Sampling from Tank Farm Stacks Using Sorbent Tubes

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This is a new revision. The First Time Use process as defined in TFC-OPS-OPER-C-13 can be used during the initial performance of this revision.
1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for sampling organic and/or mercury emissions emitted from Tank Farm ventilation exhaust stacks using sorbent tubes. Sampling is required to meet permit conditions. The principles of collection are based upon EPA Method 18 and 30B.

1.2 Scope

1.2.1 This procedure applies to ventilation exhaust stacks located in East and West Tank Farms that are permitted by the Washington Department of Ecology (WDOE).

1.2.2 This procedure includes site-specific appendices. Changes or revisions to the instructions may affect the appendices and must be approved by Environmental.

1.2.3 This procedure is worked in accordance with approved work packages.

2.0 INFORMATION

2.1 Terms and definitions

Field calibration. Procedure used at the sampling location at the beginning, during and end of the sample collection period to determine the volumetric flow rate of air through the sampling train. Field calibration typically consists of attaching a calibration device to the sampling train and recording the corresponding flow rate.

Primary standard. Measures precisely the parameters that govern flow rate, i.e., volume and time.

2.2 General Information

Samples shall be taken in accordance with an approved Sample and Analysis Plan (SAP).
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 The Hazards relating to the task(s)/step(s) within the scope of this work package have been analyzed and determined to fall within the General Hazard Analysis.

3.1.2 When liquids are present or handling the absorbent materials, workers need to wear surgeons’ or nitrile gloves.

3.1.3 Contact IH for current and appropriate TVIS (Tank Vapor Information Sheet) and RC (Risk Classification) sampling plan.

3.2 Equipment Safety

3.2.1 Primary exhauster must be running.

3.2.2 When environmental conditions exist where extreme cold or damp weather conditions could potentially cause condensation to form on the sampling system, precautions must be taken to knock out the water or prevent it from condensing.

3.2.3 Tubes may contain sharp edges and precautions against cuts should be taken.

3.3 Radiation and Contamination Control

3.3.1 When work is performed in or when work will result in a high contamination, high radiation, or an airborne radioactivity area, then an approved work package must be developed which is reviewed by Radiological Control per ALARA Work Planning procedure TFC-ESHQ-RP-RWP-C-03.

3.3.2 Radiological Release of IH sampling equipment from radiological areas will be performed using a survey release plan for IH sampling equipment.

3.3.3 Without proper use of a drape and the wiping of equipment upon removal from the ventilation system could cause personnel and/or environmental contamination.

3.3.4 The following controls shall be implemented when working on potentially contaminated tank farm ventilation systems:

3.3.4.1 Directed airflow is maintained at the inspection point.

3.3.4.2 Insertion probes shall be wiped as they are removed from the port.
3.3 **Radiation and Contamination Control (Cont.)**

3.3.4.3 Yellow plastic bags shall be positioned close to the work to receive radioactive waste.

3.3.4.4 HPT Job Coverage is required for initial system breaching.

3.3.4.5 The work area will have Contamination Area posting or a well-defined boundary controlled as a Contamination Area by the job coverage HPT.

3.4 **Environmental Compliance**

3.4.1 All planned and unplanned outages of Tank Farm ventilation systems, abatement control equipment and exhaust monitoring systems must be reported to the applicable shift office per TF-REC-001 and Environmental per TFC-ESHQ-ENV_FS-C-01.

3.4.2 Any spills and/or releases shall be immediately reported to the appropriate WRPS Shift Office. This includes water discharges to surface contamination areas.

3.4.3 Sampling shall be conducted in accordance with an approved SAP.

4.0 **PREREQUISITES**

4.1 **Special Tools and Equipment**

- Sample Media (adsorption tube, see sampling plan for which tubes to use)
- Stainless Steel probe that extends to center of stack
- Flexible tubing that is Teflon or Teflon lined
- Leakless Sample Pump
- Flowmeter
- Stopwatch.

4.2 **Performance Documents**

The current revisions of the following documents may be needed to perform this procedure:

4.2.1 TO-100-052, Perform Waste Generation, Segregation, Accumulation and Clean-up.

4.2.2 Site-Specific Appendix, as required.
4.3 Field Preparation

NOTE - Steps 4.3.2 through 4.3.9 may be performed in any logical order AND/OR repeated.

