FUEL FLOODING SYSTEM

ACCEPTANCE TEST PROCEDURE

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Revision 0

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FUEL FLOODING SYSTEM (FFS)

ACCEPTANCE TEST PROCEDURE

I. INTRODUCTION AND PURPOSE

The purpose of this procedure is to specify the tests required to determine FFS adequacy and acceptance for operation. This procedure has been written with all available information. There may be a requirement of necessity, better practice or additional information which demands a change on the spot. Any changes must be approved by the Responsible Engineer and documented on the official copy of this procedure. Any changes to this procedure and the test results will be reviewed by the same functional level that reviewed/approved the original procedure before the FFS is considered operable.

II. DESCRIPTION

This Acceptance Test Procedure (ATP) consists of a system visual inspection, valve positioning, reservoir filling, hydrostatic test, water flow setting, anti-siphon valve test and water sampling.

III. REFERENCES

Refer to attached sketches and P&ID during performance of this ATP.

IV. PREREQUISITES

A. FFS reservoir, hose, valving and piping, and instrumentation installation complete.

NOTE: Only the aboveground piping will have thermal insulation. It will be installed after this acceptance test. The below-ground piping will have been hydrotested before burial.

B. FFS line connection to the standpipes is complete. FFS connection to the canal fuel storage tanks is not necessary until Section F (Flow Setting).

C. The separate tests of this procedure must adhere to the order stated in Step 1 of each section.

D. The water analysis requires special coordination with an outside laboratory. While the ATP is not complete without this sample, the FFS is considered operable and released for service when all sections of this procedure are complete and determined to be acceptable by the Responsible Engineer and reviewers. Water analysis results may be provided at a later time.

E. Totalizer and rotometer calibrations complete.

F. Do not begin without Responsible Engineer's approval.

Approved By_____

V. PRECAUTIONS

The Fuel Flooding System is a GETR safety-related system. Any condition which could affect the safety or operability of the system must be reported to the GETR Shift Supervisor on duty and the Engineer or Alternate Engineer that has been assigned this project.

Responsible Engineer: _____ Ext._____

Alternate Engineer: _____ Ext._____

VI. ACCEPTANCE TESTS

Acceptance tests in this section are as follows:

A. Division A Residual Water Determination

B. Division A Reservoir Filling and Instrument Calibration

C. Division B Residual Water Determination

D. Division B Reservoir Filling and Instrument Calibration

E. Division A and B Hydrostatic Pressure Test and Visual Inspection

F. Division A and B Flow Setting

G. Division A and B Anti-siphon Valve Test

H. Final Valve Inspection

I. Division A and B Water Sample

A. Residual Water Determination - Division A

1. The sample of FFS reservoir water may be taken up to one week before the reservoirs are filled by taking a potable water sample from the VNC site water tank. The level switches must be installed according to ORF 229-5 before the reservoirs are filled. Record times below.

Time and Date Test Started _____

By _____

Mech. 2. Verify with the Responsible Engineer that the reservoirs are positioned and ready for filling. Engineer _____

3. In the valve pit at the reservoir site, check the following valve lineup:

a. Three line valves, FFS 5, 11 and 12, open. By_____

b. Fill valve, FFS-51, closed. By_____

c. Fill valve, FFS-52, closed and capped. By_____

d. Sample valves, FFS 53 and 54, closed. By_____

e. Level switch isolation valve, FFS-55, closed. By_____

A. Residual Water Determination - Division A (Continued)

Mech. 4. At the containment building valve panel, close the manual line valve, FFS-4. By_____

Mech. 5. Connect the reservoir fill equipment as shown in Sketch #1.

Mech. 6. Open the fill valve, FFS-51.

Mech. 7. Station an individual at the reservoir site to observe the hose, valves, pipes and reservoirs as the reservoirs are filling. Establish and maintain constant two-way radio communication. The reservoir site observer must be at the site location whenever the reservoirs are being filled up to Step B.6.

Mech. 8. Open the throttle valve, RFE-1, about 1/2-full open (Sketch #1).

NOTE: Zero the totalizer or record initial reading.

Totalizer _____ gallons. By_____

Mech. 9. Start the pump and immediately adjust valve RFE-1 until the rotometer indicates 40 ± 5 gpm.

Mech. 10. Fill the reservoirs with approximately 2,000 gallons of water.

Mech. 11. While the reservoirs are filling with the first 2,000 gallons of water, visually inspect all exposed hose and pipe for leaks from the admission valve (FFS-1) to the FFS reservoirs. Inspect shield pipe drain points for leaks. Inside the containment building, open FFS-50 and inspect for leakage past closed valve FFS-4. Notify Responsible Engineer if leaks are found.

No leaks observed. By_____

A. Residual Water Determination - Division A (Continued)

Mech. 12. Close the fill valve (FFS-51), and turn off the pump. Record the totalizer reading.

Totalizer _____ gallons. By_____

Amount added to tanks _____ gallons.

Mech. 13. Inspect the filter and install the filter, rotometer and totalizer as shown in Sketch #2.

Mech. 14. Zero the totalizer meter or record reading. _____ gallons. Open the fill valve (FFS-51), and let the reservoir water flow out until it stops. Close FFS-51. Record the following:

Average Rotometer Flow _____ By_____

Total Water Drained _____ By_____

NOTE: If water does not drain, repeat Steps 5-14, filling the reservoirs with 3,000 more gallons for a total of 5,000 gallons. Record amount in Step 12. Repeat Steps 13 and 14.

Mech. 15. The water added in Step 12 minus the water drained in Step 14 is the residual undrained water. Record here.

Residual Undrained _____ gallons. By_____

Mech. 16. Inspect the filter. This will check reservoir cleanliness. If any accumulation is noted different than seen in Step 13, notify the Responsible Engineer before proceeding.

Comments:_____

_____

_____

QC Inspection By_____

B. Reservoir Filling and Instrument Calibration - Division A

NOTE: Section A must be completed before performing this section.

Mech. 1. Reconnect the fill equipment as shown in Sketch #1.

Mech. 2. Zero the totalizer or record the reading.

Totalizer _____ gallons. By_____

Mech. 3. Open the fill valve (FFS-51).

Mech. 4. Open the shutoff valve, RFE-1, about 1/2-full open.

Mech. 5. Turn the pump on and immediately adjust the flow to 40 ± 5 gpm.

NOTE: It will take approximately 60 hours to fill the Division A reservoirs. Use the log (Sketch #5) to record the operation.

Mech. 6. Fill the reservoirs until the water added (not including the residual undrained) is 45,000 ± 1,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes. By_____

Mech. 7. At 44,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 8. I/T use Operations Request Form (ORF) 229-5.

B. Reservoir Filling and Instrument Calibration - Division A (Continued)

I/T 8. At 45,000 ± 1,000 gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-55) and mark (Sketch #4) the manometer gage "1/2" at the top of the water column. Close FFS-55.

a. Step 8 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 9. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm using valve RFE-1.

Mech. 10. Fill the reservoirs until the water added (not including the residual undrained) is 79,650 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes.

By_____

Mech. 11. At 78,650 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 12. I/T use ORF 229-5.

I/T 12. At 79,650 $^{+250}_{-0}$ gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-55) and mark (Sketch #4) the manometer gage "compliance" at the top of the water column. Close FFS-55.

a. Step 12 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

QC Verified By_____

B. Reservoir Filling and Instrument Calibration - Division A (Continued)

Mech. 13. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm using RFE-1.

Mech. 14. Fill the reservoirs until the water added (not including the residual undrained) is 82,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes.

By_____

Mech. 15. At 81,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 16. I/T use ORF 229-5.

I/T 16. At 82,000 ± 250 gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-55) and mark (Sketch #4) the manometer gage "Low" at the top of the water column. Close FFS-55.

a. Step 16 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 17. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm using RFE-1.

Mech. 18. Fill the reservoirs until the water added (not including the residual undrained) is 86,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the

B. Reservoir Filling and Instrument Calibration - Division A (Continued)

two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes.

By_____

Mech. 19. At 85,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 20. I/T use ORF 229-5.

I/T 20. At 86,000 ± 250 gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-55) and mark (Sketch #4) the manometer gage "Normal Low" at the top of the water column. Close FFS-55.

a. Step 20 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 21. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm using RFE-1.

Mech. 22. Fill the reservoirs until the water added (<u>not</u> including the residual undrained) is 91,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes.

By_____

B. Reservoir Filling and Instrument Calibration - Division A (Continued)

Mech. 23. At 90,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 24. I/T use ORF 229-5.

