affected

Standard: Checks NO only 'C' RCP affected
RNO Step 5 **GO TO** Step 5

Comment:

Step 5 RNO

Performance Step: 26 **PERFORM** the following:

a. **STOP** the affected RCP
b. **REFER** TO Attachment 7, Operation With Two RCPs.
c. **GO TO** Step 11

✓ **Standard:** Locates control switch for 'C' RCP and STOPs 'C' RCP.
Reports to SCO that 'C' RCP has been secured.

Comment:

Evaluator Cue: **SCO acknowledges report**
END OF JPM

Terminating Cue: Operator reports to the examiner that RCP is operating above trip limit for vibrations and SECURES 'C' RCP.

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM h
Start An RCP

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions: A GP-002 heat-up is in progress. Two hours ago the "C" RCP was removed from service for maintenance. Maintenance has been completed and the 'C' RCP is ready for operation.

Initiating Cue: The SCO has instructed you to start "C" RCP in accordance with OP-100 Section 5.1.

REFERENCE

Progress Energy

R
REFERENCE
USE

HARRIS NUCLEAR PLANT

PLANT OPERATING MANUAL

VOLUME 3

PART 2

PROCEDURE TYPE: OPERATING PROCEDURE

NUMBER: **OP-100**

TITLE: **REACTOR COOLANT SYSTEM**

Table of Contents

Section		Page
1.0	PURPOSE	3
2.0	REFERENCES	3
2.1.	Plant Operating Manual Procedures	3
2.2.	Technical Specifications	3
2.3.	Final Safety Analysis Report	4
2.4.	Drawings	4
2.5.	Technical Manuals	4
2.6.	Corrective Action Program (CAP) Items	4
2.7.	Other	4
3.0	PREREQUISITES	5
4.0	PRECAUTIONS AND LIMITATIONS	5
5.0	STARTUP	9
5.1.	Reactor Coolant Pump Start-up	9
6.0	NORMAL OPERATION	13
7.0	SHUTDOWN	16
7.1.	Reactor Coolant Pump Shutdown	16
8.0	INFREQUENT OPERATIONS	16
8.1.	Pressurizer Relief Tank Make Up	16
8.2.	Venting the Pressurizer Relief Tank	18
8.3.	Purging the Pressurizer Relief Tank	23
8.4.	Draining The Pressurizer Relief Tank	26
8.5.	Recirculating the Pressurizer Relief Tank	29
8.6.	Rapid Cooldown of the PRT Using Reactor Make Up Water	31
8.7.	Venting the Rx Vessel Head	34
8.8.	Placing the RCS Standpipe In Service	37
8.9.	Removing the RCS Standpipe From Service	40
8.10.	Establishing Cooling To RCPs During Emergency Conditions	43
8.11.	Establishing Conditions for Running an RCP During Emergency Conditions	50
8.12.	Reactor Coolant Pump Start-up During Emergency Conditions	52
8.13.	Actions for #1 Seal Leakoff Flow less than 0.2 gpm	55
8.14.	Pressurizing the PRT	60
9.0	DIAGRAMS/ATTACHMENTS	62
	Attachment 1 - Reactor Coolant System Electrical Lineup Checklist	63
	Attachment 2 - Reactor Coolant System Valve Lineup Checklist	68
	Attachment 3 - # 1 Seal Performance Parameters	80

1.0 PURPOSE

This procedure provides operating instructions for the Reactor Coolant System and the Pressurizer Relief System. Operational activities included are:

- The starting and stopping of Reactor Coolant Pumps
- Filling, venting, pressurizing, purging, draining, recirculating, and rapid cooldown of the Pressurizer Relief Tank
- Venting the Reactor Vessel head
- Operation of the RCS Standpipe
- Actions to restart RCPs during accident recovery as directed by the EOPs
- Actions for low #1 seal leakoff

2.0 REFERENCES

2.1. Plant Operating Manual Procedures

1. OP-101
2. OP-102
3. OP-107
4. OP-120.07
5. OP-120.08
6. OP-145
7. OP-151.01
8. OP-152.01
9. OP-156.01
10. OP-156.02
11. GP-001
12. GP-002
13. AOP-018
14. APP-ALB-004
15. APP-ALB-010
16. CRC-255
17. LP-L-0403
18. EPT-106

2.2. Technical Specifications

1. 3.2.5
2. 3.4.1.3
3. 3.4.6.2

2.3. Final Safety Analysis Report

1. 4.4.3
2. 15.4.4

2.4. Drawings

1. 5-S-1300
2. 5-S-1301
3. 5-S-1303
4. 5-S-1303 S01
5. 5-S-1303 S02
6. 5-S-1344

2.5. Technical Manuals

1. VM-MRF, Pumps, Reactor Coolant

2.6. Corrective Action Program (CAP) Items

1. 85H0635
2. SOER 88-03 Recommendation 2
3. AR 3275

2.7. Other

1. MS-903371 (M)
2. PCR-2249
3. PCR-420
4. PCR-6986
5. ESR 97-00806
6. EQS-039, Low Temperature Over Pressurization Protection Setpoints

3.0 PREREQUISITES

1. **VERIFY** the following systems are aligned to support operation of the Reactor Coolant System and its components:

   - Primary Sample System per OP-101
   - Primary Make-up System per OP-102
   - Chemical and Volume Control System per OP-107
   - Radioactive Equipment Drain System per OP-120.08
   - Component Cooling Water System per OP-145
   - Instrument Air System per OP-151.01
   - Compressed Gas System Nitrogen per OP-152.01
   - DC Electrical Distribution per OP-156.01
   - AC Electrical Distribution per OP-156.02
   - RCP Vibration Monitor

4.0 PRECAUTIONS AND LIMITATIONS

1. Start only one RCP at a time.

2. Apply the following starting duty for the RCPs:

   - If the motor is allowed to coast to a stop between starts, two successive starts are permitted.
   - A third start is permitted when the winding and the core have cooled by running for a period of 20 minutes, OR by standing idle for a period of 45 minutes.

3. CCW flow through the thermal barrier heat exchanger should be supplied at all times when RCS temperature exceeds 200°F.

4. The temperature of CCW supplied to components should not exceed 105°F during normal operation. During the transition to Residual Heat Removal cooling in service, the temperature may increase to 125°F.

5. Volume Control Tank pressure should be maintained greater than 15 psig to insure sufficient cooling water is supplied to # 2 RCP Seal.

6. RCP seal injection temperature should be limited to a maximum of 135°F. For special operation, RCP seal injection temperature may be increased to a maximum of 150°F provided RCS temperature is maintained less than 400°F.

7. Seal injection flow should be maintained to the RCPs at all times when RCS pressure is above Containment pressure or the RCS is being filled.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

8. To prevent backflow of potentially dirty water from the Volume Control Tank, # 1 Seal leakoff valves must be shut when RCP seal injection is not supplied and RCS pressure is less than 100 psig.

9. If # 1 Seal leakoff flow required by Attachment 3 cannot be established, do not start an RCP. Refer to Section 8.13.

10. If the possibility exists for Volume Control Tank pressure to equal or exceed RCS pressure, keep the Seal Water Return Line isolated when not running the RCP.

11. RCP Standpipes must contain sufficient water to ensure the standpipes do not operate dry (no RCP Standpipe level alarms).

12. Cooling water to the motor bearing oil coolers should be maintained for at least 30 minutes after stopping an RCP.

13. An RCP should not be operated beyond the low and the high level alarms in the upper and lower oil pots. Local RAB level indication is provided for these parameters.

14. The RCP Oil Lift Pump should be started at least 2 minutes before starting the RCP, and run for 1 minute after the RCP comes up to speed.

15. The RCS must be filled and all major air pockets vented before starting a RCP.

16. An RCP should not be operated continuously until the RCS has been thoroughly vented.

17. RCS pressure must be greater than 325 psig to start an RCP during fill and vent operations. However, the minimum loop pressure for subsequent RCP operation is controlled by the minimum ΔP (200 psid) across the # 1 Seal. [R – Reference FSAR 4.4.3]

18. RCP # 1 Seal Bypass Valve should remain shut unless RCP RADIAL BRG TEMP **OR** RCP SEAL WTR INLET TEMP approaches the alarm level of 220°F. If the following conditions are met, the bypass valve should then be opened: (Reference 2.5.1)

    - Seal injection flow to each RCP is between 8 and 13 gpm.
    - # 1 Seal leakoff from any pump is less than 1 gpm.
    - RCS pressure is less than 1000 psig.

4.0 PRECAUTIONS AND LIMITATIONS (continued)

19. During RCS fill and vent, the # 1 Seal bypass valve should be opened briefly to vent the lines. The bypass valve should not be opened until RCS pressure is at least 100 psig and the # 1 Seal leakoff line is opened. After venting the lines, the # 1 Seal bypass valve should be closed and remain closed unless the conditions described in 18 above occur.

20. Whenever RCS temperature is greater than 160°F, at least one RCP must be in operation. [R - Reference 85H0635]

21. RCP seal flow has a normal operating range of between 8 and 13 gpm per pump. However, at no time should the total to all three RCPs exceed 31 gpm with RCS pressure at 2215 to 2255 psig. This is the maximum controlled leakage allowed by Tech Spec 3.4.6.2e. If plant conditions dictate, seal flow to each RCP may be reduced to a minimum of 6 gpm.

22. RCPs shall not be started with one or more of the RCS cold leg temperatures less than or equal to 325°F unless the secondary water temperature is less than 50°F above each of the RCS cold leg temperatures. (Reference 2.2.2)

23. When starting an RCP while the plant is solid, pressure surges large enough to lift an LTOP relief should be anticipated. Prompt action will be required to prevent LTOP actuation.

24. When RCS pressure is being maintained by the low pressure letdown control valve, changes to the RHR flow rate by throttling valves or starting and stopping the RHR pumps will result in changes in RCS pressure.