4.3.1 **PERFORM** a documented Pre-Job Briefing prior to working in the field.

4.3.2 **CONFIRM** ventilation system to be sampled is operating.

4.3.3 **CONTACT** 222-S lab at least 24 hours in advance **AND** **CONFIRM** lab is ready to receive samples.

4.3.4 **PREPARE** shipping equipment.

4.3.5 **PERFORM** a review of the applicable Environmental Sampling Plan prior to execution of this procedure.

4.3.6 **PREPARE** chain of custody for samples.

4.3.7 **OBTAIN** sample media **AND** **PREPARE** the sampling train.

4.3.8 **LABEL** each sorbent tube with the sample number indicated in the sampling plan:
   
   4.3.8.1 **LABEL** one tube as the sample.
   
   4.3.8.2 **LABEL** one tube a field blank.
   
   4.3.8.3 **LABEL** one tube as the duplicate.

4.3.9 **PERFORM** Field Calibration of sampling pump.

4.3.10 **ASSEMBLE** the sampling train.
   
   4.3.10.1 **BREAK** or cut off both ends of the sorbent tube before sampling to provide an opening approximately one half the internal diameter of the tube.
   
   4.3.10.2 **POSITION** a sorbent tube vertically in the sampling train so that airflow through the tube is in the direction indicated by the flow arrow on the tube **AND** **ENSURE** that the backup section is positioned nearest the sampling pump.
4.3 Field Preparation

4.3.10.3 REFER to the Environmental Sampling Plan or the approved sampling method to determine the correct flow rate.

4.3.10.4 PERFORM leak test of all components AND ENSURE that leak rate is less than 4% of sample flow.
5.0  PROCEDURE

5.1 Perform Field Calibration of Sample Pumps

5.1.1 **OBTAINT** the proper air sampling pump per Environmental Sampling Plan.

5.1.2 **CHECK** that the maintenance calibration date on the sticker is current for the pump.

5.1.3 **IF** calibration is past due, **RETURN** pump to equipment custodian with a completed green tag, i.e., “IH Instrument Service Tag” (BT-6004-019) checking the box next to “Scheduled Maintenance Calibration”.

5.1.4 **CHECK** that the pump is fully charged.

5.1.5 **OBTAINT** a Bios DryCal electronic flow calibrator for the flow range needed.

5.1.5.1 **CHECK** that the maintenance calibration date on the sticker is current.

5.1.5.2 **IF** calibration is past due, **RETURN** the flow calibrator to equipment custodian with a completed green tag, i.e., “IH Instrument Service Tag” (BT-6004-019) **AND**

**MARK** the box next to “Scheduled Maintenance Calibration.”

5.1.6 **START** the pump **AND**

**RUN** for five minutes before calibrating.

5.1.7 **INSPECT** tubing to be used for holes or tears.

5.1.8 **STOP** the pump.

**NOTE** - The inlet and outlet ports of the primary flow calibrator are located on the right side of the unit. The lower port is for suction (labeled “OUTLET”) and the upper port is for pressure (labeled “INLET”).

5.1.9 **IF** a cassette adaptor is used, **USE** CARE to **ENSURE** that it DOES NOT come into contact with the back-up pad in the cassette.

5.1.10 **CONNECT** the sampling media, tubing, and pump to the suction port of the calibrator.
5.1 Perform Field Calibration of Sample Pumps

5.1.11 IF using sorbent tubes, PLACE tubes into the tube holder ports with the arrow (printed on sorbent tube) pointing toward the pump (direction of air flow).

5.1.11.1 IF there is no arrow on the sorbent tube, INSERT the end of the tube with the smallest sorbent section (i.e., backup section) into tube holder port.

5.1.11.2 IF using thermal desorption unit (TDU) sorbent tubes or individually hand-packed tubes, CONSULT the manufacturer or the lab for information regarding the orientation of the tube.

5.1.11.3 VERIFY label each calibration sorbent tube with the media type, e.g., Hydrar, etc., the date the tube was first opened, and the specific lot # for that tube.

5.1.11.4 SAVE the labeled calibration tube for use during the post-function flow check.

5.1.12 START the pump.

NOTE - The calibrator will show the current flow, the average flow, and the number of readings in the average.