I/T 24. At 91,000 ± 250 gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-55) and mark (Sketch #4) the manometer gage "Normal" at the top of the water column. Close FFS-55.

a. Step 24 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 25. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm.

Mech. 26. Fill the reservoirs until the water added (not including the residual undrained) is 95,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes. By_____

Mech. 27. At 94,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 29. I/T use ORF 229-5.

Mech. 28. At 95,000 gallons, close the fill valve (FFS-51), turn off the pump, and close the throttle valve (RFE-1).

B. Reservoir Filling and Instrument Calibration - Division A (Continued)

I/T 29. At 95,000 ± 250 gallons, open the level switch shutoff valve (FFS-55) and mark (Sketch #4) the manometer gage "High" at the top of the water column.

a. Step 29 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 30. Disconnect the fill equipment from the fill valve. Cap the fill valve connection.

Mech. 31. Tank filling is complete. Record time and date.

Time_____ Date_____

Responsible Engineer_____

C. Residual Water Determination - Division B

1. The sample of FFS reservoir water may be taken up to one week before the reservoirs are filled by taking a potable water sample from the VNC site water tank. The level switches must be installed according to ORF 229-5 before the reservoirs are filled. Record times below.

Time and Date Test Started _____

By _____

Mech. 2. Verify with the Responsible Engineer that the reservoirs are positioned and ready for filling. Engineer _____

3. In the valve pit at the reservoir site, check the following valve lineup:

a. Three line valves, FFS 25, 31 and 32, open. By_____

b. Fill valve, FFS-61, closed. By_____

c. Fill valve, FFS-62, closed and capped. By_____

d. Sample valves, FFS 63 and 64, closed. By_____

e. Level switch isolation valve, FFS-65, closed. By_____

Mech. 4. At the containment building valve panel, close the manual line valve, FFS-24. By_____

Mech. 5. Connect the reservoir fill equipment as shown in Sketch #1.

Mech. 6. Open the fill valve, FFS-61.

Mech. 7. Station an individual at the reservoir site to observe the hose, valves, pipes and reservoirs as the reservoirs are filling. Establish and maintain constant two-way communication. The reservoir site observer must be at the site location whenever the reservoirs are being filled up to Step C.6.

C. Residual Water Determination - Division B (Continued)

Mech. 8. Open the throttle valve, RFE-1, about 1/2-full open (Sketch #1).

NOTE: Zero the totalizer or record initial reading.

Totalizer _____ gallons. By_____

Mech. 9. Start the pump and immediately adjust valve RFE-1 until the rotometer indicates 40 ± 5 gpm.

Mech. 10. Fill the reservoirs with approximately 2,000 gallons of water.

Mech. 11. While the reservoirs are filling with the first 2,000 gallons of water, visually inspect all exposed hose and pipe for leaks from the admission valve to the FFS reservoirs. Inspect shield pipe drain points for leaks. Inside the containment building, open FFS-60 and inspect for leakage past closed valve FFS-24. Notify Responsible Engineer if leaks are found.

No leaks observed. By_____

Mech. 12. Close the fill valve, FFS-61, and turn off the pump. Record the totalizer reading. Totalizer _____ gallons. By_____

Amount added to tanks _____ gallons.

Mech. 13. Inspect the filter and install the filter, rotometer and totalizer as shown in Sketch #2.

Mech. 14. Zero the totalizer meter or record reading. _____ gallons. Open the fill valve (FFS-61) and let the reservoir water flow out until it stops. Close FFS-61. Record the following:

Average Rotometer Flow_____ By_____

Total Water Drained_____ By_____

C. Residual Water Determination - Division B (Continued)

NOTE: If water does not drain, repeat Steps 5-14, filling the reservoirs with 3,000 more gallons for a total of 5,000 gallons. Record amount in Step 12. Repeat Steps 13 and 14.

Mech. 15. The water added in Step 12 minus the water drained in Step 14 is the residual undrained water. Record here.

Residual Undrained _____ gallons. By_____

Mech. 16. Inspect the filter. This will check reservoir cleanliness. If any accumulation is noted different than seen in Step 13, notify the Responsible Engineer before proceeding.

Comments:_____

_____

_____

QC Inspection By_____

D. Reservoir Filling and Instrument Calibration - Division B

NOTE: Section C must be completed before performing this section.

Mech. 1. Reconnect the fill equipment as shown in Sketch #1.

Mech. 2. Zero the totalizer or record the reading.

Totalizer _____ gallons. By_____

Mech. 3. Open the fill valve, FFS-61.

Mech. 4. Open the shutoff valve, RFE-1, about 1/2-full open.

Mech. 5. Turn the pump on and immediately adjust the flow to 40 ± 5 gpm.

NOTE: It will take approximately 60 hours to fill the Division B reservoirs. Use the log (Sketch #5) to record the operation.

Mech. 6. Fill the reservoirs until the water added (not including the residual undrained) is 45,000 ± 1,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes. By_____

Mech. 7. At 44,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 8. I/T use ORF 229-5.

D. Reservoir Filling and Instrument Calibration - Division B (Continued)

I/T 8. At 45,000 ± 1,000 gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-65) and mark (Sketch #4) the manometer gage "1/2" at the top of the water column. Close FFS-65.

a. Step 8 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 9. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm using RFE-1.

Mech. 10. Fill the reservoirs until the water added (not including residual undrained) is 79,650 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes.

By_____

Mech. 11. At 78,650 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 12. I/T use ORF 229-5.

I/T 12. At 79,650 $^{+250}_{-\ 0}$ gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-65) and mark (Sketch #4) the manometer gage "compliance" at the top of the water column. Close FFS-65.

a. Step 12 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

QC Verified By_____

D. Reservoir Filling and Instrument Calibration - Division B (Continued)

Mech. 13. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm using RFE-1.

Mech. 14. Fill the reservoirs until the water added (not including the residual undrained) is 82,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes.

By_____

Mech. 15. At 81,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 16. I/T use ORF 229-5.

I/T 16. At 82,000 ± 250 gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-65) and mark (Sketch #4) the manometer gage "Low" at the top of the water column. Close FFS-65.

a. Step 16 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 17. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm using RFE-1.

Mech. 18. Fill the reservoirs until the water added (not including the residual undrained) is 86,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the

D. Reservoir Filling and Instrument Calibration - Division B (Continued)

two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes.

By_____

Mech. 19. At 85,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 20. I/T use ORF 229-5.

I/T 20. At 86,000 ± 250 gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-65) and mark (Sketch #4) the manometer gage "Normal Low" at the top of the water column. Close FFS-65.

a. Step 20 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 21. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm using RFE-1.

Mech. 22. Fill the reservoirs until the water added (not including the residual undrained) is 91,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes.

By_____

D. Reservoir Filling and Instrument Calibration - Division B (Continued)

Mech. 23. At 90,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 24. I/T use ORF 229-5.

I/T 24. At 91,000 ± 250 gallons, shut the fill valve and turn off the pump. Open the level switch shutoff valve (FFS-65) and mark (Sketch #4) the manometer gage "Normal" at the top of the water column. Close FFS-65.

a. Step 24 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 25. Open the fill valve, turn on the pump, and immediately adjust the flow to 40 ± 5 gpm.

Mech. 26. Fill the reservoirs until the water added (not including the residual undrained) is 95,000 gallons. Periodically inspect the fill equipment and reservoir site locations. Maintain radio communication between the two locations when occupied. Immediately stop filling the reservoirs if leaks are detected. Contact the Responsible Engineer for evaluation. Observe the fill rate and adjust to 40 ± 5 gpm every 15 minutes.

By_____

Mech. 27. At 94,000 gallons, notify the Instrument Technician he has 1/2-hour before performing Step 29. I/T use ORF 229-5.

Mech. 28. At 95,000 gallons, close the fill valve (FFS-61), turn off the pump and close the throttle valve (RFE-1).

D. Reservoir Filling and Instrument Calibration - Division B (Continued)

I/T 29. At 95,000 ± 250 gallons, open the level switch shutoff valve (FFS-65) and mark (Sketch #4) the manometer gage "high" at the top of the water column.

a. Step 29 Totalizer _____ gallons.

b. Step 2 Totalizer _____ gallons.

c. a. minus b. _____ gallons added. By_____

Mech. 30. Disconnect the fill equipment from the fill valve. Cap the fill valve connection.

Mech. 31. Tank filling is complete. Record time and date.

Time_____ Date_____

Responsible Engineer_____

E. Hydrostatic Pressure Test and Visual Inspection

1. Sections A and B shall have been completed before performing this Section E for Division A. Sections C and D shall have been completed before performing this Section E for Division B.