25. Maximize purification system use during periods when high coolant activity levels are anticipated:

    - Following hydrogen peroxide addition before cooldown
    - Following RCP jog
    - Reactor Startup

26. Pressurizer Relief Tank (PRT) temperature should be maintained less than 120°F.

27. A nitrogen cover pressure of 2 to 4 psig should be maintained in the pressurizer relief tank to prevent the formation of an explosive hydrogen-oxygen mixture. Explosive mixtures of oxygen and hydrogen in the PRT must be avoided at all times. The oxygen content in the tank must not exceed 4% by volume with hydrogen present. (Reference 2.7.1)

4.0 PRECAUTIONS AND LIMITATIONS (continued)

28. The maximum # 1 Seal leakoff permitted is 6.5 gpm. (Reference 2.5.1 and 2.1.13).

29. Maintain RCS pressure greater than or equal to PRT pressure to prevent PRT backleakage into the RCS or Containment atmosphere.

30. When turning off the Pressurizer Back Up Heaters with Pressure Control PK-444A in Automatic the potential exists for Pressurizer pressure to decrease below the Tech Spec DNB limit of 2185 psig (2205 psig MCB indication Ref OST-1021). To prevent this problem, the back up heaters should be turned off one at a time while allowing the system time to respond in AUTO. Bank D should be the last heater group turned off. Another acceptable method would be to place PK-444A in manual and adjust the output to 25% to partially energize the Control Group C Heaters, de-energize the back up heaters and then place PK-444A back in auto.

31. When energizing the Pressurizer Backup Heaters Groups "A" or "B", the following sequence should minimize the pressure increase and subsequent power transient. Place PK-444A in manual and raise the output to between 40% and 45% and then place PK-444A back in AUTO. Then promptly turn on the backup heaters.

32. When starting or stopping an RCP the effect on Pressurizer Spray flow, RCS temperature and pressure, Steam Generator parameters and RHR flow and temperature, should be evaluated and compensatory measures formulated as necessary.

33. Continued RCP operation (beyond one hour) during a Loss of Seal Injection with the No. 1 Seal leaking less than 2.5 GPM, CCW at minimum flow (35 GPM) and maximum temperature (105°F) may result in pump bearing and seal water inlet temperatures which exceed the maximum normal operating temperature (220°F). Closely monitor the pump bearing and seal water inlet temperatures of RCPs with No. 1 seal leak-off below 2.5 GPM. Expedited cooling of the RCS may prevent exceeding the maximum temperature (220°F). Secure RCP if pump bearing or seal water inlet temperature exceeds 230°F.

34. The RCP No. 1 Seal may be damaged if an RCP is operating during an LTOPs (COMS) event (Reference 2.7.6). Operations should contact the System Engineer (System 2025) prior to restarting an RCP.

5.0 STARTUP

5.1. Reactor Coolant Pump Start-up

5.1.1. Initial Conditions

1. The RCS is filled and vented per GP-001 OR initial pump start per GP-001. TR
2. Attachment 1 is complete. TR
3. Attachment 2 is complete. TR
4. # 1 Seal Leakoff Flow is in the normal operating range of Attachment 3. (Reference 2.5.1) TR
5. Reactor power is less than 25%. [R - Reference FSAR 15.4.4] TR
6. If starting RCPs for RCS fill and vent per GP-001, RCS pressure is greater than 325 psig. [R - Reference FSAR 4.4.3] TR
7. # 1 Seal ΔP is greater than 200 psid. [R - Reference FSAR 4.4.3] TR
8. Seal injection flow is 8 to 13 gpm. [R - Reference FSAR 4.4.3] TR
9. VCT temperature is between 60 and 130°F. TR
10. VCT pressure is greater than 15 psig. TR

NOTE: ERFIS GD AOP-018, Locked Rotor Monitor, may be used for the following step.

11. No RCP related annunciators are in alarm which could adversely affect RCP operation. TR

5.1.2. Procedure Steps

CAUTION

Only one RCP is to be started at any one time. If the motor is allowed to coast to a stop between starts, two successive starts are permitted. A third start may be made when the winding and the core have cooled by running for 20 minutes, or by standing idle for 45 minutes.

1. **VERIFY** the following before pump start:

   a. **IF** jogging RCPs per GP-001,
   THEN VERIFY RCS Pressure is greater than 325 psig.
   [R - Reference FSAR 4.4.3] _____

   b. **VERIFY #** 1 Seal ΔP is greater than 200 psid. _____

NOTE: VCT Outlet Temp TE-116 should be used for seal injection water temperature.

   c. **VERIFY** Seal Injection flow is between 8 and 13 gpm at a temperature between 60 and 130°F. [R - Reference FSAR 4.4.3] _____

   d. **VERIFY #** 1 Seal Leakoff is in the normal operating range of Attachment 3. _____

CAUTION

RCPs shall not be started with one or more of the RCS cold leg temperatures less than or equal to 325°F unless the secondary water temperature is less than 50°F above each of the RCS cold leg temperatures. This caution is only applicable to the first RCP to be started.

2. **START** the RCP Oil Lift Pump. _____

3. **VERIFY** the amber permissive light on the lift pump control switch is lit indicating proper lift oil pressure has been achieved. _____

4. **ALLOW** the RCP Oil Lift Pump to run for a minimum of 2 minutes before starting an RCP. _____

5.1.2 Procedure Steps (continued)

NOTE: When an RCP is started, the RCP ammeter will go off scale high, and then decrease to the normal hot or cold running amps after 15 to 25 seconds.

5. **START** the RCP. _____

6. **VERIFY** the following normal operating parameters:

• Running amps:	Hot 460 to 540 amps Cold 715 amps	_____
• RCS flow:	Greater than or equal to 98%	_____
• # 1 Seal ΔP	Greater than 200 psid.	_____
• # 1 Seal leakoff	In the normal operating range of Attachment 3.	_____
• Motor Winding temperature:	Less than 300°F	_____

NOTE: The oil lift pump should be run at least 1 minute after starting an RCP.

7. After at least 1 minute, **STOP** the RCP OIL LIFT PUMP. _____

8. **COMPLETE** Section 5.1.3. _____

5.1.3. Reactor Coolant Pump Start-up Configuration Control Closeout

COMPONENT NUMBER	COMPONENT DESCRIPTION	POSITION	CHECK	VERIFY
Control Switch	RCP Oil Lift Pump A	STOP	_____	_____
Control Switch	RCP Oil Lift Pump B	STOP	_____	_____
Control Switch	RCP Oil Lift Pump C	STOP	_____	_____

All personnel performing this Section for alignment or verification must supply their initials and name below.

Initials	Name (Print)	Initials	Name (Print)
_____	_____	_____	_____
_____	_____	_____	_____

Approved by _____ _____
Unit SCO Date

After receiving the final review signature, this OP Section becomes a QA RECORD.

6.0 NORMAL OPERATION

Parameter: Inst No. : Location :	RV Flange Leakoff Temperature TI-401 MCB	90 to 110°F
Parameter: Inst No. : Location :	RCS Wide Range Press PI-402.1 SA MCB	2220 to 2250 psig
Parameter: Inst No. : Location :	RCS Wide Range Press PI-403.1 SB MCB	2220 to 2250 psig
Parameter: Inst No. : Location :	Median Tavg TR-408 MCB	557 to 588.8°F
Parameter: Inst No. : Location :	Loop A, B, C Tavg TI-412D, 422D, 432D MCB	557 to 591.8°F
Parameter: Inst No. : Location :	Loop A, B, C T TI-412A, 422A, 432A MCB	0 to 100%
Parameter: Inst No. : Location :	Chan I, II, III Loop A Flow FI-414, 415, 416 MCB	0 to 103%
Parameter: Inst No. : Location :	Chan I, II, III Loop B Flow FI-424, 425, 426 MCB	0 to 103%
Parameter: Inst No. : Location :	Chan I, II, III Loop C Flow FI-434, 435, 436 MCB	0 to 103%
Parameter: Inst No. : Location :	RCP Amps EI-160, 161, 162 MCB	Cold: 715 amps Hot: 460 to 540 amps
Parameter: Inst No. : Location :	RCP Shaft Vibration 1 YT 419A, 429A, 439A Vib Mon Panel	Less than 15 mils
Parameter: Inst No. : Location :	RCP Frame Vibration 1 YT 419B, 429B, 439B Vib Mon Panel	Less than 3 mils (Less than 3.5 mils for RCP 1B only)
Parameter: Inst No. : Location :	RVLIS Dynamic Range 1CC 86 1CCM	110% (3 pumps running)

