Anderson Greenwood - Set Pressure Verification and Adjustment for Pilot-Operated Vacuum Relief Valve

Tank Farm Maintenance Procedure

MAINTENANCE

USQ # Routine Maintenance

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# Anderson Greenwood - Set Pressure Verification and Adjustment for Pilot-Operated Vacuum Relief Valve

## 5.0 PROCEDURE

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions to verify, test, and adjust the Set Pressure for Anderson Greenwood 9200 and 9300 Series Pilot-Operated Safety Relief Valves (POSRVs).

1.2 Scope

This procedure involves the functional testing and setpoint adjustment of Anderson Greenwood 9200 and 9300 Series POSRVs.

2.0 INFORMATION

2.1 Terms and Definitions

- POSRV – Pilot-Operated Safety Relief Valve
- Set Pressure – Vacuum pressure (setpoint) at which the main valve opens
- Crack Pressure – The pressure at which the initial dome pressure change is noted (Crack Pressure is \( \approx 98\% \) of Set Pressure value).

2.2 General Information

2.2.1 Per the vendor, the average value of three (3) actuations will be calculated to determine the actual As-Found and/or As-Left Set Pressure value(s).

2.2.2 An optional method using a Bubble Tester Bottle may be used in lieu of Test Gauge #2 hook-up (ref Figure 1 for 9300 Series, or Figure 2 for 9200 Series at 241-AN & 241-AW).

2.2.3 Functional Testing may be accomplished by performing all sections except Calibration Section 5.4.

2.2.4 Any section(s) that is not required may be skipped with concurrence of the field work supervisor.

2.2.5 Set Pressure readings and adjustment are made on increasing vacuum; therefore, if Set Pressure is overshot, the vacuum will be reduced to a value that allows the POSRV to reset prior to continuing.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 Tank Pressurization Alarms may be activated during this activity.

3.1.2 When identified in the work package, Industrial Hygiene Sampling and Monitoring will be performed per appropriate Industrial Hygiene Sample Plan (IHSP).

3.2 Radiation and Contamination Control

Work in radiological areas will be performed using a Radiological Work Permit following review by Radiological Control per ALARA work planning procedure TFC-ESHQ-RP_RWP-C-03.

3.3 Environmental Compliance

3.3.1 Report all planned and unplanned shutdowns of Tank Farm ventilation equipment to the appropriate shift office to be evaluated for reporting purposes per procedure TF-REC-001, "Response to Environmental Condition".

3.3.2 Report all spills and releases to the appropriate shift office to be evaluated for reporting purposes per procedure TF-REC-001, "Response to Environmental Condition".

3.3.3 Any waste generated during performance of this procedure will be handled by qualified facility Operations personnel in compliance with TO-100-052 and/or approved Waste Planning Checklist.

3.3.4 For work in radiological areas or on potentially contaminated equipment, refer to the following ALARACT(s) in TFC-ESHQ-ENV-STD-06, As Low As Reasonably Achievable Control Technology (ALARACT) Requirements Standard:

- ALARACT 4.1, Tank Farm ALARACT Demonstration for Packaging and Transportation of Waste
- ALARACT 16.1, Tank Farm ALARACT Demonstration for Work on Potentially Contaminated Ventilation System Components.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:

- Vacuum Source to meet Data Sheet specs
- Vacuum Test Gauge #1, Dwyer (or equivalent) to meet Data Sheet specs
- Vacuum Test Gauge #2, Dwyer (or equivalent) to meet Data Sheet specs
- Valves for test set-up (ref Figure 1 and Figure 2)
- Tygon tubing, %” I.D. minimum and associated fittings (ref Figure 1 and Figure 2)
- (Optional) Bubble Tester Bottle and short section of clear tubing
- Allen wrench set
- IF testing in 241-AN or 241-AW farm, Key for lock on Field Test Valve “A”. (See Figure 1 and Figure 2)

4.2 Performance Documents

The following documents may be needed to perform this procedure:

- H-2-131087 SH 13
- CVI #50348
- CVI #50349
- CVI #0022525, Supplement 098
- H-2-85614 SH 1 – 5

4.3 Field Preparation

NOTE - During setpoint verification/adjustment of POSRV, a small amount of outside air will be allowed into system, which will later egress through the associated Exhauster(s).

4.3.1 INFORM Shift Manager/Operations that maintenance will be performed on Vacuum Breaker(s) listed on Data Sheet(s) and that in doing so, vacuum will be momentarily broken at the POSRV under test and Tank Pressurization Alarms may occur.
5.0 PROCEDURE

NOTE -  Figure 1 for 9300 Series, and Figure 2 for 9200 Series at 241-AN & 241-AW provide a reference for POSRV Test Set-Up.