   NOTE: Fittings and pipe which have been buried will have been hydrotested previously by a separate procedure.

2. Close the fill valve and connect hydro equipment as shown in Sketch #6. Equipment to be at approximately reactor first floor grade level.

3. Record the time below:

   Time Test Started_____ Date_____

Oper. 4. Check FFS valving positions as follows:

   a. In-line manual valve in the reservoir valve pit open.

      FFS-5 on Division A By_____

      FFS-25 on Division B By_____ _____

   b. In-line manual valves in the reservoir valve pit closed.

      FFS 11 and 12 on Division A By_____

      FFS 31 and 32 on Division B By_____

   c. Manual isolation valve open.

      FFS-4 on Division A By_____

      FFS-24 on Division B By_____

   d. Flow control valves open.

      FFS 2 and 3 on Division A By_____

      FFS 22 and 23 on Division B By_____

   e. Pool and canal shutoff valves closed.

      FFS 14 and 15 on Division A By_____

      FFS 34 and 35 on Division B By_____

   f. QC verification. By_____ .

E. Hydrostatic Pressure Test and Visual Inspection (Continued)

Oper. 5. Open the admission valves (FFS 1 and 21) by tripping the north seismic switch. By_____

6. Pressurize each FFS division line to 200 $^{+10}_{-0}$ psig. Hold at least 15 minutes.

Division A Actual Initial Pressure _____ psig By_____

Actual Time _____ psig By_____

Final Pressure _____ psig By_____

QC By_____

Division B Actual Initial Pressure _____ psig By_____

Actual Time _____ psig By_____

Final Pressure _____ psig By_____

QC By_____

NOTE: Perform visual inspections (Steps 7-15) while the inspected Division is pressurized.

NOTE: All inspections to include checks for leaks, tightness of fittings, and any anomolous conditions. Repair minor fitting/packing leaks.

7. Inspect the hose to the valve pit from the tanks.

Division A By_____

Division B By_____

8. Inspect the valve pit piping, valves and connections.

Division A By_____

Division B By_____

9. Inspect any accessible hose between the valve pit and the valve panel at the containment building. Buried pipe and hose will have been inspected before burial. Division A By_____

Division B By_____

E. Hydrostatic Pressure Test and Visual Inspection (Continued)

10. Inspect the containment building valve panel piping, valves and connections.

Division A By_____

Division B By_____

11. Inspect the line to the containment penetration.

Division A By_____

Division B By_____

12. Inspect the line inside the containment building from the penetration to the third floor.

Division A By_____

Division B By_____

13. Inspect the line and valves from the tee on the third floor to the flexhose which extends to the canal fuel storage tanks.

Division A By_____

Division B By_____

14. Inspect the line and valves from the tee on the third floor to the flexhose which extends to the standpipes.

Division A By_____

Division B By_____

Mech. 15. Inspect the anti-siphon drip pipes for signs of anti-siphon valve leakage.

Division A Pool By_____

Division A Canal By_____

Division B Pool By_____

Division B Canal By_____

16. QC leak inspection verification. By_____

E. Hydrostatic Pressure Test and Visual Inspection (Continued)

17. Depressurize by opening the vent valve momentarily.

18. Close the fill valve and remove the hydro equipment. Return to storage.

Oper. 19. Close the admission valves by the reset buttons on the control units located behind Process Panel #2. By_____

Mech. 20. Test complete. Notify Responsible Engineer if any leaks were detected before repair.

Comments:_____

_____

_____

Time_____ Date_____

F. Flow Setting

1. System hydrotest and visual inspection must be complete according to Section E before setting the FFS flow. The water sampling, Section I, may be completed. The anti-siphon valve test, Section G, may be complete.

2. In this section the flow control valves will be set and the FFS lines leak tested from the pool and canal shutoff valves to the canal storage tanks and standpipe flexhose connections.

3. Record the time below:

Time Test Started_____ Date_____

Oper. 4. Set up FFS valving as follows:

a. Three in-line valves in the reservoir valve pit open.

FFS 5, 11 and 12 on Division A By_____

FFS 25, 31 and 32 on Division B By_____

b. Manual isolation valve open.

FFS-4 on Division A By_____

FFS-24 on Division B By_____

c. Flow control valves closed.

FFS 2 and 3 on Division A By_____

FFS 22 and 23 on Division B By_____

d. Division B pool shutoff valve, FFS-35, open. By_____

e. Division B canal shutoff valve, FFS-34, open. By_____

f. Admission valves, FFS 1 and 21, closed. By_____

g. Division A pool shutoff valve, FFS-15 open. By_____

h. Division A canal shutoff valve, FFS-14, open. By_____

F. Flow Setting (Continued)

Mech. 5. Disconnect the Division A FFS line to the canal fuel storage tanks (if connected) and run a pipe to the pool down to reactor head level as shown in Figure 8.

NOTE: Running the canal line to the lowered pool will simulate the smaller back pressure of an empty canal. The extra line length to the pool will not affect flow. The temporary line, while being longer, is a smooth line with a smaller loss per unit length than the normal flexhose connection to the canal fuel storage tanks. The pressure loss of each is equivalent.

The pool water at the anti-siphon valve level does not exactly simulate the back pressure which would exist if the pool were drained and the pressure vessel water were at the top of the standpipes. The pool water level, however, is only about 5-1/2 feet above the standpipes; and this back pressure makes the flow setting conservative.

Mech. 6. On Division A temporarily install rotometers supplied by the Responsible Engineer 1) downstream from canal flow control valve, FFS-2, and 2) between the pool flow control valve, FFS-3, and the standpipes.

Oper. 7. Lower the pool water to the primary anti-siphon valve level.

Oper. 8. Open the admission valve, FFS-1, by tripping the south seismic switch.

By_____

F. Flow Setting (Continued)

Mech. 9. Open the Division A pool and canal flow control valves, FFS 2 and 3, and adjust to the following flows. Record actual flows.

a. Record maximum flow with flow control valves full open: _____ gpm

b. Flow setting:

Pool set to 4.3 ± 0.2 gpm. Actual_____ By_____

QC Verified By_____

Canal set to 3.25 ± 0.15 gpm. Actual_____ By_____

QC Verified By_____

NOTE: The FFS flow may be too great so that flow may not be adjusted with good sensitivity by the flow control valves. The Responsible Engineer will determine if good flow sensitivity is obtained with the flow control valves. The Responsible Engineer may install flow orifices in the lines upstream from the flow control valves.

Responsible Engineer Evaluation and Action By_____

Comments:_____

_____

_____

Mech. 10. Close the Division A pool and canal shutoff valves (FFS 14 and 15) and lock the flow control valves in position using Operations-numbered locks.

Pool Flow Control Valve, FFS-3, Locked By_____

Canal Flow Control Valve, FFS-2, Locked By_____

QC Verified By_____

Mech. 11. Open the Division A shutoff valves (FFS 14 and 15) and verify proper flow as set in Step 9.

Pool Flow _____ gpm. By_____

Canal Flow _____ gpm. By_____

QC Verified By_____

F. Flow Setting (Continued)

Mech. 12. Close the shutoff valves, FFS 14 and 15.

Oper. 13. Raise the pool to the overflow level.

Mech. 14. Open the Division A pool and canal shutoff valves (FFS 14 and 15) and record flows: Pool Flow _____ gpm. By_____

Canal Flow _____ gpm. By_____

Mech. 15. Close the Division A pool and canal shutoff valves, FFS 14 and 15.

By_____

Mech. 16. Remove the rotometers installed in Step 6. Reconnect the piping.

Mech. 17. Remove the temporary line to the pool installed in Step 5. Reconnect the flexhose to the canal storage tanks (if previously installed).

Mech. 18. Disconnect the Division B FFS line to the canal fuel storage tanks (if connected), and run a pipe to the pool down to the reactor head level as in Step 5 above.

Mech. 19. On Division B, temporarily install rotometers supplied by the Responsible Engineer 1) downstream from canal flow control valve, FFS-22, and 2) between the pool flow control valve, FFS-23, and the standpipes.

Oper. 20. Lower the pool water to the primary anti-siphon valve level.

F. Flow Setting (Continued)

Oper. 21. Verify admission valve, FFS-21, is open.