6.0 NORMAL OPERATION (continued)

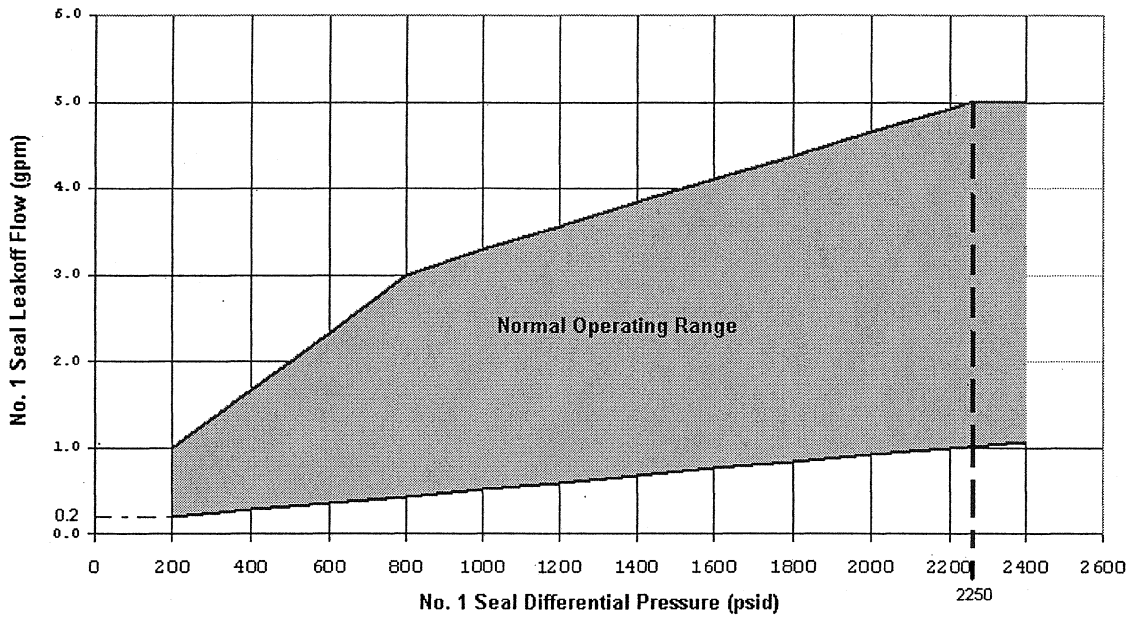
Parameter:	RCP A, B, & C Seal Leakoff HI	1 to 5 gpm
Inst No. :	FR 154A	
Location :	Recorder Panel	
Parameter:	RCP A, B, & C Seal Water Flow	8 to 13 gpm
Inst No. :	FI 130A, FI 127A, FI 124A	
Location :	MCB	
Parameter:	PRZ Press	2220 to 2250 psig
Inst No. :	PI-444, 445.1	
Location :	MCB	
Parameter:	PRZ Surge Line Temp	560 to 653°F
Inst No. :	TI-450.1	
Location :	MCB	
Parameter:	Loop 1 & 2 Spray Line Temp	525 to 560°F
Inst No. :	TI-451.1, 452.1	
Location :	MCB	
Parameter:	PRZ Liquid Temp	640 to 665°F
Inst No. :	TI-453.1	
Location :	MCB	
Parameter:	PRZ Vapor Space Temp	640 to 665°F
Inst No. :	TI-454.1	
Location :	MCB	
Parameter:	Ch I, II, & III Prz Level	25 to 51.2%
Inst No. :	LI-459A1 SA, 460SB, 461.1 SA	
Location :	MCB	
Parameter:	PRZ Pwr Relief Line Temp.	90 to 120°F
Inst No. :	TI-463	
Location :	MCB	
Parameter:	PRZ Safety Relief Line Temp.	115 to 145°F
Inst No. :	TI-465, 467, 469	
Location :	MCB	
Parameter:	PRT Level	69 to 74%
Inst No. :	LI-470.1	
Location :	MCB	
Parameter:	PRT Temp	90 to 110°F
Inst No. :	TI-471.1	
Location :	MCB	
Parameter:	PRT Press	2 to 4 psig
Inst No. :	PI-472.1	
Location :	MCB	

6.0 NORMAL OPERATION (continued)

Parameter:	RCP 1A, 1B, 1C Mtr Upper Thrust Brg Temp	120 to 170°F
Inst No. :	TRC0417A, TRC0427A, TRC04347A	
Location :	ERFIS	
Parameter:	RCP 1A, 1B, 1C Mtr Lower Thrust Brg Temp	120 to 170°F
Inst No. :	TRC0417B, TRC0427B, TRC0437B	
Location :	ERFIS	
Parameter:	RCP 1A, 1B, 1C Mtr Upper Radial Brg Temp	120 to 170°F
Inst No. :	TRC0418A, TRC0428A, TRC0438A	
Location :	ERFIS	
Parameter:	RCP 1A, 1B, 1C Mtr Lower Radial Brg Temp	120 to 170°F
Inst No. :	TRC0419, TRC0429, TRC0439	
Location :	ERFIS	
Parameter:	RCP 1A, 1B, 1C Mtr Stator Windg Temp	150 to 265°F
Inst No. :	TRC0418B, TRC0428B, TRC0438B	
Location :	ERFIS	
Parameter:	RCP 1A, 1B, 1C Radial Brg Temp	100 to 190°F
Inst No. :	TRC0131, TRC0128, TRC0125	
Location :	ERFIS	
Parameter:	RCP 1A, 1B, 1C Seal Water Inlet Temp	90 to 170°F
Inst No. :	TRC0132, TRC0129, TRC0126	
Location :	ERFIS	
Parameter:	RCP 1A, 1B, 1C Upper Bearing Oil Reservoir	-.25 to +1.25 in.
Inst No. :	LIS-417, 427, 437	
Location :	RAB Local	
Parameter:	RCP 1A, 1B, 1C Lower Bearing Oil Reservoir	-.25 to +1.25 in.
Inst No. :	LIS-419, 429, 439	
Location :	RAB Local	

Attachment 3 - # 1 Seal Performance Parameters

Sheet 1 of 1



Drawing Reference VM-MRF, Section 4 Product Update S-009, Mar 1988

Plant Startup/Shutdown	Normal Range	Minimum	Maximum	Notes
FLOW (GPM)	N/A	0.2	N/A	a, b, c, d
Δ P	N/A	200	N/A	a, b, c
Continuous Operation	**Normal Range**	**Minimum**	**Maximum**	**Notes**
FLOW (GPM)	1.0 TO 5.0	0.8	6.5	a, d, e, f
Δ P	2250	2150	2300	N/A

NOTES

a. Inform Responsible Engineer (RCP) to evaluate the operating and troubleshooting guidelines in the RCP Technical manual for leak rates outside the specified values. (Reference 2.5.1)

b. Minimum RCP startup requirements are 0.2 gpm at a ΔP of 200 psi. If 0.2 gpm at 200 psi is not met then inform Responsible Engineer (RCP) and refer to Section 8.13 for guidance.

c. For start-up at ΔPs greater than 200 psi, the minimum # 1 seal leakoff is determined from the # 1 Seal Normal Operating Range curve. For example, at a ΔP of 1000 psi the minimum seal leakrate is 0.5 gpm.

d. High flow alarm setpoint is 6.5 gpm per PCR-2249.

e. If the # 1 Seal leakoffs are outside the Normal Operating Range (1.0 to 5.0 gpm) but within the Normal Operating Limits (0.8 to 6.5 gpm) continue pump operation. Ensure that seal injection flow exceeds # 1 Seal leakoff for the affected RCP. Closely monitor pump and seal parameters and contact Responsible Engineer (RCP) for further instructions. Westinghouse may need to be consulted.

f. For # 1 Seal leakoffs outside the Normal Operating Limits (0.8 to 6.5 gpm) for Continuous Operation go to AOP-018.

g. RCP operation (beyond one hour) during a Loss of Seal Injection with the No. 1 Seal leaking less than 2.5 GPM and CCW at minimum flow (35 GPM) and maximum temperature (105°F), may result in pump bearing and seal water inlet temperatures exceeding the maximum normal operating temperature (220°F). Closely monitor the pump bearing and seal water inlet temperatures of RCPs with No. 1 seal leak-off below 2.5 GPM. Expedited cooling of the RCS may prevent exceeding the maximum temperature (220°F).

Reference

Note: This is NOT provided to candidate.

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

NOTE

- Step 1 is an immediate action.
- RCP abnormal conditions may require implementation of the SHNPP Emergency Plan. **[C.1]**

☐1. **CHECK** ANY CSIP RUNNING.

☐1. **ISOLATE** letdown by verifying the following valves SHUT:

- 1CS-7, 45 GPM Letdown Orifice A
- 1CS-8, 60 GPM Letdown Orifice B
- 1CS-9, 60 GPM Letdown Orifice C

☐2. **REFER TO** PEP-110, Emergency Classification And Protective Action Recommendations, AND **ENTER** the EAL Network at entry point X.

NOTE

Minimum allowable flow for a CSIP is 60 gpm which is provided by normal miniflow during normal operation and alternate miniflow during safety injection. Maintaining CSIP flow greater than or equal to 60 gpm also satisfies this requirement.

3. **EVALUATE** plant conditions AND **GO TO** the appropriate section:

	MALFUNCTION	SECTION	Page
☐	Loss of CCW and/or Seal Injection to RCPs	3.1	5
☐	High Reactor Coolant Pump Vibration	3.2	9
☐	Reactor Coolant Pump Seal Malfunction	3.3	12
☐	Reactor Coolant Pump Motor Trouble	3.4	21

--END OF SECTION 3.0 --

INSTRUCTIONS	RESPONSE NOT OBTAINED
3.2 High Reactor Coolant Pump Vibration	
✱☐1. **CHECK** ALL RCPs operating within the limits of Attachment 1 (Page 27). **[A.1]**	☐1. **GO TO** Step 3.
☐2. **GO TO** Step 11.	
☐3. **CHECK** Rx Power is greater than P-8 (49%).	☐3. **GO TO** Step 5.
☐4. **GO TO** Step 6.	
☐5. **CHECK** more than ONE RCP affected.	5. **PERFORM** the following: ☐ a. **STOP** the affected RCP. ☐ b. **REFER TO** Attachment 7, Operation With Two RCPs. ☐ c. **GO TO** Step 11.
☐6. **VERIFY** the Reactor is TRIPPED **AND GO TO** EOP PATH-1. (Perform Steps 7 through 10 as time permits.)	
☐7. **STOP** affected RCP(s).	
☐8. **CHECK** RCP A RUNNING.	☐8. **SHUT** 1RC-107, PRZ Spray Loop A.
☐9. **CHECK** RCP B RUNNING.	☐9. **SHUT** 1RC-103, PRZ Spray Loop B.
☐10. **EXIT** this procedure.	

Attachment 1
Sheet 1 of 2

Reactor Coolant Pump Trip Limits

NOTE

False indications such as step changes or spikes on both the upper and lower thrust bearings are signs that the instrumentation transient may not be valid.

Validation of the temperatures should be performed by observing positive indications of any of the following:

- Simultaneous temperature increases in upper and lower thrust bearing and upper guide bearing (may indicate loss of CCW cooling or oil viscosity problems common to the upper reservoir)
- Vibration levels increasing along with increasing bearing temperatures.
- High or low RCP oil level alarms along with increasing bearing temperatures.