5.1.13 START the calibrator by pressing the “ON” button.

5.1.13.1 PRESS the “READ” button once for a single measurement of flow.

5.1.13.2 PRESS and hold it for a few seconds for continuous readings.

5.1.13.3 PRESS the “STOP” button once, to stop the readings.

5.1.14 ADJUST the pump to the appropriate flow rate required by the Environmental Sample Plan.

5.1.14.1 IF the desired flow rate is not achieved, ADJUST the pump flow rate AND

REPEAT the calibration process until two consecutive average readings as noted above are within 2 % of the appropriate flow rate.

5.1.15 CALCULATE the average flow rate of the above two consecutive readings.
5.1 Perform Field Calibration of Sample Pumps (Cont.)

NOTE - Step 5.1.16 applies to both pre and post calibration. With other sorbent tube sampling, new sampling media from the same lot should be used to replace the calibration sorbent tube at the start of the survey.

5.1.16 UNLESS otherwise stated by the specific sampling method, USE the same filter cassette and “individually packed” sorbent tube for the calibration and the survey.

5.1.17 REPEAT Steps 5.1.3 to 5.1.17 for pumps that need calibration.

5.1.18 PERFORM leak test of all components AND

ENSURE that leak rate is than 4% of sample flow.

5.2 Perform Sampling

5.2.1 REMOVE all caps, plugs, or instrumentation on Test Port as indicated in stack specific Appendix.

5.2.2 INSERT sample probe into Test Port to collect sample from center of stack.

NOTE - The amount of sample tube between the probe and the sorbent tube must be as short as possible.

5.2.3 ENSURE that the required length of sample tubing is installed on sample probe.

5.2.4 CONNECT to source.

5.2.5 PURGE the sample tubing with stack exhaust atmosphere with a minimum of three times the volume of the tubing/apparatus.

5.2.6 ENSURE that the sample tubes remain in the vertical position.

5.2.7 START sample pump and adjust flow as necessary to match the flow rate specified in the Environmental Sample Plan.

5.2.8 RECORD initial sample flow rate on Data Sheet 2.

5.2.9 ENTER Sample Number Starting Time, Survey Number, on Data Sheet 2 for Specific Sample Constituent.
5.2 Perform Sampling (Cont.)

5.2.9.1 IF not previously recorded for day of sample event, **OBTAIN** Stack Flow and Stack Temperature and Operating Train from HMI or Operations by telephone (373-2618) **AND**

**RECORD** Stack Flow and Stack Temperature reading on Data Sheet 1.

5.2.10 **IF** not previously recorded for day of sample event, **CONTACT** Hanford Weather Forecaster by telephone (373-2716).

5.2.10.1 **REQUEST** Barometric Pressure and Ambient Temperature for closest weather station **AND**

**RECORD** Pressure, Temperature and Time of pressure reading on Data Sheet 1.

5.2.11 **OBSERVE** flow rate every 20 minutes of sampling **AND**

**RECORD** flow rate on Data Sheet 2.

5.2.11.1 **IF** flow has changed by more than 10%, **ADJUST** flow to appropriate Pre-Sampling Flow Rate.

5.2.11.2 **RECORD** both the unadjusted and adjusted flow rates on the Additional Field Data Section on Data Sheet 2.

5.2.12 At conclusion of sampling period, **DISCONNECT** sample line from sample port.

5.2.13 **ENTER** Final Sampling Flow Rate and Ending Time for sample on Sample Constituent Specific Data Sheet.

5.2.13.1 **ENSURE** all applicable fields in Data Sheet 1 and Data Sheet 2 are complete.

5.2.14 **PERFORM** post sampling calibration check.

5.2.15 **IF** additional samples required by Environmental Sample Plan, **REPEAT** Steps 5.1.1 through 5.2.14.

5.2.16 **ENSURE** call caps, valves, plugs and instrumentation have been restored to original configuration.

5.2.17 **TRANSPORT** the samples to the laboratory.
5.3 Restoration

5.3.1 FWS ENSURE all caps, valves, plugs, and instrumentation have been restored to original configuration AND

CIRCLE YES or NO and Data Sheet 3.

5.3.2 FWS ENTER the following on Data Sheet 3:
- Signature
- Printed name (First & Last)
- Date
- Time

5.3.3 FORWARD to Environmental for review.

5.3.4 SEND work package to the Area Operations Engineer for OPS acceptance.

5.4 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.