BFP-RW-11 and BFP-CA1-1 Double Check Valve Assembly Functional Check at 242-A Evaporator

Tank Farm Maintenance Procedure

USQ # EV-17-0079-S, Rev. 1

CHANGE HISTORY (≤ LAST 5 REV-MODS)

<table>
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<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
<th>Justification</th>
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<td>B-1</td>
<td>06/05/2017</td>
<td>Maintenance Requested Change</td>
<td>Added Serial Number Line to Attachment 1.</td>
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<td>B-0</td>
<td>01/25/2017</td>
<td>Periodic Review</td>
<td>Added &quot;TSR Compliance&quot; to Header, &quot;Design Feature&quot; to 2nd Paragraph, Section 3.3 Limits. Deleted Note from Attachment 1 DVCA Test Report, and &quot;Cert No.&quot;</td>
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<tr>
<td>A-0</td>
<td>07/31/2013</td>
<td>Maintenance request Procedure for new equipment.</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for functionally testing backflow preventers BFP-CA1-1 and BFP-RW-11 to verify the double check valve assemblies are operable. BFP-RW-11 is a safety-significant component. BFP-CA1-1 is credited in the RCRA permit.

This procedure complies with in-service inspection/test Design Feature 6.2.2 of HNF-15279 for BFP-RW-11. Failure to comply with this test in accordance with the specified frequency would result in a TSR violation when the 242-A Evaporator is in the Operation Mode.

1.2 Scope

This procedure may only be performed when the 242-A Evaporator is in the “SHUTDOWN” mode if the backflow preventers are tested in place. There is no limitation on testing new backflow preventers in the maintenance shop.

This functional test demonstrates operability of the BFP-RW-11 double check valve assembly:
- To prevent backflow of waste into the raw water system. Preventing the backflow of waste into the raw water system protects facility workers from a flammable gas accident (i.e., accumulation of flammable gas generated by waste in the raw water system piping or components)
- To limit the waste into the raw water system in a non-radiologically controlled area. Limiting the backflow of waste into the raw water system in a non-radiologically controlled area protects facility workers from chemical burns due to a wetting spray/jet/stream leak.

This functional test demonstrates operability of the BFP-CA1-1 double check valve assembly:
- To prevent backflow of waste into the filtered raw water system.
- To limit the waste into the filtered raw water system in a non-radiologically controlled area.
BFP-RW-11 and BFP-CA1-1 Double Check Valve Assembly Functional Check at 242-A Evaporator

2.0 INFORMATION

2.1 Terms and Definitions

- $\Delta p$ Differential Pressure

2.2 General Information

2.2.1 Backflow prevention device BFP-RW-11 is installed in the raw water line to the waste slurry sampler in the load-out and hot-equipment storage room. The primary functional/performance requirement for BFP-RW-11 is to prevent backflow (no through valve leakage) of waste into the raw water system due to back-pressurization. BFP-RW-11 valves V1 and V2 have a spring cracking pressure of 2.0 psig and must not open when a pressure of 1.0 lb/in$^2$ (1.0 psi) differential is applied in the direction of normal flow.

2.2.2 BFP-RW-11 consists of two Safety Significant check valves (V1 and V2). All other associated valves, test ports and piping are general service.

2.2.3 Functionally testing the BFP-RW-11 Double Check Valve Assembly will be performed to verify that check valves V1 and V2 are each drip tight in the direction of flow until the differential pressure across the valve is $\geq 1$ lb/in$^2$ or $\geq 1$ psi.

2.2.4 Backflow preventer BFP-CA1-1 is installed on the filtered raw water supply line connecting with the condensate recycle line. This system allows either raw water or process condensate to be used for the pump seal water and de-entrainment pad spray water without risk of contamination of the raw water system.

2.2.5 Functionally testing the BFP-CA1-1 Double Check Valve Assembly will be performed to verify that check valves are each drip tight in the direction of flow until the differential pressure across the valve is $\geq 1$ lb/in$^2$ or $\geq 1$ psi. The check valves inside BFP-CA1-1 have a spring cracking pressure of 5 psi.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

Refer to TF-PLN-86 for 242-A Evaporator facility specific hazards.

3.2 Radiation and Contamination Control

Work in radiological areas will be performed using a Radiological Work Permit (RWP) following review by Radiological Control per the ALARA Work Planning procedure TFC-ESHQ-RP_RWP-C-03.

3.3 Limits

HNF-15279, 242-A Evaporator Technical Safety Requirements

Design Feature 6.2.2
4.0 PREREQUISITES

4.1 Special Tools, Equipment and Supplies

The following supplies may be needed to perform this procedure:

- Calibrated Differential Gauge Type Test Kit
- Compensating Valve (needle valve)
- Hand Tools, (screwdrivers, wrenches)
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

The following supplies may be needed if the backflow preventer will be tested in the shop:

- Pump or other source of pressurized water
- Test Manifold
- Pipe, Hose, or Tubing to Connect Test Manifold to Backflow Preventer

4.2 Field Preparations

4.2.1 IF the backflow preventers are to be tested in place THEN NOTIFY Operations Supervisor of the pending disruption of water service on the line protected by the BFP-RW-11 or BFP-CA1-1 Double Check Valve Assembly during the performance of this procedure.
5.0 PROCEDURE

5.1 Initial Set Up for Testing in the Maintenance Shop

NOTE - This section will only be performed if testing in the Maintenance shop.