☐**1.** ANY of the following Motor Bearing temperatures exceeding 190°F: **[A.1]**

	ERFIS Points		
	RCP A	RCP B	RCP C
Mtr Upper Thrust Brg Temp	TRC0417A	TRC0427A	TRC0437A
Mtr Lower Thrust Brg Temp	TRC0417B	TRC0427B	TRC0437B
Mtr Upper Radial Brg Temp	TRC0418A	TRC0428A	TRC0438A
Mtr Lower Radial Brg Temp	TRC0419	TRC0429	TRC0439

☐**2.** ANY of the following Pump temperatures exceeding 230°F: **[A.1]**

	ERFIS Points		
	RCP A	RCP B	RCP C
Pump Radial Brg Temp	TRC0131	TRC0128	TRC0125
Seal Water Inlet Temp	TRC0132	TRC0129	TRC0126

☐**3.** RCP Stator Winding temperature exceeding 300°F:

	ERFIS Points		
	RCP A	RCP B	RCP C
Motor Stator Windg Temp	TRC0418B	TRC0428B	TRC0438B

Attachment 1
Sheet 2 of 2

Reactor Coolant Pump Trip Limits

NOTE

ALB-5-1-2B, RCP THERM BAR HDR LOW FLOW, indicates loss of CCW to all RCP thermal barriers.

☐**4.** Loss of RCP seal injection when ANY of the following conditions exist:

- CCW flow is lost to the associated RCP Thermal Barrier HX
- RCS temperature is greater than or equal to 400°F AND CCW HX outlet temperature is greater than 105°F
- RCS temperature is less than 400°F AND CCW HX outlet temperature is greater than 125°F

☐**5.** RCP vibration in excess of the following: **[A.1]**

- 20 mils shaft
- 15 mils shaft and increasing greater than 1 mil/hr
- 5 mils frame
- For A and C RCPs ONLY: 3 mils frame and increasing greater than 0.2 mil/hr
- For B RCP ONLY: 3.5 mils frame and increasing greater than 0.2 mils/hr

☐**6.** RCP Motor current fluctuations of 40 amps peak-to-peak:

	ERFIS Points		
	RCP A	RCP B	RCP C
Motor Current	IRC0160	IRC0161	IRC0162

☐**7.** Loss of CCW to an RCP or RCP Motor when:

- An RCP has operated for 10 minutes without CCW flow to either motor oil cooler **[A.2]**
- Isolation of CCW to an RCP is necessary to stop excessive CCW System leakage

-- END OF ATTACHMENT 1 --

Facility: Shearon Harris | Task No.: 301135H601

Task Title: Reset SI Locally | JPM No.: 2009A NRC JPM i

K/A Reference: 006 A4.08 4.2 / 4.3

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: X Actual Performance: _____

Classroom _____ Simulator _____ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: The plant was operating at 100 percent power when an inadvertent SI occurred.
The crew is responding to the SI signal and has met SI termination criteria per PATH-1. The RO attempted to reset the SI signal but only the 'A' Train of SI reset.

Initiating Cue: The SCO has directed you to locally reset Safeguards Train 'B' at SSPS per Attachment 12 of PATH-1 Guide

Task Standard: The 'B' Train of SI is reset locally at SSPS per PATH-1 Attachment 12 directions.

Required Materials: None

General References: PATH-1 Attachment 12, Rev. 23

Time Critical Task: No

Validation Time: 8 minutes (not including time for logging out key)

SIMULATOR SETUP

- N/A In-Plant JPM

Examiners Note: Key #40 (CH 751) is required to open the SSPS cabinets.

Prior to exam administration, the key will be checked out by someone from the Exam Development team and given to the NRC Lead Examiner. The key will be checked back in at the end of the day by the person that originally checked the key out.

Details of how to obtain a key will be left to the Examiner. One method to obtain a key and return it after use is listed below:

- Obtain Safety Key Locker key from the SCO's desk
- Identify which key is required based on the list in key locker area
- Unlock the Safety Key Locker door and obtain proper key (in this case key CH 751 – NOTE: there are more than one CH 751 keys, key #40 is one of them) then re-lock the key locker door
- Sign key out
- Return the Safety Key Locker key to the SCO's desk

- At conclusion of task the key to the Safety Key Locker should again be obtained from the SCO's desk
- Unlock the Safety Key Locker and return key (CH 751) to its Safety Key Locker location and re-lock the locker door
- The key should be signed back in
- The Safety Key Locker SCO key should be returned to the desk

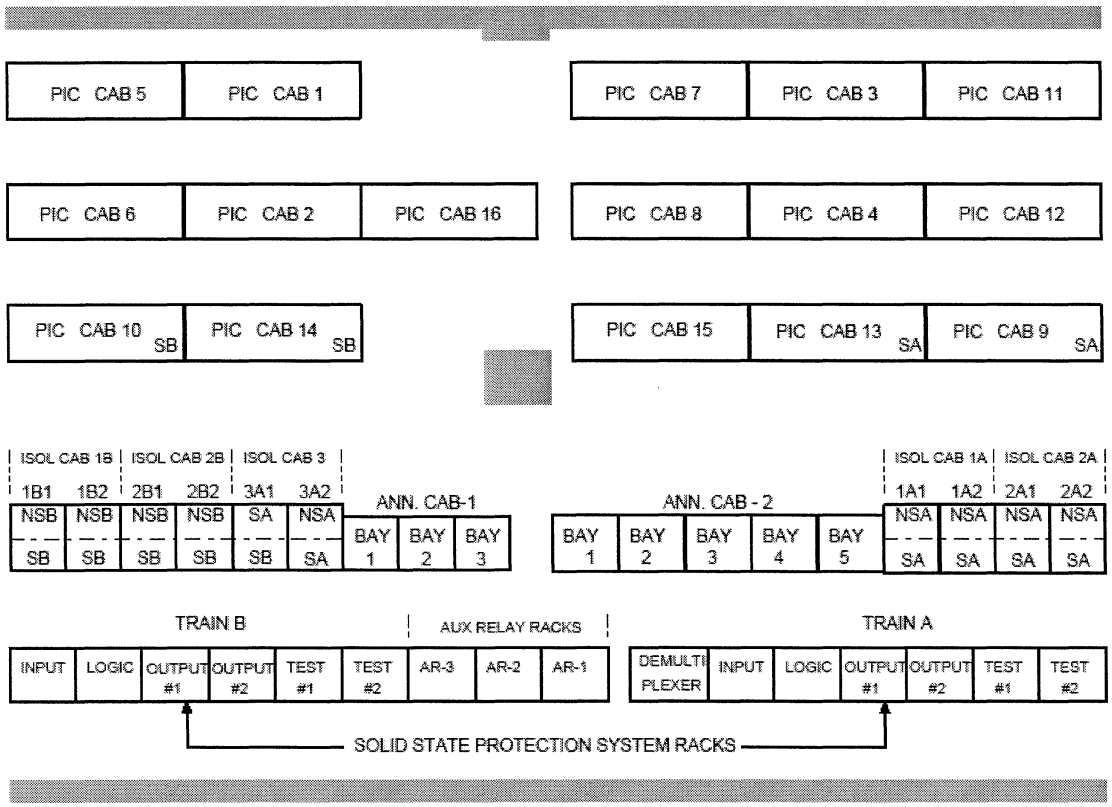
By getting a key ahead of time and just asking the candidates how to obtain a key will alleviate the need to check out and check in the key each time the JPM is administered to the candidates for this JPM. This will reduce the overall time required to perform this JPM.

Evaluator Cue:	**Provide the candidate a copy of PATH-1 Attachment 12.** **Note: The candidate will need to check out key (CH 751) to open the SSPS cabinet.** Allow the candidate to either start to obtain a cabinet door key OR go to the cabinets then realize the need for a key when the cabinets are attempted to be opened. When the need for a key is determined ask the candidate how to obtain the proper key and note the response. (See details on previous page for obtaining a cabinet door key). Then provide the candidate with the cabinet key.

Performance Step: 1 Obtain key to open SSPS cabinet (this may not happen until the candidate gets to the cabinet and determines a key is required)

Standard: Discuss how to obtain key – see previous page write up. Obtains key from SCO's desk to unlock Safety Key locker and checks out key #40 (CH 751). Proceeds to Protection System Train B Logic Cabinet and opens the cabinet door.

Comment:



Display PIC ROOM LAYOUT1.PDI, 2/19/2009 09:47

START TIME: _____

Evaluator Note:	**Start time should begin when candidate has opened the SSPS cabinet and is ready to place the Train in Test.**

NOTE Prior to Step 1

Performance Step: 2 Reviews note

Standard: Reads and initials NOTE: Steps 1, 2 AND 3 reset output signals from "A" Train SSPS. Step 4, 5 AND 6 reset output signals from "B" Train SSPS.
IF SI will NOT reset due to failure of the associated reactor trip breaker to OPEN, THEN attempts to manually or locally OPEN the breaker should be completed before performing this attachment.

Identifies that steps 4-6 will be performed and steps 1-3 do not apply.

Comment:

Step 4

✓ **Performance Step: 3**

At Protection System Train B, Logic Cabinet, Place The Following Breakers In OFF:

- Tripped O.V.P Breaker 48V (top power supply)
- Tripped O.V.P Breaker 48V (bottom power supply)

Standard:

Unlocks door and opens Protection System Train B, Logic Cabinet, locates switch and places Tripped O.V.P Breaker 48V (top power supply) breaker to down (OFF) position

Locates switch and places Tripped O.V.P Breaker 48V (bottom power supply) breaker to down (OFF) position

Evaluator:	**CUE: Tripped O.V.P. Breaker 48V (top power supply) switch is in the down (OFF) position** **Tripped O.V.P. Breaker 48V (bottom power supply) switch is in the down (OFF) position**

Comment:

Evaluator Note:	**If the candidate states that the cabinet door 48 volt power supply green lights de-energize and the red General Warning light has energized (when the first power supply breaker is turned OFF) then:** **CUE: The green light 48 Volt power supply light is off and the red General Warning light is lit.**

Step 5

✓ **Performance Step: 4**

At Protection System Safeguards Test Train B, Cabinet No. 1, Momentarily Position Switch S821 To RESET.