Mech. 22. Open the Division B pool and canal flow control valves (FFS 22 and 23) and adjust to the following flows. Record actual flows.

a. Record maximum flow with flow control valves full open. _____ gpm

b. Flow setting:

Set to 4.3 ± 0.2 gpm. Actual_____ By_____

QC Verified By_____

Set to 3.25 ± 0.15 gpm. Actual_____ By_____

QC Verified By_____

NOTE: Responsible Engineer flow control valve sensitivity evaluation as described in Step 9. By_____

Comments:_____

_____

_____

Mech. 23. Close the Division B pool and canal shutoff valves (FFS 34 and 35) and lock the flow control valves in position using Operations-numbered locks.

Pool Flow Control Valve, FFS-23, Locked By_____

Canal Flow Control Valve, FFS-22, Locked By_____

QC Verified By_____

Mech. 24. Open the Division B shutoff valves (FFS 34 and 35) and verify proper flow as set in Step 22.

Pool Flow _____ gpm. By_____

Canal Flow _____ gpm. By_____

QC Verified By_____

Mech. 25. Close the shutoff valves, FFS 34 and 35.

F. Flow Setting (Continued)

Oper. 26. Raise the pool to the overflow level.

Mech. 27. Open the Division B pool and canal shutoff valves (FFS 34 and 35) and record flows.

Pool Flow _____ gpm. By_____

Canal Flow _____ gpm. By_____

Mech. 28. Close the Division B pool and canal shutoff valves (FFS 34 and 35).

By_____

Mech. 29. Remove the rotometers installed in Step 19. Reconnect the piping.

Mech. 30. Remove the temporary line to the pool installed in Step 18. Reconnect the flexhose to the canal storage tanks (if previously installed).

Mech. 31. One by one, open each Division pool and canal shutoff valve (FFS 14, 15, 34 and 35) and inspect the line for leaks up to and including the standpipe flexhose connection and the canal fuel storage tank flexhose connection (if installed).

Division A pool line inspected. By_____

Division A canal line inspected. By_____

Division B pool line inspected. By_____

Division B canal line inspected. By_____

Mech. 32. Verify all four shutoff valves (FFS 14, 15, 34 and 35) are closed.

By_____

F. Flow Setting (Continued)

Oper. 33. Close the admission valves (FFS 1 and 21) by resetting the control units located behind Process Panel #2. By_____

34. Flow setting complete.

Time_____ Date_____

Responsible Engineer_____

G. Anti-Siphon Valve Test

CAUTION: The flow control valves, FFS-2, FFS-3, FFS-22 and FFS-23, are locked in position. Do not disturb these valves.

1. Sections A-E must be completed before testing the anti-siphon valves. Flow Setting, Section F, may be performed before or after this section. The water sampling, Section I, may be completed.

2. In this section, each anti-siphon valve is functionally tested.

3. Record the time below:

Time Test Started_____ Date_____

Mech. 4. If the canal fuel storage tank flexhose is not connected, temporarily connect a flexhose or pipe to the FFS pipe so that the temporary line extends below the canal water level.

Division A By_____

Division B By_____

Mech. 5. Disconnect the FFS anti-siphon valve drip pipe on the air -- not the water -- side of the Division A canal anti-siphon valves.

6. Connect anti-siphon valve test equipment to the Division A canal anti-siphon valves as shown in Sketch #7.

7. Open canal shutoff valve, FFS-14; close pool shutoff valve, FFS-15.

By_____

G. Anti-Siphon Valve Test (Continued)

8. Run a line from Division A test valve, FFS-50, to a 5-gallon bucket on the first floor.

9. Open FFS-50 and verify an air reduction, water rise, in both test fixtures.

FFS-16 Satisfactory By_____

FFS-17 Satisfactory By_____

QC Verified By_____

NOTE: One valve may be plugged to check the redundant valve.

10. Close FFS-50.

11. Remove the test equipment and reconnect the anti-siphon valve drip pipe.

By_____

12. Disconnect the FFS anti-siphon valve drip pipe on the air -- not the water -- side of the Division A pool anti-siphon valves.

13. Connect anti-siphon valve test equipment to the Division A pool anti-siphon valves as shown in Sketch #7.

14. Open pool shutoff valve, FFS-15; close canal shutoff valve, FFS-14.

By_____

15. Open FFS-50 and verify an air reduction, water rise, in both test fixtures.

FFS-18 Satisfactory By_____

FFS-19 Satisfactory By_____

QC Verified By_____

NOTE: One valve may be plugged to check the redundant valve.

G. Anti-Siphon Valve Test (Continued)

16. Close and cap FFS-50.

17. Remove the test equipment and reconnect the anti-siphon valve drip pipe.

By_____

18. Disconnect the FFS anti-siphon valve drip pipe on the air -- not the water -- side of the Division B canal anti-siphon valves. Plug FFS-36.

19. Run a line from Division B test valve, FFS-60, to a floor drain.

20. Open canal shutoff valve, FFS-34; close pool shutoff valve, FFS-35.

By_____

21. Open FFS-60 and leave open until water stops flowing. This will verify the adequacy of FFS-37 and verify the adequacy of the valve sizing.

By_____

QC Verified By_____

22. Close FFS-60. Connect the anti-siphon valve test equipment to the Division B canal anti-siphon valves as shown in Sketch #7.

23. Open the admission valve, FFS-21, and refill the FFS line by permitting water flow for a minimum of 45 minutes. Close FFS-21 when finished.

Actual Time_____ By_____

24. Open FFS-60 and verify an air reduction, water rise, in both test fixtures.

FFS-36 Satisfactory By_____

QC Verified By_____

NOTE: One valve may be plugged to check the redundant valve.

G. Anti-Siphon Valve Test (Continued)

25. Close FFS-60.

26. Remove the test equipment and reconnect the anti-siphon valve drip pipe.

By_____

27. Disconnect the FFS anti-siphon valve drip pipe on the air -- not the water -- side of the Division B pool anti-siphon valves.

28. Connect the anti-siphon valve test equipment to the Division B pool anti-siphon valves as shown in Sketch #7.

29. Open pool shutoff valve, FFS-35; close canal shutoff valve, FFS-34.

By_____

30. Open FFS-60 and verify an air reduction, water rise, in both test fixtures.

FFS-38 Satisfactory By_____

FFS-39 Satisfactory By_____

QC Verified By_____

NOTE: One valve may be plugged to check the redundant valve.

31. Close and cap FFS-60.

32. Remove and store the test equipment.

33. Reconnect the anti-siphon valve drip pipe. By_____

34. Dispose of any water in the 5-gallon bucket in a floor drain.

H. Final Valve Inspection

1. All previous sections (A-G) of this ATP shall be completed prior to performing the final valve lineup according to this section. This section is performed at this time for convenience. The valve manipulations will be controlled by the lock and tag procedure, SOP X.P., and will become restricted after completing this section. Flow control valves were locked and operation restricted in Section F. Operations special-numbered locks will be used. Reference SOP X.P.

2. Proper valving is established in this section.

3. Record time of beginning the valve lineup.

Time_____ Date_____

Oper. 4. Verify that the admission valves (FFS 1 and 21) are closed.

Oper. 5. At the Division A reservoir valve pit:

a. Close and cap both sample valves.

FFS-53 closed and capped. By_____

FFS-54 closed and capped. By_____

b. Lock open the three in-line manual valves.

Reservoir #1 valve FFS-11 locked open. By_____ Lock #_____

Reservoir #2 valve FFS-12 locked open. By_____ Lock #_____

Common valve, FFS-5, locked open. By_____ Lock #_____

c. Close and cap the reservoir fill valve.

Valve FFS-52 closed and capped. By_____

d. Open the level instrument valve.

Valve FFS-55 open. By_____

H. Final Valve Inspection (Continued)

Oper. 6. At the Division A containment building valve panel:

a. Close and cap the reservoir fill valve.

Valve FFS-51 closed and capped. By_____

b. Lock open the manual isolation valve.

Valve FFS-4 locked open. By_____ Lock #_____

Oper. 7. Inside the containment building for Division A:

a. Close and cap the test valve on the first floor near the penetration.

Valve FFS-50 closed and capped. By_____

b. Verify the flow control globe valves to the pool and canal are locked in place. Do not disturb.

Pool FFS-3 valve locked. By_____

Canal FFS-2 valve locked. By_____

c. Lock open both the pool and canal shutoff valves.

Pool valve FFS-15 locked open. By_____ Lock #_____

Canal valve FFS-14 locked open. By_____ Lock #_____

Oper. 8. At the Division B reservoir valve pit:

a. Close and cap both sample valves.

FFS-63 closed and capped. By_____

FFS-64 closed and capped. By_____

b. Lock open the three in-line manual valves.

