Glycol System Maintenance on POR06 Exhauster Heat Exchanger

Tank Farm Maintenance Procedure

MAINTENANCE

USQ # GCX-2

<table>
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<th>Release Date</th>
<th>Justification</th>
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<td>06/21/2018</td>
<td>Periodic Review</td>
<td>Corrected Page 12, broken Hyperlink in Special Instructions.</td>
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<td>A-1</td>
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<td>Maintenance Request</td>
<td>Changed Reference from POR-006 to POR06, Delete Steps 2.1.4 and 2.1.5, 2.2.2, Added Note to 5.0, rewrote Activity &quot;Drain Glycol Tank&quot;, rewrote Activity &quot;Flush Glycol Tank&quot;, rewrote Activity &quot;Rinse Glycol Tank&quot;, rewrote Activity &quot;Clean Glycol Site Glass&quot;, rewrote Activity &quot;Fill Glycol Reservoir Tank, Changed Record Section and Added new Drawing Rev.</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for maintenance of the glycol system on the heat exchanger for Exhauster POR06 located at T Farm.

1.2 Scope

This procedure involves inspecting the Exhauster heater system, cleaning the reservoir sight glass, cycling the glycol system valves and sampling, flushing, rinsing, and adding the propylene glycol/water mixture to the Glycol Tank in POR06 Exhauster heat exchanger located at T Farm.

2.0 INFORMATION

2.1 General Information

2.1.1 Unless otherwise specified, component identification numbers are preceded by “POR06-VTP”.

2.1.2 Glycol can be drained from system by using one of the following methods:

- Gravity drain with tubing connected to Glycol drain valve.
- Peristaltic pump using tubing connected to Glycol drain valve.

2.1.3 The Glycol system will hold approximately eight to ten (8-10) gallons.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 Glycol tank, exposed piping and valves may be hot (120°F to 190°F). Temperature will be verified and allowed to cool below 120°F prior to working glycol system.

3.1.2 During the performance of the low temperature system maintenance, compliance with the DOE-0336, Hanford Site Lockout/Tagout Procedure is required.

3.1.3 Utilize TVIS-T-001 and the appropriate SEG for work in or on the exhauster. Contact IH for the correct Sample Plan.

3.1.4 The Work package hazards for performance of this procedure have been determined to fall under the scope of the General Hazard analysis (GHA) in accordance with TFC-ESHQ-SAF_S-C-02.

3.2 Radiation and Contamination Control

3.2.1 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 Protection

3.3.1 The Central Shift Office must be notified in the event of a leak or a spill in accordance with TFC-ESHQ-ENV_FS-C-01, Environmental Notifications. This includes Prestone Radiator Flush, Propylene Glycol, de-mineralized water, and/or raw water.

3.3.2 Glycol heaters are listed as required abatement technology in applicable air permit for ventilation systems included in scope of this procedure and must be operable during exhauster operation. Any shutdown, bypass, or new issues identified with heater systems must be reported to the appropriate Operations shift manager and Environmental per the Environmental On-Call list.
4.0 PREREQUISITES

4.1 Special Tools, Equipment and Supplies

The following supplies may be needed to perform this procedure:

- Leather gloves
- Rubber gloves
- Waste container(s) capable of containing approximately 10 - 30 gallons
- Two (2) five gallon buckets for glycol transfer due to drain valve height restrictions (optional)
- Clear one (1) quart waste container
- Ground cover with absorbent pads
- Wrench (to remove 1” plug from drain valve)
- 1” (inch) 90° Street Elbow, NPT threads (for drain valve connection)
- 1” Tygon tubing; (length as determined by FWS)

OR

- 1” Tygon tubing, Peristaltic Grade; (length as determined by FWS)
- One, (1), 1”hose clamp for Tygon tubing
- Infrared Temperature Reading Gun or Thermometer °F
- Peristaltic pump (Optional)
  - GFCI (with extension cord) for Peristaltic pump
- Funnel
- Prestone radiator flush (GHS-SDS and/or MSDS #018682A)
- 50/50 mix of propylene glycol with corrosion inhibitors and de-mineralized water for glycol system (GHS-SDS and/or MSDS #038772, GHS-SDS and/or MSDS #041791 or equivalent)
- Bag with absorbents
- Pipe cleaners and rags
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User
4.1 Performance Documents