Standard:

Unlocks door with key and locates switch S821 and momentarily positions the switch to the RESET position (to the right)

Evaluator:	**CUE: Switch S821 has been taken to RESET**

Comment:

Step 6

✓ **Performance Step: 5** At the Protection System Train B, Output Cabinet No. 1, Place the Mode Selector Switch To TEST.

Standard: Unlocks door with key and locates Protection System Train B, Output Cabinet No. 1, and places the Mode Selector Switch To TEST (to counter clockwise direction)

Evaluator:	**CUE: Mode selector switch has been taken to TEST**

Comment:

Performance Step: Contact MCR

Standard: Contact MCR and informs SCO that Train 'B' Safeguards has been reset at SSPS

Evaluator:	**CUE: SCO acknowledges that Train 'B' Safeguards has been reset at SSPS** **END OF JPM**

Comment:

Terminating Cue: **Train 'B' of Safeguards has been reset locally at SSPS and SCO has been informed**

Evaluator Note:	**PRIOR to leaving the area, ensure that the candidate relocks all 3 cabinet doors AND then returns the key back to the Examiner.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM i
Reset SI Locally

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS: The plant was operating at 100 percent power when an inadvertent SI occurred.

The crew is responding to the SI signal and has met SI termination criteria per PATH-1. The RO attempted to reset the SI signal but only the 'A' Train of SI reset.

INITIATING CUE: The SCO has directed you to locally reset Safeguards Train 'B' at SSPS per Attachment 12 of PATH-1 Guide

REFERENCE

Attachment 12
Sheet 1 of 1
Resetting Safeguards Signals At SSPS

NOTE:
- Steps 1, 2 AND 3 reset output signals from "A" Train SSPS. Step 4, 5 AND 6 reset output signals from "B" Train SSPS.
- IF SI will NOT reset due to failure of the associated reactor trip breaker to OPEN, THEN attempts to manually or locally OPEN the breaker should be completed before performing this attachment.

---

1. At Protection System Train A, Logic Cabinet, Place The Following Breakers In OFF:
   - Tripped O.V.P Breaker 48V (top power supply)
   - Tripped O.V.P Breaker 48V (bottom power supply)

2. At Protection System Safeguards Test Train A, Cabinet No. 1, Momentarily Position Switch S821 To RESET.

3. At the Protection System Train A, Output Cabinet No. 1, Place the Mode Selector Switch To TEST.

4. At Protection System Train B, Logic Cabinet, Place The Following Breakers In OFF:
   - Tripped O.V.P Breaker 48V (top power supply)
   - Tripped O.V.P Breaker 48V (bottom power supply)

5. At Protection System Safeguards Test Train B, Cabinet No. 1, Momentarily Position Switch S821 To RESET.

6. At the Protection System Train B, Output Cabinet No. 1, Place the Mode Selector Switch To TEST.

- END -

PERFORMANCE INFORMATION

Facility: Shearon Harris Task No.: 301117H401

Task Title: Local Inspection of Annunciator Cabinets JPM No.: 2009A NRC JPM J

K/A Reference: 016 A2.02 2.9 / 3.2

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: X Actual Performance: _____

Classroom _____ Simulator _____ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: ANNUNCIATOR SYSTEM 1 POWER SUPPLY FAILURE alarm, ALB 26-1-4 has alarmed in the main control room. The crew has entered AOP-037, "Loss of Main Control Room Annunciators."

Initiating Cue: You have been directed by the USCO to check the status of System 1 annunciator power supplies per Attachment 1 of AOP-037 and provide the status of your findings.

Task Standard: Status reported to Control Room correctly.

Required Materials: Annunciator cabinet key #48

General References: AOP-037, Rev 12 Attachment 1

Time Critical Task: No

Validation Time: 10 Minutes

✓ - Denotes Critical Steps

SIMULATOR SETUP

- N/A In-Plant JPM

Examiners Note: Key #48 is required to open the Annunciator power supply cabinets.

Prior to exam administration, the key will be checked out by someone from the Exam Development team and given to the NRC Lead Examiner. The key will be checked back in at the end of the day by the person that originally checked the key out.

Details of how to obtain a key will be left to the Examiner. One method to obtain a key and return it after use is listed below:

- Obtain Safety Key Locker key from the SCO's desk
- Identify which key is required based on the list in key locker area
- Unlock the Safety Key Locker door and obtain proper key
- Sign key out
- Return the Safety Key Locker key to the SCO's desk

- At conclusion of task the key to the Safety Key Locker should again be obtained from the SCO's desk
- Unlock the Safety Key Locker and return key to its Safety Key Locker location and re-lock the locker door
- The key should be signed back in
- The Safety Key Locker SCO key should be returned to the desk

By getting a key ahead of time and just asking the candidates how to obtain a key will alleviate the need to check out and check in the key each time the JPM is administered to the candidates for this JPM. This will reduce the overall time required to perform this JPM

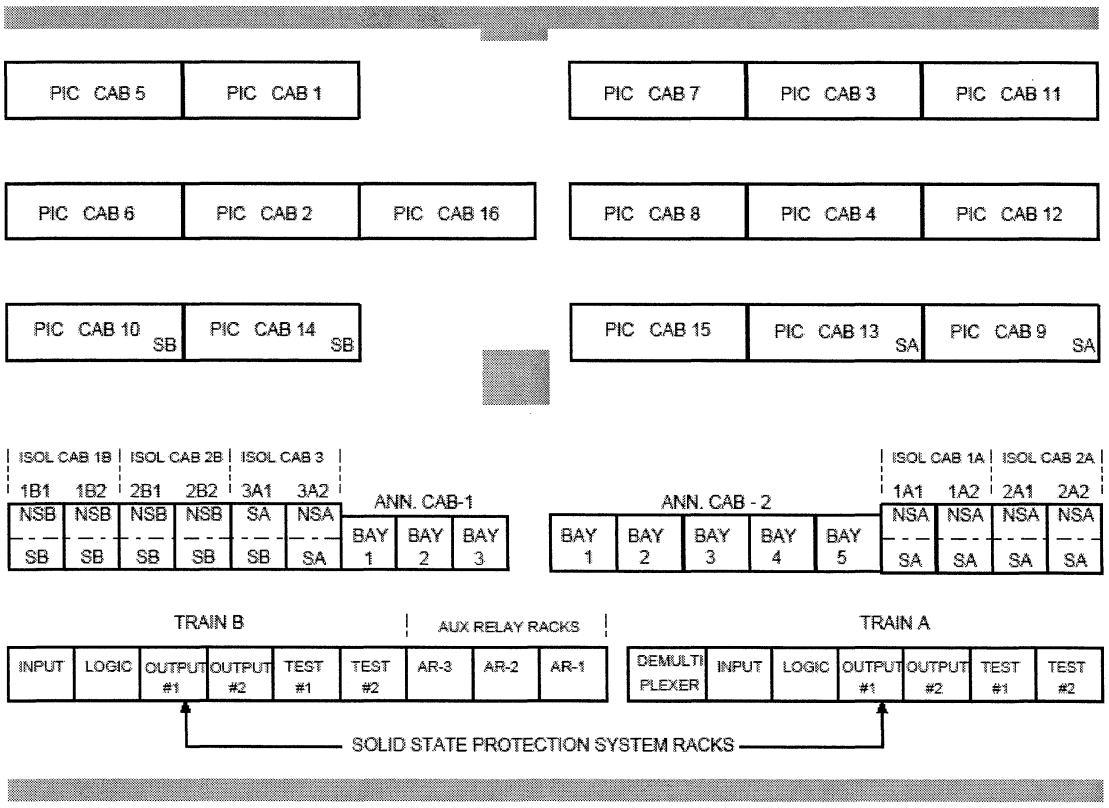
Evaluator Cue:	**Provide the candidate a copy of AOP-037, Attachment 1.** **Note: The candidate will need to check out key #48 to open the Annunciator power supply cabinets.** Allow the candidate to either start to obtain a cabinet door key OR go to the cabinets then realize the need for a key when the cabinets are attempted to be opened. When the need for a key is determined ask the candidate how to obtain the proper key and note the response. (See details on previous page for obtaining a cabinet door key). Then provide the candidate with the correct cabinet key.

Step 1

Performance Step: 1 OBTAIN Annunciator Cabinet key (this may not happen until the candidate gets to the cabinet and determines a key is required)

Standard: Discuss how to obtain key – see previous page write up. Obtains key from SCO's desk to unlock Safety Key locker and checks out key #48. Proceeds to Annunciator Power Supply Cabinet door area.

Comment:



Display PIC ROOM LAYOUT1.PDI, 2/19/2009 09:47

START TIME: _____

Evaluator Note:	**Start time should begin when candidate has opened the Annunciator power supply cabinet to begin the first check.**

NOTE prior to Step 2

Performance Step: 2 Review note

Standard: Reads and initials note:

- All power supplies are located in the east side of the cabinets. Indicating lights for the 24 VDC and 12 VDC are on the top side of the power supply.
- Equipment designators used below in brackets [ ] are those listed in the MCB Annunciator Reference Guide. The equipment is not labeled in the field.

Locates annunciator cabinet, System 1, Bay 1 unlocks and opens door.

Comment:

Step 2

Performance Step: 3 **CHECK** the indicated lights for each of the following Annunciator Cabinets (drawing page 2 of attachment) **AND INITIAL** if **LIT**.