Reservoir #1 valve FFS-32 locked open. By_____ Lock #_____

Reservoir #2 valve FFS-31 locked open. By_____ Lock #_____

Common valve, FFS-25, locked open. By_____ Lock #_____

c. Close and cap the tank fill valve.

Valve FFS-62 closed and capped. By_____

d. Open FFS level instrument valve, FFS-65. By_____

H. Final Valve Inspection (Continued)

Oper. 9. At the Division B containment building valve panel:

a. Close and cap the reservoir fill valve.

Valve FFS-61 closed and capped. By_____

b. Lock open the manual isolation valve.

Valve FFS-24 locked open. By_____ Lock #_____

Oper. 10. Inside the containment building for Division B:

a. Close and cap the test valve on the first floor near the penetration.

Valve FFS-60 closed and capped. By_____

b. Verify the flow control globe valves to the pool and canal are locked in place. Do not disturb.

Pool valve FFS-23 locked. By_____

Canal valve FFS-22 locked. By_____

c. Lock open both the pool and canal shutoff valves.

Pool valve FFS-35 locked open. By_____ Lock #_____

Canal valve FFS-34 locked open. By_____ Lock #_____

11. Verify that the green "normal" tank level lights are on. If the "high" level lights or the "normal low" level lights are on, notify the Responsible Engineer.

Division A normal level lights on. By_____

Division B normal level lights on. By_____

12. The FFS is now ready for operation. Tripping either seismic switch will begin FFS water flow. Record time below.

Time_____ Date_____ By_____

Responsible Engineer_____

Quality Assurance_____

I. Water Sample

1. The water sample may be taken up to one week prior to filling the reservoirs and may be delayed one day after filling.

2. A water sample is taken and evaluated according to this section.

Oper. 3. Take a water sample from each reservoir site according to a detailed ORF. This ORF will contain special instructions determined by the Analytical Laboratory. This ORF will verify the sample valve is closed and capped after sampling.

ORF #_____ By_____

Oper. 4. Identify water samples as to source and type of analysis to be performed. As a minimum, analysis is for pH, total dissolved solids, bacteria and algicides. By_____

Oper. 5. Time_____ and Date_____ completed.

By_____

VII. REVIEW

A. Responsible Engineer will review and accept the FFS checkout as complete and satisfactory.

B. Residual Water Determination - Division A, Section A. By_____

C. Reservoir Filling and Instrument Calibration - Division A, Section B. By_____

D. Residual Water Determination - Division B, Section C. By_____

E. Reservoir Filling and Instrument Calibration - Division B, Section D. By_____

F. Division A and B Hydrostatic Pressure Test and Visual Inspection, Section E. By_____

G. Division A and B Flow Setting, Section F. By_____

H. Division A and B Anti-Siphon Valve Test, Section G. By_____

I. FFS Final Valve Inspection, Section H. By_____

J. Division A and B Water Sample, Section I. By_____

K. The standpipes and flexhose connections to the canal fuel storage tanks will be tested by other procedures. When the standpipe ATP is completed and the canal fuel storage tank ATP is completed, the FFS is considered operable.

Completed Acceptance Test Review:

Manager, Plant Engineering and Maintenance _____

Manager, GETR Operations _____

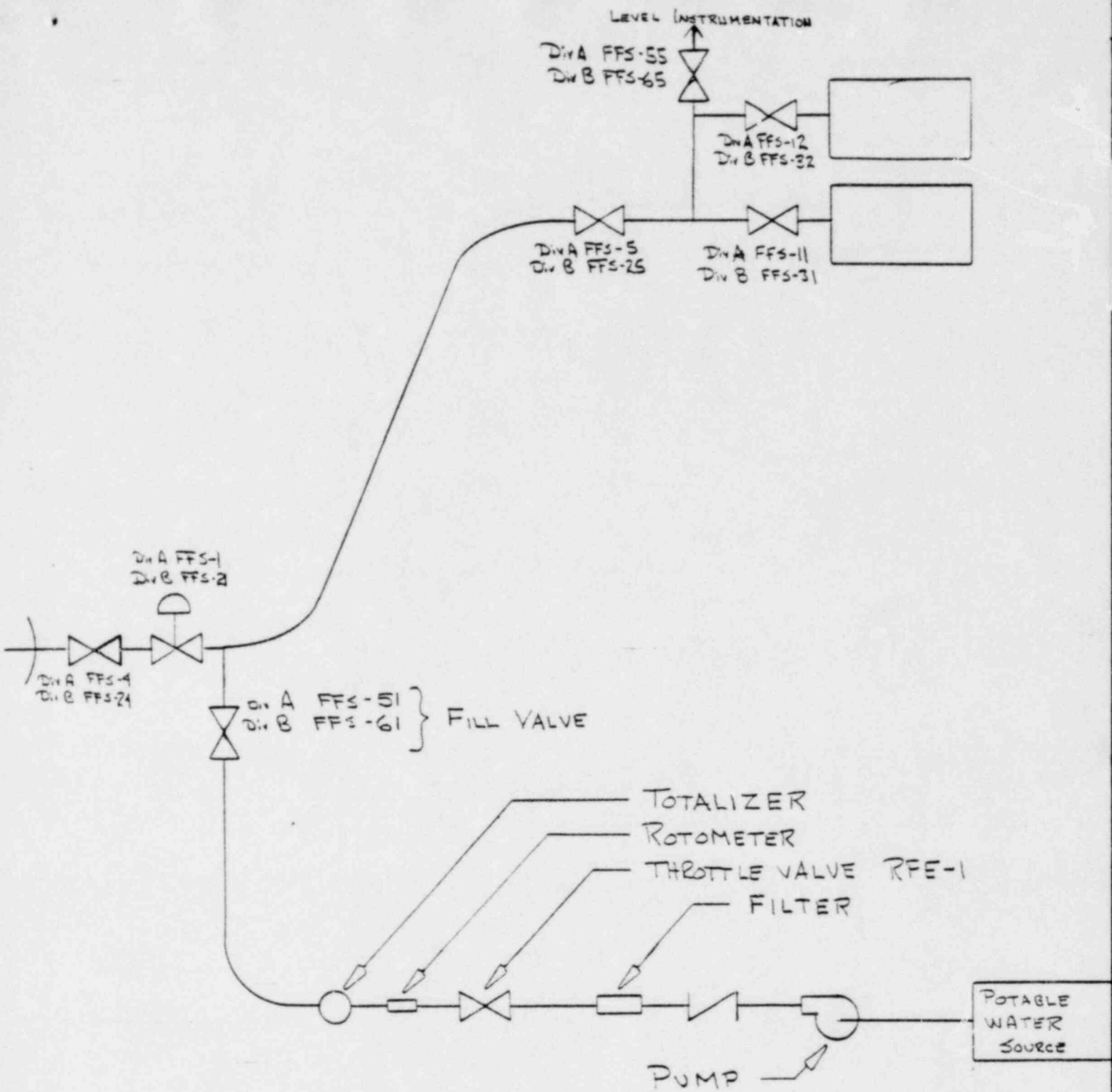
Manager, Quality Assurance _____

Manager, Nuclear Safety Technology _____

Completed Acceptance Test Approval:

Manager, Reactor Irradiations _____

DRS/4-1-81

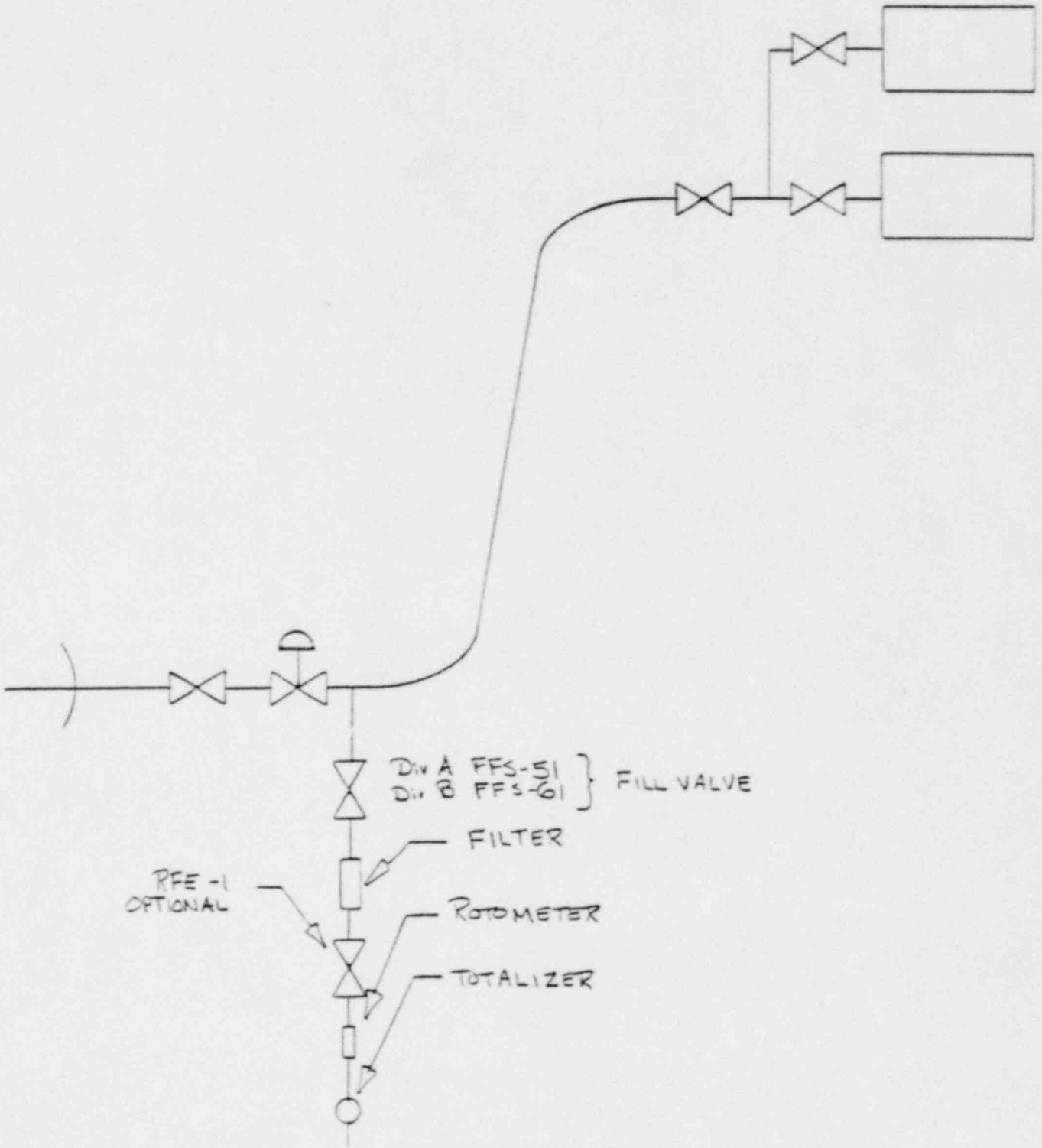


SKETCH #1

RESERVOIR FILL EQUIPMENT

Rev 2

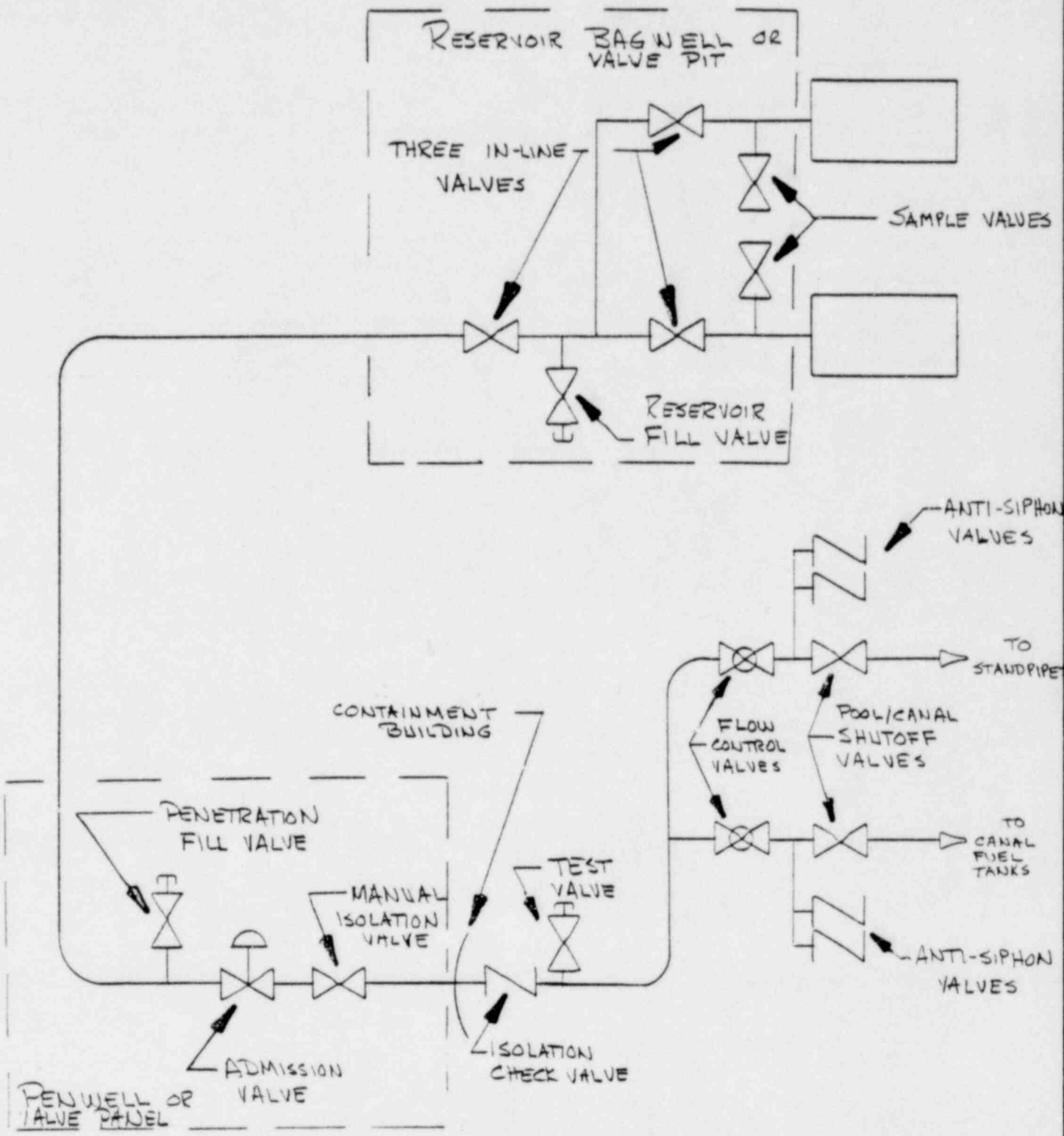
DRS
4/15/93



SKETCH #2
RESERVOIR DRAIN EQUIPMENT

Rev 1

DZS
4/15/03



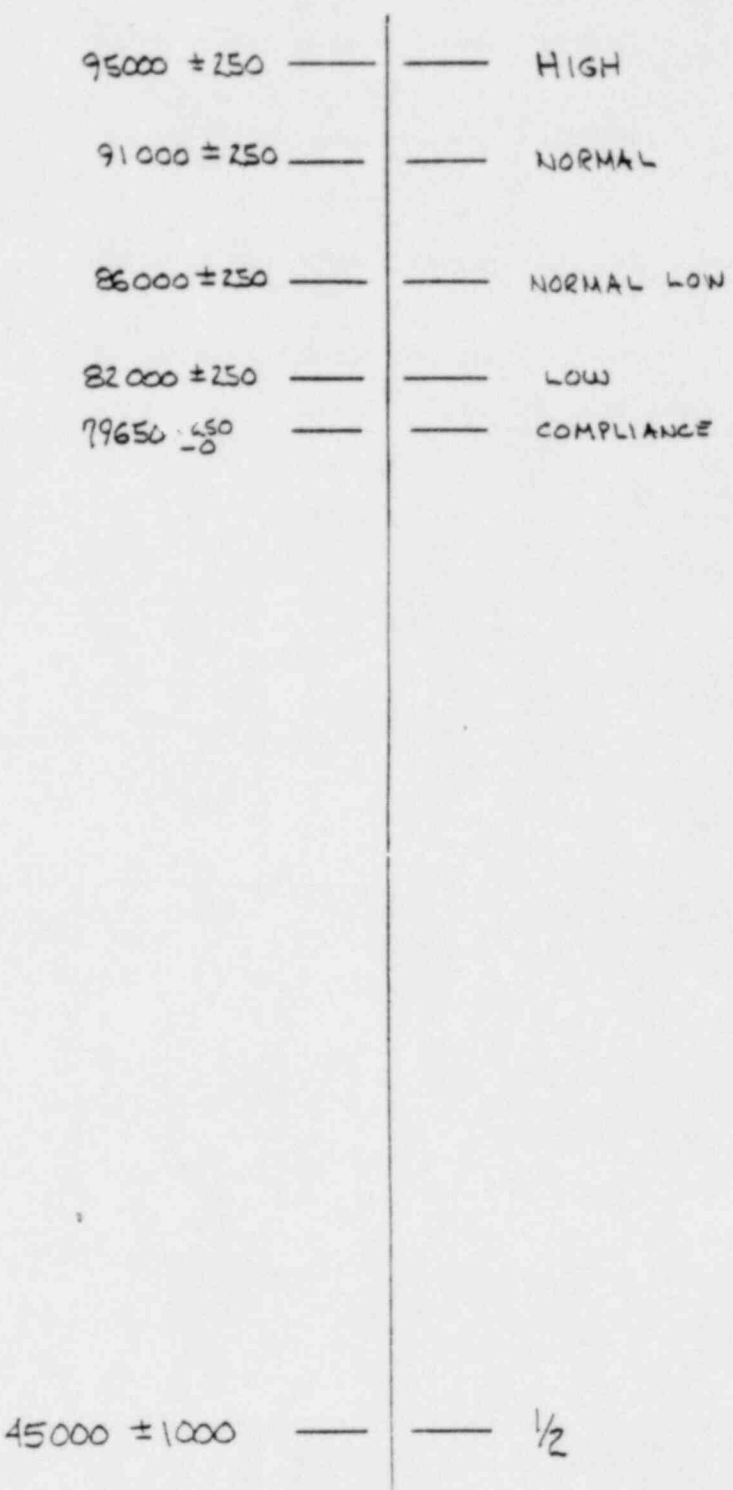
SKETCH #3

FFS VALVE NOMENCLATURE

Rev 1

D 25

4/15/91