The following documents may be needed to perform this procedure:

- TO-100-052, Perform Waste Generation, Segregation, Accumulation and Clean-up
- TFC-ESHQ-ENV_FS-C-01, Environmental Notifications
- DOE-0336, Hanford Site Lockout/Tagout Procedure
- TO-060-045, Operate POR06 Portable Exhaust Ventilation System
- H-2-829116, Sh. 1, POR06 Portable Exhaust System

4.2 Field Preparation

4.2.1 NOTIFY HPT coverage is required during system breach.

4.2.2 REQUEST Operations to configure the identified system to allow performance of this procedure.

4.2.3 ENSURE lockout/tagout and overlocking requirements have been satisfied per DOE-0336, Hanford Site Lockout/Tagout Procedure.
5.0 PROCEDURE

Special Instructions

Refer to Figure 1 for Glycol System layout and valve location.

As field conditions dictate, Steps and Activities may be performed in any logical order, in parallel, independently or N/A’ed to complete individual task(s) when directed by FWS with directions recorded on work record or Comments Section of Data Sheet.

5.1 POR06 Glycol System Maintenance

Inspect Heater System and Cycle Valves

5.1.1 CONFIRM with operations that low temperature system is lock and tagged per DOE-0336, Hanford Site Lockout/Tagout Procedure.

5.1.2 DON appropriate PPE per Section 4.1.

5.1.3 VISUALLY INSPECT the following Glycol system components for damage, corrosion, etc.
- Recirculation Heater (HTR-001)
- Recirculation Pump (P-001)
- Heat Exchanger (HX-001)
- Piping
- Instrumentation and Controls.

5.1.4 RECORD inspection results on in Data Sheet.

5.1.5 CHECK drain valve V-204 on Glycol system is capped/plugged.

5.1.5.1 IF not, OBTAIN cap/plug for installation during Restoration Section 5.2.

5.1.6 CONFIRM at HMI that glycol heater and pump is OFF at HMI or with Infrared Temperature Reading Gun.

NOTE - Depending on temperature, it could take up to 24 hours for glycol to cool below 120°F.

5.1.7 CHECK glycol temperature using HMI or Infrared Temperature Reading Gun.

5.1.7.1 IF glycol temperature is above 120°F, ALLOW cooling until the temperature is below 120°F.
5.1 POR06 Glycol System Maintenance (Cont.)

5.1.8 RECORD the As Found valve(s) positions on the Data Sheet.

5.1.8.1 CYCLE each of the valves manually two (2) to three (3) times.

5.1.8.2 RETURN valves to As Found position.

5.1.9 RECORD any discrepancies and/or comments on Data Sheet.

Drain Glycol Tank

5.1.10 INSTALL ground cover with absorbent pads under glycol waste container(s), glycol reservoir tank and glycol tank drain valve.

5.1.11 DON appropriate PPE per Section 4.1.

NOTE - POR06 utilizes a “Fill Cap/Vent” versus a Vent Valve (Figure 1).

5.1.12 OPEN glycol Fill Cap/Vent (Figure 1) AND

SIMULTANNEOUSLY APPLY wet rag to “Fill Cap/Vent”.

5.1.13 IF installed, REMOVE 1” plug from glycol drain valve V-204 AND

SIMULTANNEOUSLY APPLY wet rag to drain valve.

5.1.14 ATTACH 1” 90° street run elbow to glycol drain valve V-204 AND

TIGHTEN snug (with room to allow connection of hose).

5.1.15 IF using Peristaltic Pump to drain glycol from tank, GO TO Step 5.1.17.

NOTE - Five gallon bucket(s) may be required for glycol transfer due to drain valve height restrictions.