Standard: Reviews table (may check operator aid posted inside cabinet door which is the same drawing as sheet 2 in procedure)

Comment:

Evaluator Cue:	**I will provide you the light indication for each light that you are inspecting after you identify to me where the light location is and tell me what indication you are looking for. (LIT OR NOT LIT)**

Step 2 continued

✓ **Performance Step: 4** SYSTEM 1, BAY 1

INV (TOP ROW LEFT)

LIGHT-LIT

Standard: Checks INV light LIT, INITIALS Attachment

Evaluator Cue:	**INV light is LIT.**

Comment:

Step 2 continued

✓ **Performance Step: 5**

SYSTEM 1, BAY 1

AC (TOP ROW LEFT)

LIGHT-LIT

Standard: Checks AC light LIT, does NOT initial sheet

Evaluator Cue:	**AC light is OUT.**

Comment:

Step 2 continued

✓ **Performance Step: 6**

SYSTEM 1, BAY 1

125 VDC PWR ON (TOP ROW)

LIGHT (RIGHT) - LIT

Standard: Checks 125 VDC light LIT. INITIALS Attachment

Evaluator Cue:	**125 VDC PWR ON light is LIT.**

Comment:

Step 2 continued

✓ **Performance Step: 7**

SYSTEM 1, BAY 1

12 VDC PWR ON (SECOND ROW, OUTSIDE (SMALLER))

LIGHT (LEFT) – LIT

LIGHT (RIGHT) - LIT

Standard: Checks both 12 VDC power supply indicating lights lit. INITIALS Attachment

Evaluator Cue:	**Both 12 VDC PWR ON lights are LIT.**

Comment:

Step 2 continued

✓ **Performance Step: 8**

SYSTEM 1, BAY 1

24 VDC PWR ON (SECOND ROW, INNER (LARGER))

LIGHT (LEFT) – LIT

LIGHT (RIGHT) - LIT

Standard: Checks both 24 VDC power supply indicating lights lit. INITIALS Attachment

Evaluator Cue:	**Both 24 VDC PWR ON lights are LIT.**

Comment:

Evaluator NOTE	**The actual power supply light is hard to see that it really is LIT. To the candidate it may appear to be off and they may want to report this to the MCR. Allow them to AFTER the JPM is completed if they desire to. The light is LIT and can be verified by obtaining a small step ladder or stool and looking down at the top of the light. This information can be found in the Operator OE data base for AOP-037.**

Step 2 continued

✓ **Performance Step: 9**

SYSTEM 1, BAY 3

INV (TOP ROW LEFT)

LIGHT-LIT

Standard:

Locates annunciator cabinet, System 1 Bay 3

Checks INV light LIT, INITIALS Attachment

Evaluator Cue:	**INV light is LIT.**

Comment:

Step 2 continued

✓ **Performance Step: 10**

SYSTEM 1, BAY 3

AC (TOP ROW LEFT)

LIGHT-LIT

Standard:

Checks AC light LIT, INITIALS Attachment

Evaluator Cue:	**AC light is LIT.**

Comment:

Step 2 continued

✓ **Performance Step: 11**

SYSTEM 1, BAY 3

125 VDC PWR ON (TOP ROW)

LIGHT (RIGHT) - LIT.

Standard: Checks 125 VDC light LIT, INITIALS Attachment.

Evaluator Cue:	**125 VDC PWR ON light is LIT.**

Comment:

Step 2 continued

✓ **Performance Step: 12**

SYSTEM 1, BAY 3

12 VDC PWR ON (SECOND ROW, OUTSIDE (SMALLER))

LIGHT (LEFT) – LIT

Standard: Checks 12 VDC power supply indicating light lit., INITIALS Attachment

Evaluator Cue:	**12 VDC PWR ON light is LIT.**

Comment:

Step 2 continued

✓ **Performance Step: 13** SYSTEM 1, BAY 3

24 VDC PWR ON (SECOND ROW, INNER (LARGER))

LIGHT (LEFT) – LIT

Standard: Checks 24 VDC power supply indicating light lit, INITIALS Attachment.

Evaluator Cue:	**24 VDC PWR ON light is LIT.**

Comment:

Performance Step:14 NOTIFY CONTROL ROOM OF SYSTEM 1, BAY 1 AND BAY 3 CHECKS.

Standard: Notifies control room that, for Bay 1 of System 1, the AC power available light is out; all other lights are lit.

Evaluator Cue:	**Control room acknowledges report.** **END OF JPM**

Comment:

Terminating Cue: Control Room notified of results of System 1 checks.

STOP TIME: _____

KEY

LOSS OF MAIN CONTROL ROOM ANNUNCIATORS

Attachment 1
Sheet 1 of 2
System 1 Annunciator Power Supply Status Determination

☐1. **OBTAIN** Annunciator Cabinet key.

NOTE

- All power supplies are located in the east side of the cabinets. Indicating lights for the 24 VDC and 12 VDC are on the top side of the power supply.
- Equipment designators used below in brackets [ ] are those listed in the MCB Annunciator Reference Guide. The equipment is not labeled in the field.

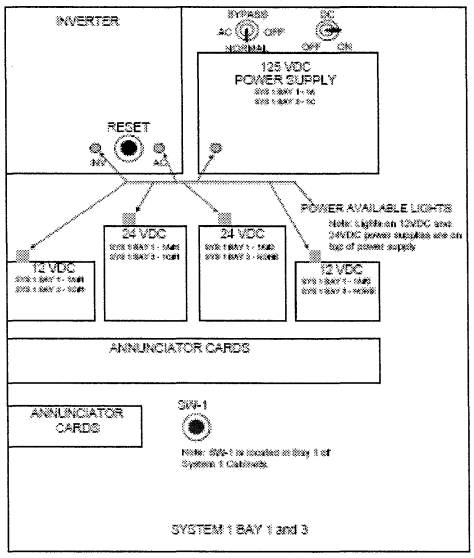
☐2. **CHECK** the indicated lights for each of the following Annunciator Cabinets (drawing page 2 of attachment) AND INITIAL if LIT.

CABINET	INV (Top Row Left)		AC (Top Row Left)		125 VDC PWR ON (Top Row)		12 VDC PWR ON (Second Row, Outside [Smaller])				24 VDC PWR ON (Second Row, Inner [Larger])			
	Light	Initial	Light	Initial	Light (Loc)	Initial	Light (Loc)	Initial	Light (Loc)	Initial	Light (Loc)	Initial	Light (Loc)	Initial
System 1 Bay 1	LIT	ON	LIT	OFF	LIT ([1A] right)	ON	LIT ([1A#1] left)	ON	LIT ([1A#2] right)	ON	LIT ([1A#1] left)	ON	LIT ([1A#2] right)	ON
System 1 Bay 3	LIT	ON	LIT	ON	LIT ([1C] right)	ON	LIT ([1C#1] left)	ON	N/A	N/A	LIT ([1C#1] left)	ON	N/A	N/A

AOP-037 Rev. 12 Page 10 of 52

LOSS OF MAIN CONTROL ROOM ANNUNCIATORS

Attachment 1
Sheet 2 of 2
System 1 Annunciator Power Supply Status Determination



AOP-037 Rev. 12 Page 11 of 52

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM J

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

Initial Conditions: ANNUNCIATOR SYSTEM 1 POWER SUPPLY FAILURE alarm, ALB 26-1-4 has alarmed in the main control room. The crew has entered AOP-037, "Loss of Main Control Room Annunciators."

Initiating Cue: You have been directed by the USCO to check the status of System 1 annunciator power supplies per Attachment 1 of AOP-037 and provide the status of your findings.

REFERENCE

Attachment 1
Sheet 1 of 2

System 1 Annunciator Power Supply Status Determination

☐1. **OBTAIN** Annunciator Cabinet key.

NOTE

- All power supplies are located in the east side of the cabinets. Indicating lights for the 24 VDC and 12 VDC are on the top side of the power supply.
- Equipment designators used below in brackets [ ] are those listed in the MCB Annunciator Reference Guide. The equipment is not labeled in the field.

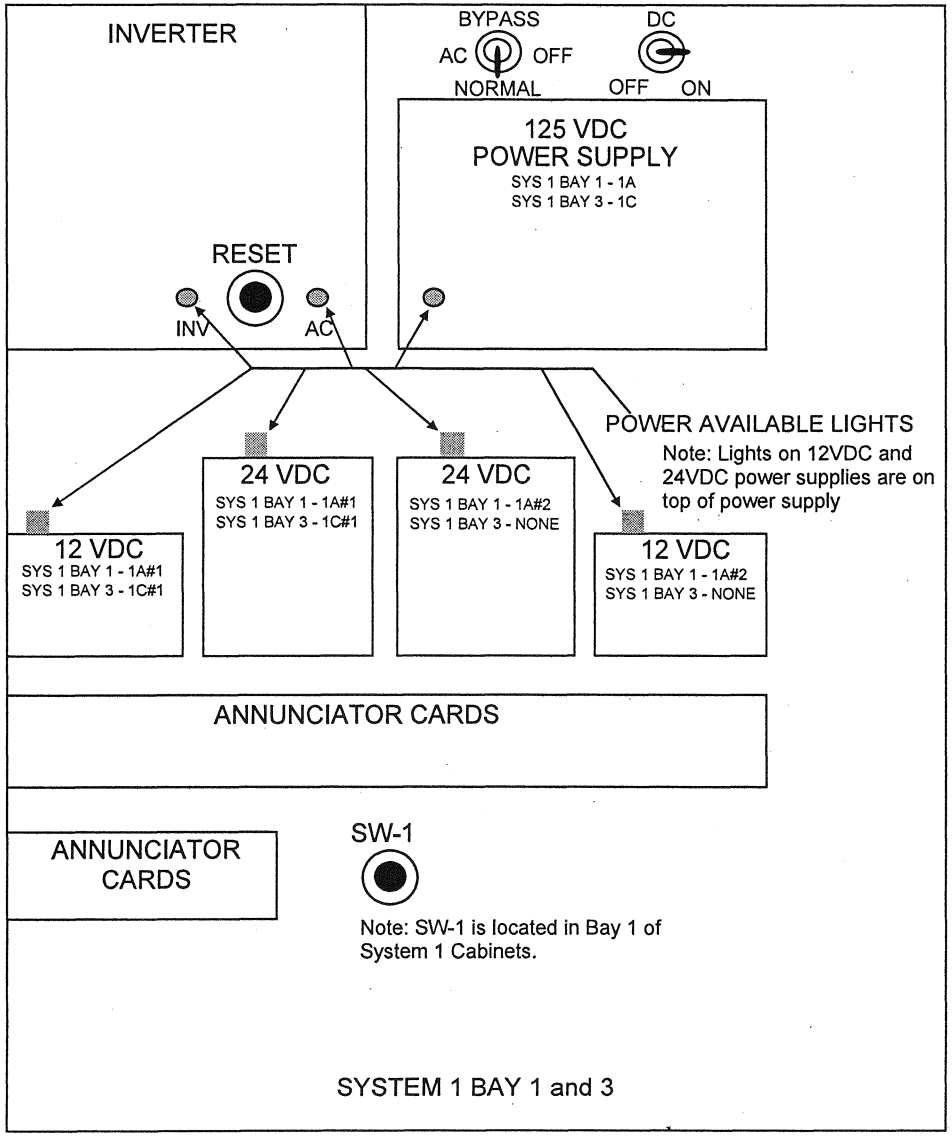
☐2. **CHECK** the indicated lights for each of the following Annunciator Cabinets (drawing page 2 of attachment) AND INITIAL if LIT.

