

Job Performance Measure "A" Alternate

Facility: **Vogtle**

Task No: V-LO-TA-09028

Task Title: Perform Manual Makeup with Loss of Boric Acid Flow

JPM No: V-NRC-JP-13009-HL17

K/A Reference: 004A4.12 3.8 / 3.3

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance _____ Actual Performance _____

Classroom _____ Simulator _____ Plant _____

NOTE: For time considerations, the Candidates may be allowed to "pre-brief" this JPM and allowed to review 13009-1 prior to starting the JPM.

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: VCT level is 32%. Current RCS Boron concentration is 917 ppm and BAST concentration is 7000 ppm.

Initiating Cue: The SS has directed you to perform a Manual Make-up per 13009-1 to raise VCT to 50%. There are no recent make-ups in the log.

Task Standard: Candidate initiates manual makeup to raise VCT level and stops the makeup when the Boric Acid flow stops.

Required Materials: 13009-1, "CVCS Reactor Makeup Control System Ver. 48.0

General References: None

Time Critical Task: No

Validation Time: 10 minutes (After Simulator entry.)

SIMULATOR SETUP:

Simulator Setup:

Reset to IC # 219 for HL-17 NRC Exam

NOTE for Setup: Adjust pot for slight dilution and re-snap.

Simulator Setup from Scratch:

1. Reset to IC-14 (MOL 100%)
2. Ensure Boric Acid transfer pump 1 is in AUTO /Pump 2 STOP
3. Lower VCT level to 32% and allow VCT pressure to stabilize
4. Insert the following on Trigger 1:
 - Annunciator ALB36D01 480V MCC 1ABD TROUBLE to ON
 - Override light A-LO_HS0276A_Y to OFF
 - Override light A-LO_HS0276A_G to OFF
 - Override light A-LO_HS0276A_R to OFF
 - Override HS-276A to STOP with 1 sec delay
 - Override HS-277A to STOP
5. Override HS-276A to STOP
6. Freeze the simulator
7. Ensure RCS boron status board is marked **RCS 917 ppm BAST 7000 ppm**
8. **RESET INTEGRATORS SETPOINT TO ZERO, MUST BE DONE EACH RESET.**

Note to simulator operator:

After each reset, go to run to allow VCT Hi/Lo pressure to alarm and clear (less than 30 secs) and then go back to freeze.

Setup time: 3 minutes

Performance Information

Critical steps denoted with an asterisk

Candidate refers to 13009-1, CVCS Reactor Makeup Control System, section 4.6, Manual Makeup.

Standard: Candidate selects section 4.6 manual makeup.

Comment:

CAUTIONS

If Manual Makeup is being performed to maintain VCT level when letdown is being diverted, letdown should not exceed 75 gpm.

BAST concentration is inaccurate until sampled following batching. Temperature and power should be closely monitored following manual makeup to the VCT with the BAST concentration inaccurate.

Standard: Candidate reviews CAUTIONS prior to step 4.6.1 and determines they are not applicable to current conditions.

Comment:

Step 4.6.1 Manual Makeup at 100 GPM Total Flow.

Standard: Candidate chooses section.

Comment:

NOTE

Volumetric change in VCT is equal to 19.2 gallons per percent change in level.

Standard: Candidate reviews NOTE prior to step 4.6.1.1

Comment:

***Step 4.6.1.1 Set TOTAL MAKEUP Integrator 1-FQI-0111 to the desired amount of Total Makeup Water.**

Standard: Candidate sets 1-FQI-0111 to 340 to 348 gallons (19.2 gallons / % X 18% = 345.6 gallons) by depressing the gray pushbutton under the digit to be changed to toggle the reading up or down. The red pushbutton will reset reading to all zeros. Note: Pot was adjusted off slightly upon setup.

Comment:

CAUTION

Digital counters and thumbwheel settings on BORIC ACID TO BLENDER Integrator 1-FQI-0110 read in tenth-gallon increments.

Standard: Candidate reviews CAUTION prior to step 4.6.1.2.

Comment:

Step 4.6.1.2 Set BORIC ACID TO BLENDER Integrator 1-FQI-0110 to the amount of boric acid as follows:

a. Calculate volume of boric acid using the following calculation.

$$\text{Gallons of Boric Acid} = \frac{\text{Total M/U} \times \text{RCS Cb}}{\text{BAST Cb}}$$

Standard: Candidate calculates 43 - 46 gallons (346 X 917 / 7000).

Comment:

Step 4.6.1.2 b. Review logs for recent make-ups to confirm calculated volume of Boric Acid is appropriate.

Standard: N/A

Comment:

NOTE

Minor adjustments from the calculated boric acid volume and recent makeup data may be required based on burnup, plant conditions, and desired RCS temperature response.

Standard: Candidate reviews NOTE prior to step 4.6.1.2 c.

Comment:

***Step 4.6.1.2c. Adjust Boric Acid to Blender Integrator 1-FQI-0110 to the desired volume based on plant conditions and desired reactivity response.**

Standard: Candidate sets integrator to calculated volume of 43 - 46 gals by depressing the gray pushbutton under the digit to be changed to toggle the reading up or down. The red pushbutton will reset reading to all zeros.