* WATER QUANTITY DOES NOT INCLUDE RESIDUAL WATER THAT DOES NOT DRAIN FROM RESERVOIR TANKS

SKETCH #4

FFS TANK LEVEL INSTRUMETATION

Rev 1

DRS 4/15/8

DIVISION ____ WATER FILL LOG

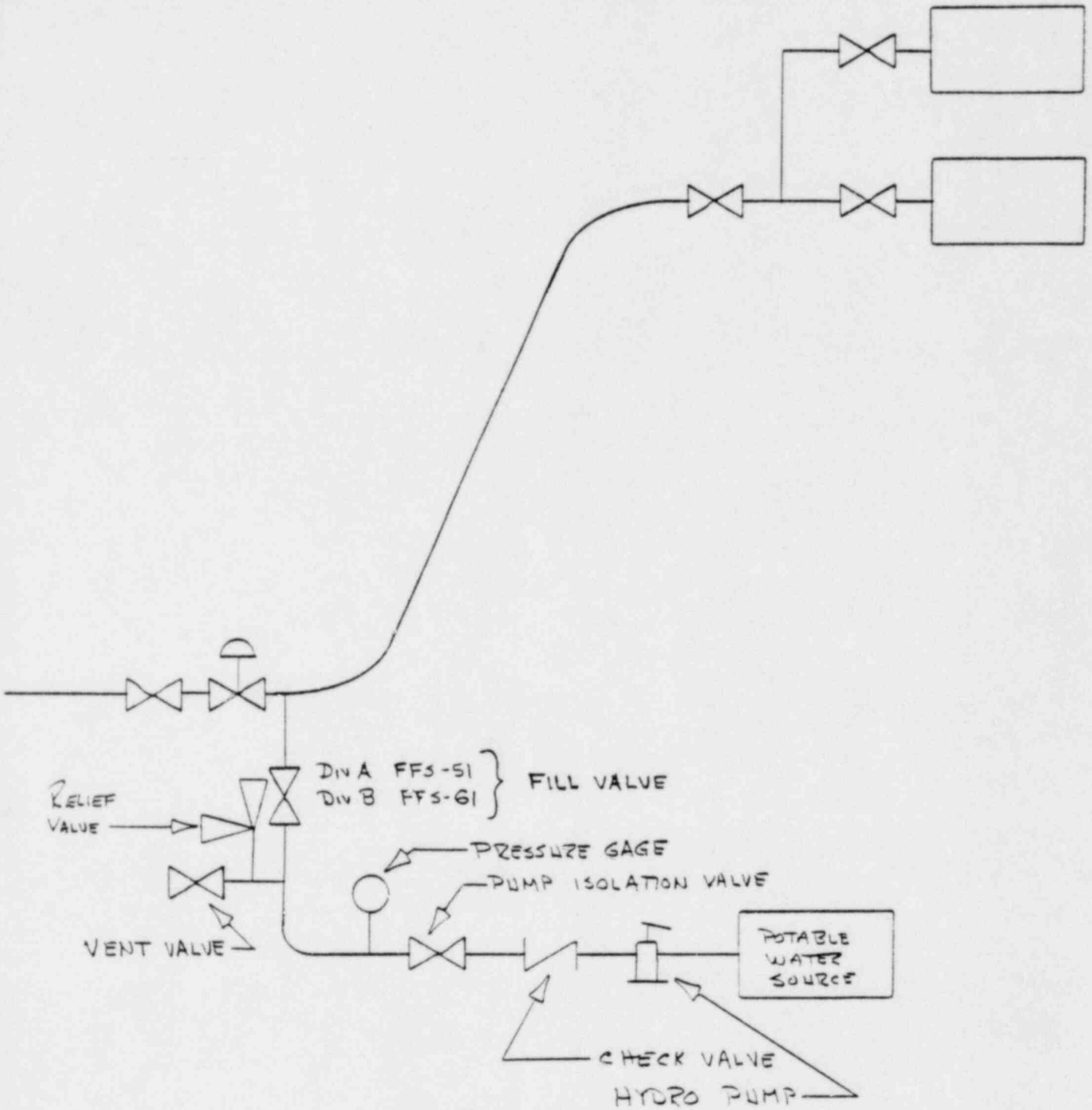
TIME	FILL RATE* (GPM)	FILL RATE* ADJUSTED TO (GPM)	TOTALIZER (GALLONS)	COMMEN

* ROTOMETER READING

Rev. 1

SKETCH #5
FFS FILL LOG