5.1.16 DRAIN Glycol tank using Gravity Flow as follows:

5.1.16.1 CONNECT/TIGHTEN 1” hose to 90° street run elbow at V-204, glycol drain valve AND

ROUTE drain hose into an appropriate waste container(s).

5.1.16.2 OPEN glycol drain valve V-204.
5.1 POR06 Glycol System Maintenance (Cont.)

5.1.16.3 AFTER system is fully drained (observed by no more fluid draining from tank), PERFORM the following:
   a. CLOSE glycol Fill Cap/Vent (Figure 1).
   b. CLOSE glycol tank drain valve V-204.

5.1.16.4 VISUALLY INSPECT drained glycol AND RECORD any discoloration, sediment, etc. on Data Sheet.

5.1.16.5 GO TO Step 5.1.19.

5.1.17 DRAIN Glycol tank using Peristaltic Pump as follows:

5.1.17.1 INSTALL end of drain hose, connected to outlet of peristaltic pump into an appropriate waste container(s).

5.1.17.2 INSTALL length of drain hose connected to inlet of peristaltic pump to the glycol drain valve V-204.

5.1.17.3 OPEN Glycol drain valve V-204.

5.1.17.4 PLUG GFCI to peristaltic pump and 120 volt receptacle (using extension cord if needed) AND TURN peristaltic pump switch on to drain glycol tank.

5.1.17.5 AFTER system is fully drained (observed by no more fluid draining from tank) DÉ-ENERGIZE peristaltic pump.

5.1.17.6 CLOSE glycol drain valve V-204.

5.1.18 VISUALLY INSPECT drained glycol AND RECORD any discoloration, sediment, etc. on Data Sheet.

5.1.19 IF not already open, OPEN FIELD CAP/VENT (located on top of glycol tank TK-001) AND APPLY wet rag to Fill/Vent port.
5.1 POR06 Glycol System Maintenance (Cont.)

NOTE - Glycol system holds approximately eight to ten (8 - 10) gallons.

5.1.20 ADD required quantity per manufacturer’s instructions of flush solution (Prestone Radiator Flush/De-ionized water) into glycol tank TK-001 FIELD CAP/VENT until level indicator (sight glass LG-201) reads approximately 55-60%.

5.1.21 CLOSE Fill/Vent Port located on top of glycol tank TK-001.

5.1.22 REQUEST operations to START the glycol pump using Glycol Pump On/Off Hand Switch HS-102 (to cycle the flush solution throughout system).

5.1.23 RUN glycol pump for 2 hours (minimum) to achieve proper flush.

5.1.24 WHEN flush is complete, REQUEST operations to STOP glycol pump using HS-102.

5.1.25 To drain flush solution GOTO Step 5.1.10 Drain Glycol Tank.

5.1.26 RECORD flush completed on Data Sheet.

5.1.27 VISUALLY INSPECT drained flush solution AND

RECORD any discoloration, sediment, etc. on Data Sheet.

5.1.28 RE-FLUSH Glycol System until no discoloration, sediment, etc is found AND

GO TO Step 5.1.29.

Rinse the Glycol Tank

5.1.29 IF not already open, OPEN FIELD CAP/VENT located on top of glycol tank TK-001.

5.1.30 ADD the required quantity of de-ionized water into glycol tank FIELD CAP/VENT until level indicator (sightglass LG-201) reads approximately 55-60%.

5.1.31 CLOSE FIELD CAP/VENT located on top of glycol tank TK-001.

5.1.32 REQUEST operations to START the glycol pump using Glycol Pump ON/OFF Hand Switch HS-102 to cycle the rinse solution throughout system.