CABINET	INV (Top Row Left)		AC (Top Row Left)		125 VDC PWR ON (Top Row)		12 VDC PWR ON (Second Row, Outside [Smaller])				24 VDC PWR ON (Second Row, Inner [Larger])			
	Light	Initial	Light	Initial	Light (Loc)	Initial	Light (Loc)	Initial	Light (Loc)	Initial	Light (Loc)	Initial	Light (Loc)	Initial
System 1 Bay 1	LIT		LIT		LIT ([1A] right)		LIT ([1A#1] left)		LIT ([1A#2] right)		LIT ([1A#1] left)		LIT ([1A#2] right)	
System 1 Bay 3	LIT		LIT		LIT ([1C] right)		LIT ([1C#1] left)		N/A	N/A	LIT ([1C#1] left)		N/A	N/A

Attachment 1

Sheet 2 of 2

System 1 Annunciator Power Supply Status Determination



Facility: Shearon Harris | Task No.: 301011H401

Task Title: Local Makeup to the VCT using the Manual Emergency Boration Valve | JPM No.: 2009A NRC JPM k

K/A Reference: 004 A2.14 3.8 / 3.9

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: X Actual Performance: _____

Classroom _____ Simulator _____ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: The plant is operating at 100 percent power. The Reactor Makeup Control System is inoperable; FCV-113B and FCV-114A will not open. A boric acid pump and a Reactor Makeup Water pump are running but VCT level is slowly decreasing since makeup cannot be established.

Initiating Cue: You are the RAB NLO. The SCO has informed you that AOP-003, Attachment 2 is being performed in the MCR. You are to establish makeup flow to the VCT. Go to the 236' RAB Emergency Boration Valve Gallery and contact the control room when you are there. The MCR will provide you with directions

Task Standard: 1CS-274 and 1CS-287 have been located and opening of these valves has been simulated.

Required Materials: None

General References: AOP-003 Rev. 26, Attachment 2

Time Critical Task: No

Validation Time: 9 Minutes

SIMULATOR SETUP

- N/A Evaluation will be performed by Simulating in plant activities.

- Cues will be provided to the candidate by the examiner.

Standard: The RAB NLO would have the locked valve key and radio. The candidate should go to the 236' RAB Emergency Boration Valve Gallery and simulate contacting the MCR by radio (not in an area that is radio restricted) or by telephone. There is a connection for headset communication in the area. The candidate may suggest that communications would be performed by headset.

Evaluator NOTE:	**The Control Room will direct the local operator from AOP-003 Attachment 2 starting at step 10-16 (attached).** **The directions that would be communicated from the MCR to the local operator are written into this JPM.**

Evaluator Cue:	**(Inform the candidate by whatever means the candidate determined suitable for communication. There is no standard communication for this task. It could be a radio, headset or telephone.)** **NOTE: Some communication methods may require using a second operator to perform.** **CUE: I will "simulate" all Control Room communications and provide you with verbal directions required to accomplish AOP-003 Attachment 2.**

START TIME: _____

(Start time is when operator is in the VCT valve gallery area and ready to communicate with the MCR).

Performance Step: 1 When at the required location report to the MCR

Standard: Contacts the MCR and informs them they are ready to receive directions

Evaluator Cue:	**The Control Room directs you to UNLOCK 1CS-274, RMUW Manual Blend from RMWST and then UNLOCK 1CS-287, Manual Alternate Emergency Boration.**

Standard: Acknowledges MCR directions with 3 way communications

Comment:

✓ **Performance Step: 2** Unlocks the following

- 1CS-274, RMUW Manual Blend From RMWST
- 1CS-287, Manual Alternate Emergency Boration

Standard: Locates and unlocks 1CS-274 and 1CS-287 and reports completion to the MCR

Evaluator Cue:	**1. The locks have been removed from 1CS-274 and 1CS-287** **2. The MCR acknowledges that the locks have been removed.**

Evaluator Cue:	**The Control Room directs you to perform the following as close together as possible to achieve an even makeup.** **First throttle OPEN 1CS-287 until directed to STOP** **Then throttle OPEN 1CS-274 until directed to STOP** **(Candidate should simulate opening the valves until you tell them to stop.)**

Standard: Acknowledges MCR directions with 3 way communications

Comment:

✓ **Performance Step: 3** Locally perform the following:

Throttle open 1CS-287, Manual Alternate Emergency Boration, to obtain the required boric acid flow rate.

Standard: Informs the Control Room that he/she is throttling opening 1CS-287 and opens the valve until the Control Room directs him to stop.

Evaluator Cue:	**The MCR acknowledges that 1CS-287 is being throttled open.** **(Pause) The Control Room directions are to for you to STOP opening 1CS-287. The required flow has been established.** **(Once the candidate reports that they have stopped provide the next direction)** **Now throttle open 1CS-274 until you are directed to stop by the control room's mark.**

Standard: Acknowledges MCR directions with 3 way communications

Comment:

	Step
✓ **Performance Step: 4**	Throttle OPEN 1CS-274, RMUW Manual Blend from RMWST, to obtain the required dilution water flow rate.
Standard:	Informs the Control Room that he/she is throttling opening 1CS-274 and opens the valve until the Control Room directs him/her to stop.

Evaluator Cue:	**The Control Room directions are to STOP opening 1CS-274. The required flow has been established. The VCT is now filling.** **(A few moments later inform the candidate that time compression is being used)** **The VCT is now at the required level.** **The MCR is directing you to SHUT and then lock both 1CS-274 and 1CS-287 and report when complete.**

Standard:	Simulates shutting and then locking both 1CS-274 and 1CS-287. Informs the Control Room that both valves are shut and locked using 3 way communications.

Evaluator Cue:	**1CS-274 is SHUT and locked** **1CS-287 is SHUT and locked** **The MCR acknowledges that both 1CS-274 and 1CS-287 are SHUT and LOCKED.** **END OF JPM**

Comment:

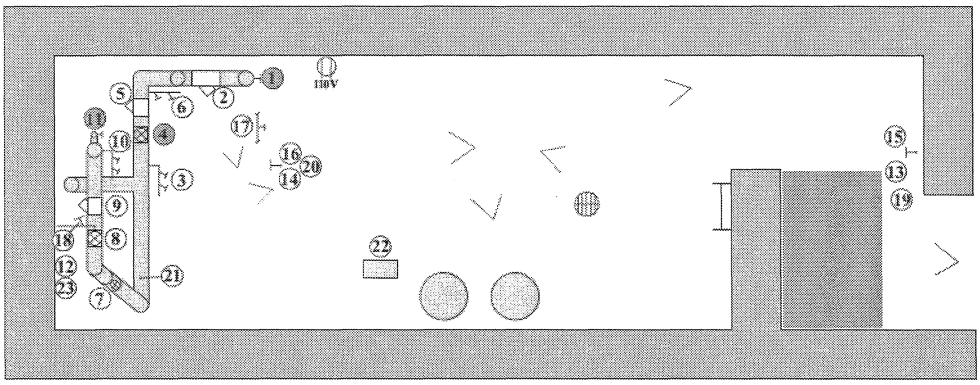
Terminating Cue: The control room is informed that the lineup is secured.

STOP TIME: _____

KEY

MAP 15

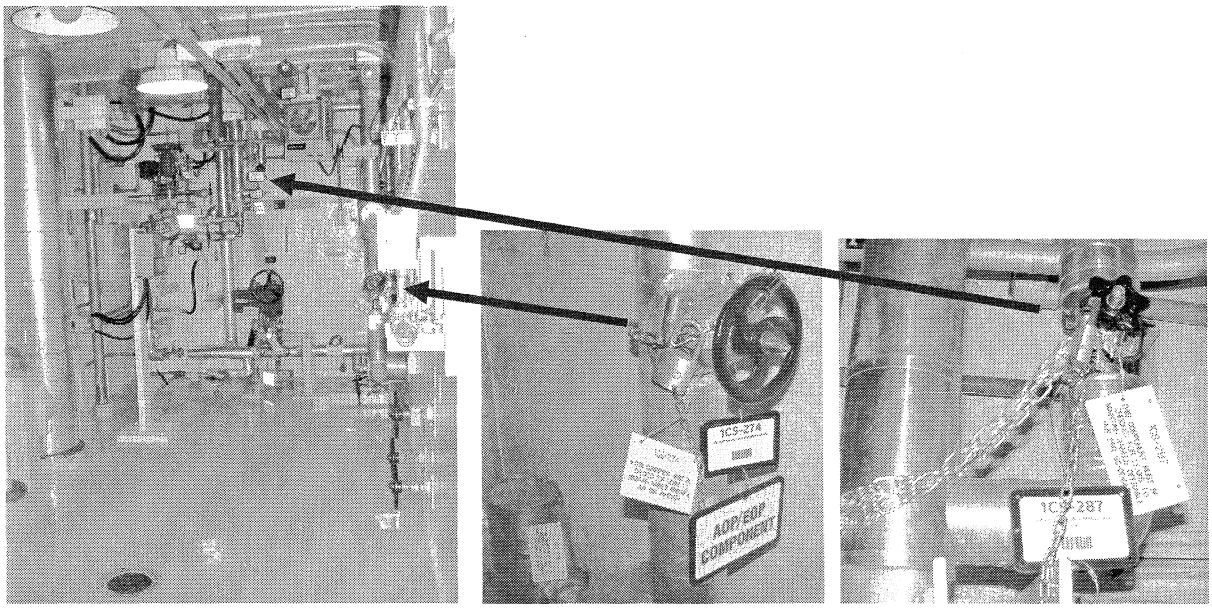
RAB 236' EMERGENCY BORATION VALVE GALLERY



