Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

Tank Farm Maintenance Procedure

MAINTENANCE

USQ # N/A-4

Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

CHANGE HISTORY ( ≤ LAST 5 REV-MODS )

<table>
<thead>
<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
<th>Justification</th>
<th>Summary of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-5</td>
<td>12/18/2017</td>
<td>Maintenance Request</td>
<td>Add &quot;(200ml - 500ml)&quot; to Section 4.1. Reword 4.3.1 from: &quot;OBTAIN 2 clean VOA sample collection bottles – one with a capacity of 500ml and one with a capacity of 200ml.&quot; To read as: &quot;OBTAIN 2 clean VOA sample collection bottles – with a capacity between 200ml and 500ml.&quot; Change Step 5.1.7 to a OR continuation. Add to Step 5.2.8 &quot;greater than or equal to 200ml&quot; Remove from Step 5.2.14: &quot;(Point-of-contact is currently Barry Orth at 270HV/B105/200E)&quot;. Step 5.1.6 IF oil level is not visible in sight glass, REFILL per section 5.3 DOCUMENT Oil level on Data Sheet 1 OR IF annual oil sampling is due GO TO Section 5.2 OR IF annual oil sampling is not due GO TO Section 5.6</td>
</tr>
<tr>
<td>B-4</td>
<td>06/12/2017</td>
<td>Periodic Review</td>
<td>Inconsequential Change. Removed as necessary from Step 3.1.1. Added First and Last to Signature Page Table 2 and Record Section Update.</td>
</tr>
<tr>
<td>B-3</td>
<td>01/07/2016</td>
<td>Operations Request</td>
<td>Modified 1.1 &amp; 1.2, struck out &quot;routine maintenance&quot; of 5.1 title, two bullets 5.1, modified 5.1.6, struck out 5.1.7 - 5.1.20, moved warming and caution to new section 5.3, modified 5.1.11, added new section 5.3, modified signature on Data Sheet 2. Step 5.1.2.1 add the word &quot;be&quot; after the words &quot;or need to...&quot; and switch words &quot;to go&quot; to &quot;go to&quot;. Step 5.2.2 replace word &quot;new&quot; with &quot;clean&quot;. Step 5.2.9 delete the word &quot;black&quot; Step 5.2.11 add words &quot;in site glass&quot; after phrase &quot;IF oil level...&quot; and replace word &quot;low&quot; with words &quot;below 20%&quot;. Section 5.3 rename to &quot;ADD OIL TO LEAD GLASS SHIELDING WINDOWS&quot; Step 5.3.2 first bullet - replace word &quot;new&quot; with &quot;clean&quot; Step 5.3.3 replace word &quot;new&quot; with &quot;clean&quot; Step 5.3.4 replace word &quot;new&quot; with &quot;clean&quot; Step 5.4.1 replace word &quot;new&quot; with &quot;clean&quot; Step 5.4.2 switch words &quot;approximate the...&quot; to &quot; the approximate.&quot; Steps 5.1.2 is a repeat of 5.1.6 information in BOLD below 5.1.5 should be a step, and change 40% to 20% 5.3.10 and 5.3.11 should be a separate section 5.4 5.1.2 link to new 5.4 5.3.9 to 20%-50%</td>
</tr>
<tr>
<td>B-2</td>
<td>07/21/15</td>
<td>Maintenance Request</td>
<td>Added 500ml collection bottle to step 4.3.1, changed 5.2.8 to 500ml BOA oil sample. Added section 5.2.10, Changed 5.2.14 to Barry and changed B102 to B105. Added &quot;use one data sheet for each sample taken&quot; to section 5.5.1</td>
</tr>
<tr>
<td>B-1</td>
<td>11/19/2014</td>
<td>CHAMPS Removal</td>
<td>Removed reference to CHAMPS, updated records statements and removed next periodic review date.</td>
</tr>
</tbody>
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      |             |         |              |      |
REFERENCE | 7-MISC-858 | B-5     | 12/18/2017   | 1    |
Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for performing general monthly maintenance of the lead glass shielding windows in 242-A.