5.1.1 CONNECT pump or other source of pressurized water to test manifold.

5.1.2 ENSURE the double check valve assembly flow direction.

5.1.3 CONNECT double check valve assembly to pump using suitable hose, pipe or tubing.

5.2 Double Check Valve Assembly Test Using Differential Gauge Type Test Kit

Check Valve #1

5.2.1 REFER to Figure 1 for “Double Check Valve Test Kit”.

5.2.2 ENSURE Shutoff Valve #1 is open.

5.2.3 IF in place, REMOVE caps/plugs on test cocks.

5.2.4 FLUSH Test Cocks #1, #2, #3 and #4 by opening and closing Test Cocks.

5.2.5 IF correct fittings are not on test cocks, INSTALL appropriate fittings to test cocks.

5.2.6 CONNECT Compensating Valve to Test Cock #2.

5.2.7 CONNECT high side hose of the Test Kit to Compensating Valve on No. 2 Test Cock.

5.2.8 IF Test Cock #3 is not the highest point on the check body valve, INSTALL sight tube on Test Cock #3.

5.2.9 CLOSE all test kit valves.

5.2.10 SLOWLY OPEN Test Cock #2.

5.2.11 OPEN AND CLOSE high pressure control valve (bleed valve) on test kit to purge.

5.2.12 IF sight tube is used, FILL by momentarily opening Test Cock #3.

5.2.13 CLOSE Shutoff Valve #2.
5.3 Initial Set Up for Testing in the Maintenance Shop

NOTE - This section will only be performed if testing in the Maintenance shop.

5.3.1 CONNECT pump or other source of pressurized water to test manifold.

5.3.2 ENSURE the double check valve assembly flow direction.

5.3.3 CONNECT double check valve assembly to pump using suitable hose, pipe or tubing.

5.3.4 HOLD the Test Kit at the elevation of Test Cock #3, OR

IF sight tube is used, HOLD the Test Kit at water level in sight tube.

5.3.5 CLOSE Shutoff Valve #1.

5.3.6 SLOWLY OPEN Test Cock #3.

5.3.7 AFTER water stops flowing from Test Cock #3 and the gauge stabilizes, READ psid shown on the test gauge kit AND PERFORM the following:

5.3.7.1 RECORD \( \Delta p \) gauge reading on Attachment 1 Test Report as “No. 1 Check Valve Differential psid” (\( \geq 1.0 \) psid). (DF 6.2.2)

5.3.7.2 DOCUMENT on the Test Report if “No. 1 Check Valve” held tight or Failed.

5.3.8 CLOSE all Test Cocks.

5.3.9 OPEN Shutoff Valve #1.

5.3.10 REMOVE all test equipment.
5.4 Initial Set Up for Testing in the Maintenance Shop

NOTE - This section will only be performed if testing in the Maintenance shop.

5.4.1 CONNECT pump or other source of pressurized water to test manifold.

5.4.2 ENSURE the double check valve assembly flow direction.

5.4.3 CONNECT double check valve assembly to pump using suitable hose, pipe or tubing.

Check Valve #2

5.4.4 CONNECT compensating valve to No. 3 test cock.

5.4.5 CONNECT high side hose of the Test Kit to compensating valve on No. 3 Test Cock.

5.4.6 IF Test Cock #4 is not the highest point on the check body valve, INSTALL sight tube on Test Cock #4.

5.4.7 CLOSE all test kit valves.

5.4.8 SLOWLY OPEN Test Cock #3.

5.4.9 OPEN AND CLOSE high pressure control valve (bleed valve) on test kit to purge.

5.4.10 IF sight tube is used, FILL by momentarily opening Test Cock #4.

5.4.11 HOLD the Test Kit at the elevation of Test Cock #4, OR

IF sight tube is used, HOLD the Test Kit at water level in sight tube.

5.4.12 ISOLATE by closing Shutoff Valve #1.

5.4.13 SLOWLY OPEN Test Cock #4.
5.4 Initial Set Up for Testing in the Maintenance Shop (Cont.)

5.4.14  AFTER water stops flowing from Test Cock #4 and the gauge stabilizes, READ psid shown on the test gauge kit AND PERFORM the following:

5.4.14.1  RECORD Δp gauge reading on Attachment 1 Test Report as “No. 2 Check Valve Differential psid” (≥ 1.0 psid). (DF 6.2.2)

5.4.14.2  DOCUMENT on Test Report if “No. 2 Check Valve” held tight or failed.

5.4.15  CLOSE all Test Cocks AND REMOVE test equipment.

5.4.16  IF removed, INSTALL caps/plugs on test cocks.
5.5 Initial Set Up for Testing in the Maintenance Shop

NOTE - This section will only be performed if testing in the Maintenance shop.