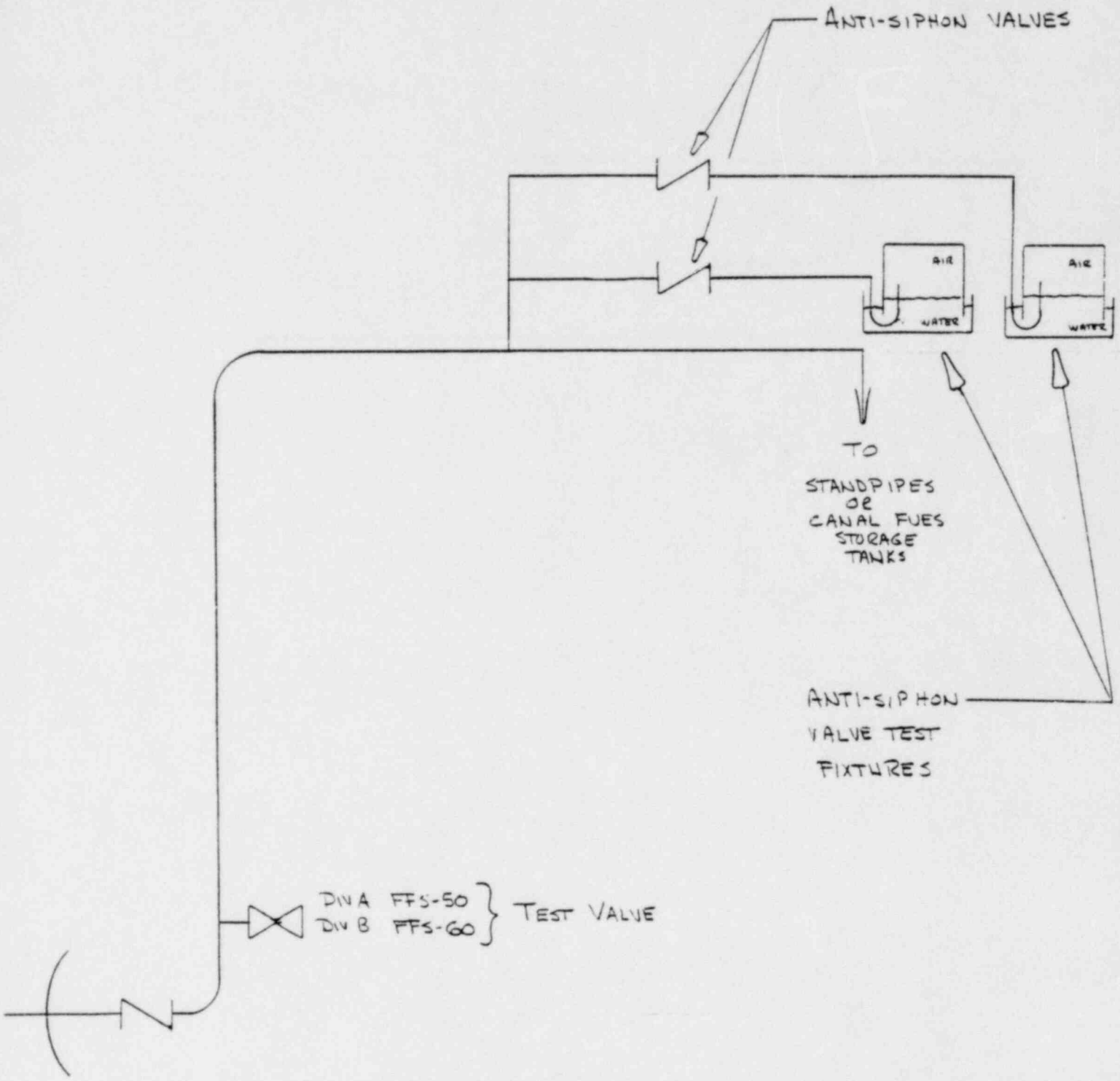
DRS
4/15/81



SKETCH #6
HYDROSTATIC PRESSURE TEST

Rev 1

DRS
4/15/81



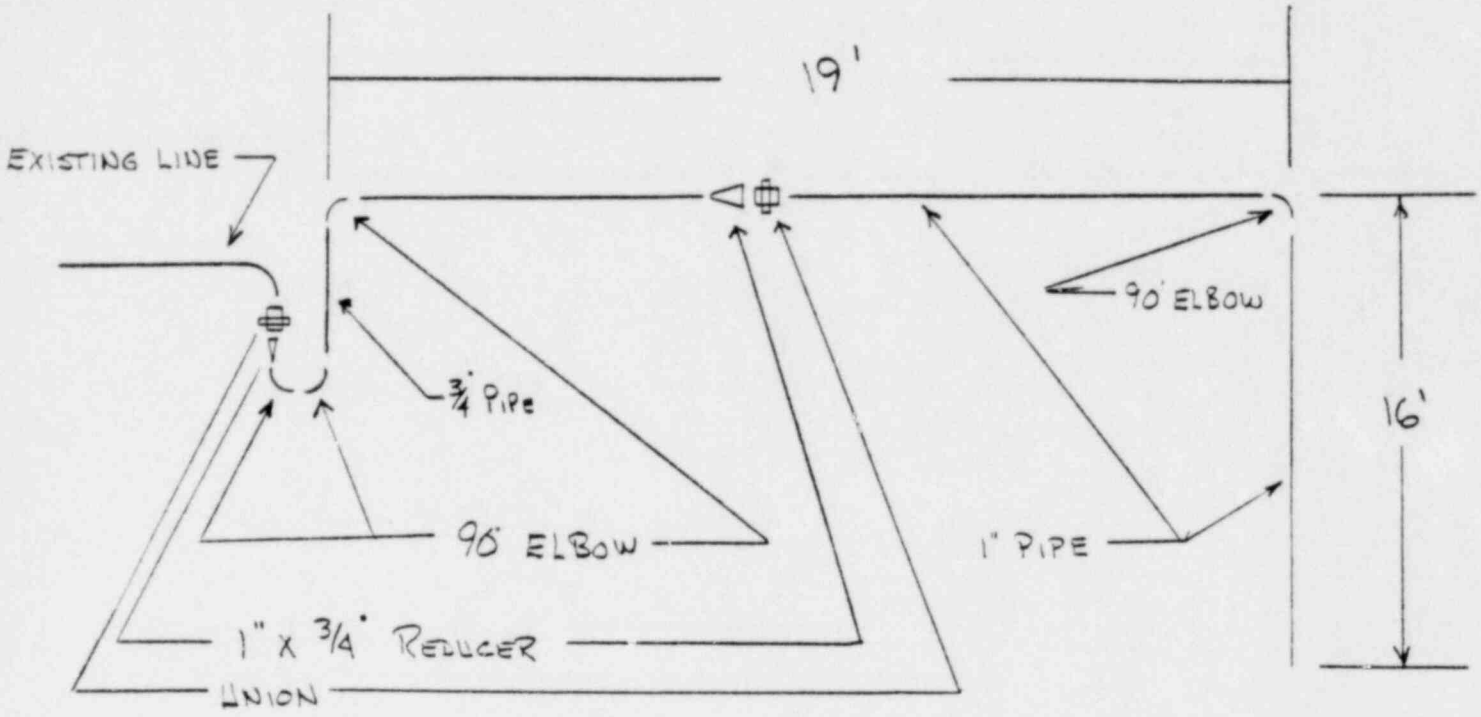
SKETCH #7

ANTI-SIPHON VALVE TEST EQUIPMENT

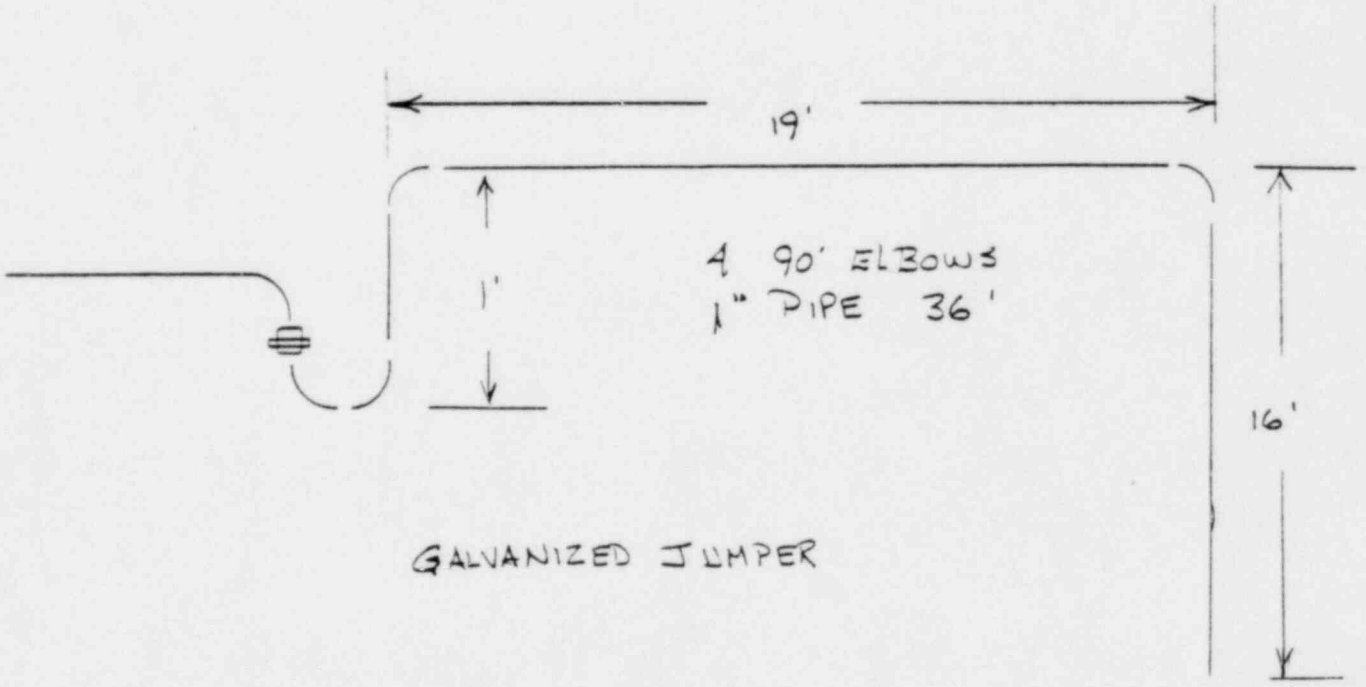
P.1.0

DRS

4/31/81



STEEL OR WROUGHT IRON JUMPER



GALVANIZED JUMPER

SKETCH #3
FLOW TEST JUMPER

Rev 0

JRS
4/21/2