5.1.33 RUN glycol pump for 2 hours (minimum) to achieve proper rinse.
5.1 POR06 Glycol System Maintenance (Cont.)

5.1.34 WHEN the rinse is complete, REQUEST operations to STOP glycol pump using Glycol Pump ON/Off Hand Switch HS-102.

5.1.35 To drain flush solution GOTO Step 5.1.10 Drain Glycol Tank.

5.1.36 IF rinse results for Glycol Tank are not satisfactory, REPEAT Steps 5.1.29 through 5.1.35.

5.1.37 RECORD satisfactory rinse on Data Sheet.

5.1.38 DISCONNECT AND REMOVE hose from drain valve, V-204.

5.1.39 GO TO Step 5.1.40 to clean Sight Glass.

Clean Glycol Reservoir Tank Sight Glass

Special Instructions

POR06 does not have Sight Glass isolation valves and may be difficult or impractical to clean. If so, enter N/A (with comments) for sight glass cleaned on Data Sheet and go to Step 5.1.46 or, if possible to clean sight glass, continue with Step 5.1.40.

5.1.40 PLACE a bag with absorbents under glycol tank sight glass LG-201.

5.1.41 ENSURE no glycol can be seen in site glass.

5.1.42 DISASSEMBLE sight glass assembly.

5.1.43 CLEAN sight glass with pipe cleaners, rags, etc.

5.1.44 RE-ASSEMBLE sight glass assembly using new parts if required.

5.1.45 RECORD sight glass cleaned on Data Sheet.
5.1 POR06 Glycol System Maintenance (Cont.)

**Fill Glycol Reservoir Tank**

5.1.46 **ENSURE** valves on Data Sheet valve table have been returned their As-Found positions **AND**

**RECORD** the valve positions in the As-Left column of the Data Sheet Table.

**NOTE** - The glycol system holds approximately eight to ten (8 to 10) gallons.

5.1.47 **IF** FIELD CAP/VENT on glycol reservoir tank is closed, **OPEN** FIELD CAP/VENT.

5.1.48 **ADD** a mixture of 50% de-ionized water and 50% propylene glycol with corrosion inhibitors to glycol reservoir tank until glycol level indicator reads approximately 55-60%.

5.1.49 **CLOSE** FIELD CAP/VENT.

5.1.50 **RECORD** volume of glycol mixture added on Date Sheet.

5.1.51 **REQUEST** operations to **START** the glycol pump using Glycol Pump ON/OFF Hand Switch HS-102 (to cycle the glycol solution throughout system).

5.1.52 **RUN** glycol pump for ≈ ten (10) minutes to disperse glycol through system.

5.1.52.1 **WHILE** pump is running, **CHECK** for leaks **AND**

**TIGHTEN/REPAIR** any leaks found.

5.1.53 **WHEN** the run time is complete, **REQUEST** operations to **STOP** glycol pump using Glycol Pump ON/OFF Hand Switch HS-102.

5.1.54 **ALLOW** approximately 10 minutes for glycol drain-back to Tank.

5.1.55 **IF** glycol level indication is > 55% **GO TO** Step 5.1.57.

5.1.56 **IF** glycol level indication is < 55%, **REPEAT** Steps 5.1.48 thru 5.1.55 until glycol level is 55-60%.

5.1.57 **ENSURE** glycol FIELD CAP/VENT is closed.

5.1.58 **RECORD** glycol reservoir tank fluid level As-Left reading (approximate) on Data Sheet.
5.2 Restoration

5.2.1 IF any de-ionized water or propylene glycol is spilled, NOTIFY Shift Manager to contact Environmental per on-call list to inform them of event and amount.

5.2.2 IF not already installed, INSTALL cap/plug on drain valve.

5.2.3 IF any problems were encountered, INFORM FWS.

5.2.4 DISPOSE of fluids in waste container per TO-100-052 and waste planning checklist.

5.2.5 REMOVE ground cover.

5.2.6 DISPOSE of bag with absorbents per TO-100-052 and waste planning checklist.

5.2.7 ENSURE lockout/tagout and overlocking has been removed in accordance with DOE-0336, Hanford Site Lockout/Tagout Procedure.

5.2.8 NOTIFY Operations that testing is complete and system may be returned to desired configuration.

5.3 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.

5.4 Review

5.4.1 INFORM FWS test is complete.

5.4.2 FWS 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.
5.5 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 – POR06 Glycol System

Excerpt from Drawing H-2-829116, Sheet 1