5.5.1 CONNECT pump or other source of pressurized water to test manifold.

5.5.2 ENSURE the double check valve assembly flow direction.

5.5.3 CONNECT double check valve assembly to pump using suitable hose, pipe or tubing.

NOTE - Steps 5.5.4 and 5.5.5 will only be performed if the Double Check Valve Assembly was tested in place in the field.

5.5.4 IF unit passed test, OPEN Shutoff Valve #1 to pressurize assembly THEN SLOWLY OPEN Shutoff Valve #2 to re-establish water service.

NOTE - If the unit did not pass test, the system shall remain isolated and tagged out until repairs are made and unit has been retested.

5.5.5 IF unit did not pass test, FWS PERFORM the following:

5.5.5.1 ENSURE Double Check Valve Assembly Shutoff Valve #2 is closed and tagged out.

5.5.5.2 DOCUMENT on Test Report (Attachment 1) that Double Check Valve Assembly Shutoff Valve #2 is closed and tagged out.
### 5.6 Restoration

**NOTE** - This section is performed only if testing was performed in the field.

5.6.1 **ENSURE** Shutoff Valves No. 1 and No. 2 are open and water service has been re-established.

5.6.2 **RECORD** the Test Equipment information and calibration status on Test Report.

5.6.3 **IF** any problems were encountered with calibration, **INFORM** FWS.

5.6.4 **CHECK** equipment restoration by observing indications are consistent with expected conditions.

### 5.7 Acceptance Criteria

Acceptance Criteria has been met when Steps in this procedure have been satisfactorily performed and BFP-RW-11 and/or Double Check Valve Assembly(ies) meets the given specifications and tolerance(s).
5.8  Review

5.8.1  INFORM FWS test is complete.

5.8.2  FWS REVIEW AND ENSURE the following:
- Completed functional test meets the acceptance criteria
- Promptly notify Out-of-Tolerance conditions to the Shift Manager.
- Comments sections are filled out appropriately
- Work requests needed as a result of this procedure are identified and generated
- Work request number(s) of any work documents generated as a result of this procedure are recorded Comments Sheet 1.

5.9  Records

This procedure is performed within a work package, as such, the procedure in its entirety will be maintained as a record per the Work Control process.

The record custodian identified in the Company-level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.
Figure 1 – Double Check Valve Assembly Test Kit

- High Pressure Control Valve (Bypass Valve)
- Bypass Valve
- Low Pressure Control Valve
- Differential Pressure Gauge
- Flexible Hose
- Test Cock #1
- Test Cock #2
- Test Cock #3
- Test Cock #4
- Shutoff Valve #1
- Flow
- Check Valve #1
- Check Valve #2
- Shutoff Valve #2

BFP-RW-11 and BFP-CA1-1 Double Check Valve Assembly Functional Check at 242-A Evaporator
**DOUBLE CHECK VALVE ASSEMBLY TEST REPORT**

Double Check Valve Assembly Tested: ( ) BFP-RW-11 ( ) BFP-CA1-1

<table>
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<tr>
<th>Initial Test Results</th>
<th>Test After Repair or Cleaning [1]</th>
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<tr>
<td>No. 1 Check Valve: Differential ________ psid*</td>
<td>No. 1 Check Valve: Differential ________ psid*</td>
</tr>
<tr>
<td>No. 1 Check Valve: Held Tight [ ] Failed [ ] (✓)</td>
<td>No. 1 Check Valve: Held Tight [ ] Failed [ ] (✓)</td>
</tr>
<tr>
<td>No. 2 Check Valve: Differential ________ psid*</td>
<td>No. 2 Check Valve: Differential ________ psid*</td>
</tr>
<tr>
<td>No. 2 Check Valve: Held Tight [ ] Failed [ ] (✓)</td>
<td>No. 2 Check Valve: Held Tight [ ] Failed [ ] (✓)</td>
</tr>
<tr>
<td>Assembly Passed Test Yes ___ No ___ (✓)</td>
<td>Assembly Passed Test Yes ___ No ___ (✓)</td>
</tr>
<tr>
<td>* Shall be 1.0 psid or greater (≥ 1.0 psid)</td>
<td>* Shall be 1.0 psid or greater (≥ 1.0 psid)</td>
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</table>

[1] IF performed, DOCUMENT repair and/or cleaning information in “Remarks Section”

Δp Gauge Calibration Date ________________ Calibration Due ________________

Δp Gauge Serial Number________________________

Backflow Preventer Serial Number__________________________

Initial Test By: __________________________ / __________________________ Date ____________

Sign Print (First & Last)

Repaired By: __________________________ / __________________________ Date ____________

Sign Print (First & Last)

Repair Test By: __________________________ / __________________________ Date ____________

Sign Print (First & Last)

Remarks: __________________________________________

__________________________________________________

__________________________________________________

__________________________________________________
# Comments Sheet 1

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