This procedure provides instructions for performing annual oil sampling of lead glass shielding windows in 242-A.

1.2 Scope

This procedure involves monthly inspection, repair, and/or replacement of the 242-A aqueous make up AMU room lead glass shielding window oil.

This procedure also involves the annual sampling of the mineral oil in the 242-A aqueous make up AMU room lead glass shielding window.

2.0 INFORMATION

2.1 Terms and Definitions

- VOA  Volatile Organic Analysis
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

WARNING - Lead glass shielding window has the potential to create a dielectric discharge resulting in a potential electrical shock hazard to personnel and or explosions.

3.1.1 This procedure is written in a generic manner to allow for its performance in multiple locations. As such, location-specific hazards will not be identified. Perform a hazard analysis on location-specific hazards in accordance with TFC-ESHQ-SAF_S-C-02.

3.2 Equipment Safety

CAUTION - Over pressurizing interior of window could cause the window to fail.

CAUTION - Failure to perform a pre-sample flush may result in contaminated samples and incorrect lab test results.
Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

4.0 PREREQUISITES

4.1 Special Tools, Equipment and Supplies

The following supplies may be needed to perform this procedure:
- Cart/Table
- White gloves for window inspection
- Two-stage gas regulator
- Nitrogen tank
- Peristaltic pump
- Lead Glass Shielding Window Neoprene Bellows
- Carboy or Drum of Certified Hot Cell white mineral oil
- Polyethylene tubing
- 2 clean sample collection bottles (200ml-500ml)
- Black electrical tape
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
- 2-MISC-160, Static Bonding for Portable Equipment in Tank Farms
- Site Form A-6004-228
- Current revision of GHS-SDS and/or MSDS #038564, Hot Cell white mineral oil
- Current revision of GHS-SDS and/or MSDS #037959, Nitrogen
- TO-100-052, Perform Waste Generation, Segregation, Accumulation and Clean-up.
4.3 Field Preparation

4.3.1 **OBTAIN** 2 clean VOA sample collection bottles – with a capacity between 200ml and 500ml.

4.3.2 **ENSURE** a fire extinguisher is staged at the worksite as required by GHS-SDS and/or MSDS #038564.

4.3.3 **CONFIRM** no hot work will be in-progress within 20 feet of the worksite. (No work involving arcing, sparkling, welding, grinding, or oxygen/acetylene torches.)

4.3.4 **ENSURE** room lighting and hot cell interior lighting is functioning sufficiently to perform visual inspections of visibility, clarity, and cover glass status.
5.0 PROCEDURE

5.1 Perform Monthly Checks of Lead Glass Shielding Window(s)

5.1.1 DURING performance of this procedure, DOCUMENT the following on Data Sheet 1:
- Results of all inspections made
- Any directions received from Shift Manager, OE, Maintenance Manager or FWS.

Inspect Overall Condition of Shielding Windows (Steps 5.1.2 through 5.1.5)

5.1.2 IF neoprene bellows are damaged or deteriorated, REPAIR OR REPLACE them.

5.1.2.1 IF bellows have been replaced or need to be refilled with Nitrogen go to section 5.4

5.1.3 INSPECT window and frame for indication of oil leakage.

5.1.4 PERFORM window clarity and cover glass inspection.

5.1.5 IF cover glass damage, window clarity degradation, or shielding oil leakage is observed, CONTACT system engineer for further direction.