- The Set Pressure value is to be obtained on Increasing Vacuum.

5.1 POSRV Functional Testing

Functional Testing of POSRVs can be accomplished by performing Sections 5.2 POSRV Test Setup and 5.3 Obtain POSRV As-Found Data.

5.2 POSRV Test Setup

NOTE -  Figure 1 or Figure 2 may be referenced for the following steps.

5.2.1 IF testing is performed in 241-AN or 241-AW farm, REMOVE lock on Field Test Valve “A”.

5.2.2 ADJUST handle on Field Test Valve “A” to the Field Test Position to line up Testing Equipment.

5.2.3 PERFORM pre-job Rad Survey.

5.2.4 RECORD the RSR number in the work record.

5.2.5 CONNECT Test Assembly using either Test Gauge #2

OR

CONNECT the optional Bubble Tester Bottle.

NOTE -  Per the vendor, the average value of three (3) actuations will be calculated, and that average value will be taken as the Set Pressure reading.

5.2.6 ENSURE Test Gauge #2 is installed AND

OPEN isolation valve to Test Gauge #2,

OR

CONNECT Bubble Tester Bottle.

5.2.7 ENSURE vent valve “B” and isolation valve “C” are in the closed position.

5.2.8 CONNECT vacuum source.
5.3 Obtain POSRV As-Found Data

5.3.1 START vacuum pump.

5.3.2 OPEN vent valve “B” to allow equalization to atmosphere in the Pilot Valve.

5.3.3 OPEN isolation valve “C” to vacuum source.

5.3.4 SLOWLY CLOSE vent valve “B”.

NOTE - Relief valve actuation is indicated by a deflection in Test Gauge #2 reading, or slight movement of the relief valve disc (See Figure 2) or, if using bubble tester, a small amount of liquid will be drawn into clear tubing.

- Vacuum should be allowed to stabilize when nearing Set Pressure value.

5.3.5 MONITOR Test Gauge #2 or the relief valve disc or bubble tester for relief valve actuation indication.

5.3.6 IF Test Gauge #1 is pulsing, ADJUST valves B, C and D when necessary to stabilize the vacuum.

5.3.7 SLOWLY INCREASE vacuum until POSRV actuates AND RECORD on Data Sheet if space is provided, OR

NOTE Test Gauge #1 reading on Comments Section of Data Sheet.
5.3 Obtain POSRV As-Found Data (Cont.)

5.3.8 REDUCE vacuum below the point at which the relief valve resets (closes).

5.3.9 REPEAT Steps 5.3.5 thru 5.3.8 two (2) additional times AND CALCULATE readings to get the average Set Pressure value.

5.3.10 RECORD the calculated average in As-Found column on Data Sheet.

5.3.11 IF As-Found Set Pressure value is not within specified tolerance per Data Sheet, GO TO Section 5.4, Calibrate POSRV Set Pressure Value.

OR

5.3.12 IF As-Found Set Pressure value is within specified tolerance but deemed marginal, and optimization is desired, GO TO Section 5.4, Calibrate POSRV Set Pressure Value.

OR

5.3.13 IF As-Found Set Pressure value is within specified tolerance, RECORD As-Found value in As-Left column of Data Sheet AND GO TO Section 5.5, Restoration.
5.4 Calibrate POSRV Set Pressure Value

5.4.1 IF POSRV is existing (not new installation), GO TO Step 5.4.10.

NOTE - Set Pressure adjustment is made on increasing vacuum. Therefore if Set Pressure is overshot, the vacuum will be reduced to less than Set Pressure prior to continuing.

5.4.2 ENSURE Test Assembly to POSRV is connected per Section 5.1.

NOTE - Figure 1 or Figure 2 may be referenced for bubble tester set-up connection.

5.4.3 ENSURE Test Gauge #2 is installed and its isolation valve is Open

OR

ENSURE bubble tester set-up is connected.

5.4.4 ENSURE isolation valve “C” is closed.

5.4.5 ENSURE Field Test Valve “A” is lined up to test equipment.

5.4.6 OPEN vent valve “B” to allow equalization to atmosphere in the Pilot Valve.

5.4.6.1 AFTER equalization, CLOSE vent valve “B”.

5.4.7 REMOVE the POSRV Adjustment Screw Cap.

5.4.8 TURN the Set Pressure adjustment screw clockwise until it is screwed in 80% to 90%.

NOTE - Relief valve actuation is indicated by a deflection in Test Gauge #2 reading, or slight movement of the relief valve disc (Figure 2) or, if using bubble tester, a small amount of liquid will be drawn into clear tubing.

- Vacuum should be allowed to stabilize when nearing Set Pressure value.

5.4.9 OPEN isolation valve “C”.

5.4.10 IF Test Gauge #1 is pulsing, ADJUST valves B, C and D to stabilize the vacuum.

NOTE - Pressure/Vacuum is applied slowly to lessen the chance overshooting.