< MOVIES
< PHOTOGRAPHS
AOP/EOP COMPONENT
ELEVATED DOSE AREA
LOW DOSE AREA

ITEM	DESCRIPTION	ELEV
1	1CS-274	3'
2	1CS-275	1'
3	1CS-276/277	1'
4	1CS-278	1'
5	1CS-279	1'
6	1CS-280/281	1'
7	1CS-282	4'
8	1CS-283	5'
9	1CS-284	5'
10	1CS-285/286	5'
11	1CS-287	7'
12	1IA-1123-I13	8'

ITEM	DESCRIPTION	ELEV
13	1IA-1123-I14/I15	9'
14	1IA-1123-I16/I17	9'
15	1IA-1141	4'
16	1IA-1142	7'
17	1IA-1533	9'
18	1VL-8	6'
19	AW-D28SB-1	9'
20	AW-D75SB-1	9'
21	FT-01CS-0113SW	1'
22	FY-01CS-0113AW	5'
23	I/P-*1CS-0113AW	4'



VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009A NRC JPM k

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS: The plant is at 100 percent power. The Reactor Makeup Control System is inoperable; FCV-113B and FCV-114A will not open. A boric acid pump and an RMW pump are running but VCT level is slowly decreasing since makeup cannot be established.

INITIATING CUE: You are the RAB NLO. The SCO has informed you that AOP-003, Attachment 2 is being performed in the MCR. You are to establish makeup flow to the VCT. Go to the 236' RAB Emergency Boration Valve Gallery and contact the control room when you are there. The MCR will provide you with directions

Reference

Note: This is NOT provided to candidate.

Attachment 2
Sheet 1 of 8

Manual Makeup in Modes 1 through 4

INSTRUCTIONS	RESPONSE NOT OBTAINED

CAUTION

Due to accident analysis, this attachment can only be used in Modes 1 through 4.

☐ **1.** **RECORD** desired boron concentration of the makeup solution:

C_{BLEND} = _____ ppm

NOTE

If RCS boron concentration is above 1750 ppm, blended makeup at 120 gpm may not be possible, due to the inability of the system to reliably deliver more than 30 gpm boric acid flow. In those cases, either select a conservatively low total makeup flow, or consult Attachment 7 of OP-107.01 to determine the maximum possible makeup flow.

☐ **2.** **RECORD** desired total makeup flow rate:

$\dot{M}_{BLEND}$ = _____ gpm

☐ **3.** **RECORD** most recent Boric Acid Tank boron concentration from Unit Status Board:

C_{BAT} = _____ ppm

4. **CHECK** BOTH of the following:

☐ • FT-113, Boric Acid to Blender Flow, is known to be operative

☐ • 1CS-283 (FCV-113A), Boric Acid Filter to Boric Acid Blender Flow Control Valve, can be opened **OR** is failed open

☐ **4.** **GO TO** Step 17.

Attachment 2
Sheet 2 of 8
Manual Makeup in Modes 1 through 4

INSTRUCTIONS	RESPONSE NOT OBTAINED

☐ **5. DETERMINE** required boric acid flow rate:

$\dot{M}_{BA} = [(C_{BLEND}) \times (\dot{M}_{BLEND})] / (C_{BAT})$

$= [\underset{\text{Step 1}}{_____} \times \underset{\text{Step 2}}{_____}] / \underset{\text{Step 3}}{_____}$

= _____ gpm

☐ **6. RECORD** in Step 13a the result from the previous step.

☐ **7. DETERMINE** required dilution flow rate:

$\dot{M}_{DIL} = (\dot{M}_{BLEND}) - (\dot{M}_{BA})$

$= \underset{\text{Step 2}}{_____} - \underset{\text{Step 5}}{_____}$

= _____ gpm

☐ **8. RECORD** in Step 13b the result from the previous calculation.

☐ **9. Independently VERIFY** boric acid flow rate and dilution flow rate calculations made in Steps 5 and 7.

10. DIRECT an operator to perform the following:

☐ **a. OBTAIN** a radio and a locked valve key.

☐ **b. ESTABLISH** communication between 236' RAB Emergency Boration Valve Gallery and the Control Room.

(Continued on Next Page)

Attachment 2
Sheet 3 of 8
Manual Makeup in Modes 1 through 4

INSTRUCTIONS	RESPONSE NOT OBTAINED
10. (continued)	
c. **UNLOCK** the following:	
☐ • 1CS-274, RMUW Manual Blend from RMWST	
☐ • 1CS-287, Manual Alternate Emergency Boration	
11. VERIFY the following:	
☐ • One Boric Acid Transfer Pump—RUNNING	
☐ • One Reactor Makeup Water Pump—RUNNING	
☐ • 1CS-283 (FCV-113A), Boric Acid Filter to Boric Acid Blender Flow Control Valve—OPEN	
☐ **12.** Prior to continuing, **CHECK** that all previous steps are complete.	

Attachment 2
Sheet 4 of 8
Manual Makeup in Modes 1 through 4

INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

- Boric acid flow can be monitored on ERFIS point FCS0113A, or locally in 236' RAB Emergency Boration Valve Gallery.
- Dilution water flow can be monitored on ERFIS point FCS0110, or on FI-110 on the MCB.
- Actions in the next step should be performed as closely together as possible to achieve an even makeup.

13. As closely together as possible, **Locally PERFORM** the following:

☐ a. **THROTTLE OPEN** 1CS-287, Manual Alternate Emergency Boration, to obtain _____ gpm boric acid flow rate (from Step 5).

☐ b. **THROTTLE OPEN** 1CS-274, RMUW Manual Blend from RMWST, to obtain _____ gpm dilution water flow rate (from Step 7).

✱☐ **14. MONITOR** the following for expected response:

- Tavg
- Reactor power
- Control rod motion
- VCT level

Attachment 2
Sheet 5 of 8
Manual Makeup in Modes 1 through 4

INSTRUCTIONS	RESPONSE NOT OBTAINED
15. WHEN desired VCT level has been reached, **THEN:**	
a. **Locally SHUT AND LOCK** the following:	
☐ • 1CS-274, RMUW Manual Blend from RMWST	
☐ • 1CS-287, Manual Alternate Emergency Boration	
☐ b. **CHECK** instrument air AVAILABLE.	☐ b. **EXIT** this attachment.
☐ c. **SHUT** 1CS-283 (FCV-113A), Boric Acid Filter to Boric Acid Blender Flow Control Valve.	
☐ **16. EXIT** this attachment.	
☐ **17. DETERMINE** required boric acid flow rate:	
$\dot{M}_{BA}$ = [(C_{BLEND}) x (120)] / (C_{BAT})	
= [_____ x (120)] / _____ (Step 1, Step 3)	
= _____ gpm	
☐ **18. RECORD** in Step 23a the result from the previous step.	
☐ **19. Independently VERIFY** boric acid flow rate calculation made in Step 17.	

Attachment 2
Sheet 6 of 8
Manual Makeup in Modes 1 through 4

INSTRUCTIONS	RESPONSE NOT OBTAINED

NOTE

1CS-278 SB, Emergency Boric Acid Addition, is powered from MCC 1B35-SB-8C.

20. DIRECT an operator to perform the following:

☐ a. **OBTAIN** a radio and a locked valve key.

☐ b. **ESTABLISH** communication between 236' RAB Emergency Boration Valve Gallery and the Control Room.

☐ c. **UNLOCK** 1CS-274, RMUW Manual Blend from RMWST.

CAUTION

1CS-278 is a Limitorque SMB-00/SB-00 motor operated globe valve. If manually operated:

- It is subject to drifting open. (OP-107 Precautions and Limitations)
- It will require stroking electrically from the control switch to be declared operable per OMM-014.

☐ d. **TAKE** manual control of 1CS-278, Emergency Boric Acid Addition.

21. VERIFY the following are RUNNING:

☐ • ONE Boric Acid Transfer Pump

☐ • At least ONE Reactor Makeup Water Pump

Attachment 2
Sheet 7 of 8
Manual Makeup in Modes 1 through 4

INSTRUCTIONS	RESPONSE NOT OBTAINED

☐ **22.** Prior to continuing,
CHECK that all applicable previous steps are complete.

NOTE

- Total makeup flow can be monitored on ERFIS point FCS0110, or on FI-110 on the MCB. Until 1CS-274 is opened, this will consist of boric acid flow only.
- Actions in the next step should be performed as closely together as possible to achieve an even makeup.

23. As closely together as possible,
Locally PERFORM the following:

☐ **a.** **THROTTLE OPEN** 1CS-278 SB, Emergency Boric Acid Addition, to obtain _____ gpm boric acid flow rate (from Step 17).

☐ **b.** **THROTTLE OPEN** 1CS-274, RMUW Manual Blend from RMWST, to obtain 120 gpm total makeup flow rate.

✱☐ **24.** **MONITOR** the following for expected response:

- Tavg
- Reactor power
- Control rod motion
- VCT level

Attachment 2
Sheet 8 of 8

Manual Makeup in Modes 1 through 4

INSTRUCTIONS	RESPONSE NOT OBTAINED
25. WHEN desired VCT level has been reached, **THEN:**	
☐ a. **Locally SHUT AND LOCK** 1CS-274, RMUW Manual Blend from RMWST.	
☐ b. **SHUT** 1CS-278 SB, Emergency Boric Acid Addition.	
☐ c. **VERIFY** breaker 1B35-SB-8C (for 1CS-278 SB) is CLOSED.	
☐ **26. EXIT** this attachment.	

--END OF ATTACHMENT 2--