Check Oil Level of Lead Glass Shielding Windows

5.1.6 IF oil level is below 20% of the sight glass, REFILL per section 5.3 DOCUMENT Oil level on Data Sheet 1

OR

IF annual oil sampling is due GO TO Section 5.2

OR

IF annual oil sampling is not due GO TO Section 5.6.
5.2 Perform Annual Sampling of Lead Glass Shielding Window(s) Oil

5.2.1 PREPARE sample labels with the following information:
- Requesting Company - Washington River Protection
- 242-A Evaporator
- Date/Time sample was taken (e.g. 05/15/2012, 0800)
- Sample Source - (e.g. Upper Pump Room Shield Window)
- Sample number (e.g. sample #1, #2, or #3)
- WRPS Contract #49047
- Material being sampled - White mineral oil
- GHS-SDS and/or MSDS #038564.

OR

IF sample bottle will be used to collect waste oil used to flush out the sample line PREPARE a label that reads; VOID SAMPLE - NOT TO BE SHIPPED FOR ANALYSIS.

5.2.2 USE clean polyethylene tubing, to connect drain line to shielding window lower valve as shown in Figure 3.

5.2.3 OPEN shielding window lower valve.

CAUTION
Failure to perform a pre-sample flush may result in contaminated samples and incorrect lab test results.

5.2.4 FLUSH 200ml of oil to a sample collection bottle to clear out valve assembly of old oil, dirt, etc. THEN

CLOSE shielding window lower valve.

5.2.5 CAP sample collection bottle AND

SET ASIDE for later disposal.
Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

5.2 Perform Annual Sampling of Lead Glass Shielding Window(s) Oil (Cont.)

5.2.6 PLACE a VOID SAMPLE label on sample bottle used to collect flushing oil.

5.2.7 OPEN shielding window lower valve.

5.2.8 COLLECT a greater than or equal to 200ml Volatile Organic Analysis (VOA) oil sample; ensuring air/water contamination is kept out of sample as much as feasible THEN

CLOSE shielding window lower valve.

5.2.9 TIGHTLY SEAL sample bottle using electrical tape AND

LABEL for shipping.

5.2.10 RECORD the following in the work record:

- Sample Source – (e.g. Upper Pump Room Shield Window)
- Sample number (e.g. sample #1, #2, or #3)

5.2.11 IF oil level in site glass is below 20% after sampling is completed add oil per Section 5.3.

5.2.12 REQUEST Waste Owner/Custodian complete Part A of site form A-6004-228.

5.2.13 REQUEST HPT complete Part B of site form A-6004-228.

5.2.14 DELIVER the following to WRPS TOC Sampling Operations Group:

- Collected sample(s)
- Site Form A6004-228 with parts A and B completed and signed
- A copy of GHS-SDS and/or MSDS #038564
- Contact information for Hot Cell Services in Kent, WA. 2538544945 or hotcell@hotcell.com.
- Shipping Information as follows:
  Ship to: Hot Cell Services
  22626 85th Pl. S
  Kent, WA. 98031
5.3 Add Oil to Lead Glass Shielding Windows

**WARNING**

Lead glass shielding window has the potential to create a dielectric discharge resulting in a potential electrical shock hazard to personnel and or explosions.

5.3.1 ENSURE window is bonded per procedure 2-MISC-160.

5.3.2 PRIOR (24 hours or more) to performing oil fill, ENSURE the following oil fill equipment is staged near the window.
- Peristaltic pump / clean polyethylene tubing
- Nitrogen bottle and regulator
- Carboy or oil drum
- Two-stage gas regulator
- 3 Liter neoprene bellows.

5.3.3 USE clean polyethylene tubing, to connect pump to oil source as shown in Figure 1.

5.3.4 USE clean polyethylene tubing, to connect pump to shielding window as shown in Figure 1.

5.3.5 INTERMITTENTLY MONITOR O₂ levels to verify they remain between 19.5% and 23.5%.

5.3.5.1 IF O₂ levels are outside acceptable range, CONFIGURE work area in a safe configuration AND EXIT the area until levels have returned to a safe range.

**CAUTION**

Over pressurizing interior of window could cause the window to fail.