5.4.11 SLOWLY APPLY Set Pressure/Vacuum per Data Sheet.

5.4.12 MONITOR Test Gauge #2 or the relief valve or bubble tester for relief valve actuation indication.
5.4 Calibrate POSRV Set Pressure Value (Cont.)

5.4.13 SLOWLY BACK the Set Pressure adjustment screw out until one of the following results occurs:
- A deflection in Test Gauge #2 indication is observed
- (If using bubble tester) A small amount of liquid is drawn into the clear tubing
- Slight movement of the relief valve disc. (See Figure 2)

5.4.14 RELEASE vacuum from POSRV.

NOTE - Vacuum should be allowed to stabilize when nearing Set Pressure value.

5.4.15 SLOWLY INCREASE Vacuum (to lessen the chance overshooting) to Set Pressure value per Data Sheet

5.4.15.1 ADJUST vacuum adjustment screw on POSRV (ref. Figure 1 or Figure 2) to obtain relief valve actuation at Set Point value.

5.4.16 REDUCE vacuum below the point at which the relief valve resets (closes).

5.4.17 MONITOR Test Gauge #2 or the relief valve disc or bubble tester for relief valve actuation indication.
5.4 Calibrate POSRV Set Pressure Value (Cont.)

5.4.18 SLOWLY INCREASE vacuum until POSRV actuates AND

RECORD on Data Sheet, if space is provided

OR

NOTE Test Gauge #1 reading on Comment Section of Data Sheet.

5.4.19 REDUCE vacuum below the point at which the relief valve resets (closes).

5.4.20 REPEAT Steps 5.4.17 thru 5.4.19 two (2) additional times AND

CALCULATE readings to get the Average Set Pressure value.

5.4.21 IF Average Set Pressure reading is within tolerance per Data Sheet,

RECORD As-Left value on Data Sheet AND

GO TO Section 5.5, Restoration.

5.4.22 IF Average Set Pressure reading is not within tolerance per Data Sheet,

REPEAT Steps 5.4.14 through 5.4.21 until value is within tolerance.

OR

5.4.23 IF Average Set Pressure reading cannot be brought to tolerance, NOTIFY

FLM for resolution AND

STOP WORK until further directed.
5.5 Restoration

5.5.1 TURN OFF vacuum pump.

5.5.2 CLOSE isolation valve “C”.

5.5.3 OPEN vent valve “B” to allow equalization to atmosphere in pilot valve.

5.5.4 IF Test Gauge #2 is used, ENSURE associated isolation valve is closed.

5.5.5 REMOVE Test Equipment and field test assembly AND REPLACE any piping, caps, or plugs that were removed for testing.

NOTE - Figure 1 or Figure 2 may be referenced for returning Field Test Valve “A” to Normal Operating Position.

5.5.6 RETURN Field Test Valve “A” to Normal Operating Position.

NOTE - Independent Verification is required on Field Test Valve “A” in 241-AN and 241-AW Farms.

5.5.7 IF testing was performed in 241-AN or 241-AW Farm, PERFORM Independent Verification as follows:

5.5.7.1 SIGN on PMID Data Sheet that Field Test Valve “A” is in Normal Operating Position.

5.5.7.2 INDEPENDENTLY VERIFY that Field Test Valve “A” is in Normal Operating Position.

5.5.7.3 Independent Verifier SIGN on the PMID Data Sheet.

5.5.8 PERFORM post-job Rad Survey.

5.5.9 RECORD the RSR number in the work record.

5.5.10 IF any problems were encountered with calibration, INFORM FLM.

5.5.11 ENSURE equipment system restoration by observing indications are consistent with expected conditions.

5.5.12 ENSURE Test Equipment information and calibration status are recorded on Data Sheet.

5.5.13 NOTIFY Operations that testing is complete and system may be returned to desired configuration.
5.6 Acceptance Criteria

Acceptance Criteria has been met when steps in this procedure have been satisfactorily performed and As-Left values meet the specifications and tolerance(s) per the Data Sheet.

5.7 Review

5.7.1 INFORM FLM test is complete.

5.7.2 FLM REVIEW AND ENSURE the following:

- Completed Data Sheets meet the acceptance criteria
- 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 in the Comments/Remarks section of the Data Sheet, as applicable.

5.8 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 – 9300 Series Vacuum Relief Valve Test Setup

NOTE: All Test Tubing and Fittings, 3/8” Minimum I.D.
Anderson Greenwood - Set Pressure Verification and Adjustment for Pilot-Operated Vacuum Relief Valve

Figure 2 - 9200 Series Vacuum Relief Valve Test Setup for AN and AW Farms Only