Comment:

Step 4.6.1.3 Adjust BORIC ACID Flow Controller 1-FIC-0110 pot setting using the following Formula and verify controller is in AUTO:

$$1\text{-FIC-0110 pot setting} = \frac{\text{RCS Cb} \times 25}{\text{BAST Cb}}$$

Standard: Candidate calculates $(917 \times 25 / 7000) = 3.275$ and adjusts 1-FIC-0110 pot to the correct setting (3.26 to 3.30).

Comment:

Step *4.6.1.4 Place VCT MAKEUP CONTROL 1-HS-40001B in STOP.

Standard: Candidate places 1-HS-40001B to STOP

Green Light - ON
Red Light - OFF

Comment:

Step *4.6.1.5 Place VCT MAKEUP MODE SELECT 1-HS-40001A in MAN.

Standard: Candidate places 1-HS-40001A to MAN, one click clockwise.

Comment:

Step 4.6.1.6 Verify the following:

- BA TO BLENDER 1-HS-0110A in AUTO.
- RX MU WTR TO BA BLENDER 1-HS-0111A in AUTO.
- One Boric Acid Transfer Pump in AUTO or START.
- One Reactor Makeup Water Pump in AUTO or START.
- Verify TOTAL MAKEUP Flow controller 1-FIC-0111 is in AUTO with pot set for 100 gpm (approximately 6.25) total flow rate.

Standard: Candidate verifies:

1-HS-0110A in AUTO
1-HS-0111A in AUTO
One BA Transfer Pump in AUTO (placing in START is acceptable)
One Reactor MU Water Pump in AUTO (placing in START is acceptable)
1-FIC-0111 in AUTO set at ~ 6.25

NOTE: This is the normal setup for these components.

Comment:

NOTE

While letdown is configured for 120 gpm, the preferred flow path for Manual Makeup is through 1-FV-0110B BLENDER OUTLET TO CHARGING PUMPS SUCT. The design capacity of the VCT spray nozzles would be challenged with 120 gpm letdown in service and the addition of the makeup flow upstream of the VCT (1X6AH04-00024). This could prevent makeup from reaching the desired flow rate. Thus, 1-FV-0111B should only be used if 1-FV-0110B is not available.

Standard: Candidate reads note.

Comment:

CAUTION

With either Blender Outlet valve handswitch in the open position, an automatic isolation will not occur due to a Boric Acid and/or Total Makeup Flow Deviations.

Standard: Candidate reads caution. It is applicable to this evolution.

Comment:

Step *4.6.1.7 Opens one of the following valves:

Blender Outlet to Charging Pumps Suction 1-FV-0110B

OR

Blender Outlet to VCT 1-FV-0111B

Standard: Places either 1-FV-0110B or 1-FV-0111B to open.

Red light – ON
Green light - OFF

Comment:

NOTES

- Manual makeup can be stopped at any time by placing 1-HS-40001B in STOP.
- VCT level should be maintained between 30 and 87 percent. (1-LIC-0185 Controller pot should normally be set to 8.7.)
- VCT Pressure 1-PI-115 should be maintained between 20 and 45 psig.

Standard: Candidate reads notes.

Comment:

Step *4.6.1.8 Place VCT MAKEUP CONTROL 1-HS-40001B in START and perform the following.

- Verify Boric Acid Transfer Pump is running.
- Verify Reactor Makeup Water Pump is running.
- Verify Boric Acid to Blender 1-FV-0111A throttles open to provide the correct flow of boric acid.
- Verify Reactor MU Water to Blender 1-FV-0111A throttles open to provide total flow.
- If desired, control Boric Acid Flow controller 1-FIC-0110 by adjusting pot OR using up/down pushbuttons to control boric acid at the desired flowrate.

Standard: Candidate places 1-HS-40001B to START.

Candidate verifies bulleted items above work as desired.

NOTE to examiner: Bulleted items above should work as designed.

**Note to Simulator operator: After items verified,
IF B ATP #1 in service insert Trigger 1
B ATP #2 is overridden to STOP.**

Comment:

***Step 4.6.1.9** **Monitors counters on Boric Acid to Blender Integrator 1-FQI-0110 and Total Makeup Integrator 1-FQI-0111 and perform the following:**

- WHEN counter on 1-FQI-0110 BORIC ACID TO BLENDER Integrator reaches its setpoint, verify 1-FV-0110A BORIC ACID TO BLENDER is closed.
- WHEN counter on 1-FQI-0111 TOTAL MAKEUP Integrator reaches its setpoint, verify 1-FV-0111A REACTOR MAKEUP WATER TO BLENDER is closed.

Note to Simulator operator: If candidate attempts to start other BAT pump it will not start.

Standard: Candidate places 1-HS-40001B to STOP after BAT pump trip and prior to Blender and Total Makeup Integrators have reached their setpoint.

Comment:

Candidate reports failure to Shift Supervisor.

Standard: Candidate reports failure to Shift Supervisor.

CUE: **When failure is reported, “The SS desires Maintenance to troubleshoot before proceeding.”**

Terminating cue: Candidate returns initiating cue sheet.

Verification of Completion

Job Performance Measure No. V-NRC-JP-13009-HL17

Examinee's Name:

Examiner's Name:

Date Performed:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____

Response: _____

Result: Satisfactory/Unsatisfactory

Examiner's signature and date: _____

Initial Conditions: VCT level is 32%. Current RCS Boron concentration is 782 ppm and BAST concentration is 7000 ppm.

Initiating Cue: The SS has directed you to perform a Manual Make-up per 13009-1 to raise VCT to 50%. There are no recent make-ups in the log.