5.3.6 SLOWLY PRESSURIZE the new carboy/drum of oil sufficiently to slightly inflate oil drum neoprene bellows to the approximate size of a football.
5.3  Add Oil to Lead Glass Shielding Windows Cont.  

5.3.7  PUMP oil into the window while venting at the top as shown in Figure 1.

5.3.8  WHEN filling oil reservoir, CONSIDER oil expansion/contraction due to window temperature fluctuation.

5.3.9  WHEN window sight glass indicates between 20% and 50% full, STOP pumping oil into the window.

5.4  Recharge Upper Neoprene Bellows

5.4.1  USE clean polyethylene tubing to connect nitrogen to shielding window as shown in Figure 2.

CAUTION
Over pressurizing interior of window could cause the window to fail.

5.4.2  SLOWLY PRESSURIZE shielding window(s) with nitrogen such that the neoprene bellows slightly inflates to the approximate size of a football.
5.5 Restoration

5.5.1 IF any problems were encountered, INFORM FWS.

5.5.2 DISCONNECT AND REMOVE Test Equipment and equipment bonding.

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

5.5.4 NOTIFY Operations checks and/or sampling is complete.

5.5.5 FWS ENSURE the job site has been cleaned and all waste has been placed in proper containers per TO-100-052.

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 WHEN test results are received from off-site test facility, RECORD sample test results for each sample taken on Data Sheet 2. Use one data sheet for each sample taken.

5.7.2 INFORM FWS periodic maintenance is complete.

5.7.3 FWS REVIEW AND ENSURE the following:

- Completed Data Sheets meet 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.

5.8 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 Retention and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.
Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

Data Sheet 1 - Monthly Inspection of Lead Glass Shielding Window(s) Work Record

<table>
<thead>
<tr>
<th>Date</th>
<th>Work Event/Inspection Findings/Directions Given/etc.</th>
<th>Initials</th>
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<tbody>
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Final Review Comments

SM/OE/FWS Sign/Print (First & Last)/Date
Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

Data Sheet 2 - Lab Test Results for Annual Sampling of Shielding Window Oil

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<table>
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<tbody>
<tr>
<td>Neutralization number per ASTM D974</td>
<td>(acceptable is less than 0.006mg/KOH/g., marginal is 0.006 - 0.007mg KOH/g., unacceptable is 0.008 mg KOH/g or greater)</td>
</tr>
<tr>
<td>Neutralization # ____________________</td>
<td>Circle one: Acceptable / Marginal / Unacceptable</td>
</tr>
<tr>
<td>Water Content per ASTM D6304.</td>
<td>(acceptable is less than 15 ppm, marginal is 15-19 ppm, unacceptable is 20 ppm or greater)</td>
</tr>
<tr>
<td>Water content ______________________</td>
<td>Circle one: Acceptable / Marginal / Unacceptable</td>
</tr>
<tr>
<td>Peroxide Content per ASTM E299.</td>
<td>(acceptable is less than 10 ppm, marginal is 10-34 ppm, unacceptable is 35 ppm or greater)</td>
</tr>
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<td>Peroxide Content ____________________</td>
<td>Circle one: Acceptable / Marginal / Unacceptable</td>
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<tr>
<td>Comments</td>
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</tbody>
</table>

Engineering Sign/Print (First & Last)/Date
Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

Figure 1 - Configuration for Filling Shielding Window with Oil

Neoprene Bellows

Vent

Shielding Window Lower Valve

Neoprene Bellows

Nitrogen

Cart

New Oil

Persitaltic Pump

Reference Document No. 7-MISC-858

Release Date: 12/18/2017
Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

Figure 2 - Configuration for Checking Upper Bellows

Neoprene Bellows

Vent

Nitrogen
Perform Monthly and Annual Checks of Oil Filled Lead Glass Shielding Windows

Figure 3 - Configuration for Taking Annual Sample(s)

Neoprene Bellows
Vent
Collection Bottle
Shielding Window Lower Valve

Collection Bottle