Perform Multi-Media Sampling

Tank Farm Plant Operating Procedure

USQ # TF-17-1659-D, Rev. 0

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<thead>
<tr>
<th>CHANGE HISTORY (≤ LAST 5 REV-MODS)</th>
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<td>A-1</td>
</tr>
</tbody>
</table>

Table of Contents

1.0 PURPOSE AND SCOPE .......................................................................................................................... 3
  1.1 Purpose .............................................................................................................................................. 3
  1.2 Scope ................................................................................................................................................... 3
### 2.0 INFORMATION

- 2.1 Terms and Definitions ................................................................. 4
- 2.2 General Information ........................................................................ 5

### 3.0 PRECAUTIONS AND LIMITATIONS............................................................ 6

- 3.1 Personnel Safety .......................................................... 6
- 3.2 Equipment Safety .......................................................... 6
- 3.3 Radiation and Contamination Control ............................................. 7
- 3.4 Environmental Compliance ....................................................... 7

### 4.0 PREREQUISITES ............................................................................... 8

- 4.1 Special Tools, Equipment and Supplies ........................................ 8
- 4.2 Performance Documents .............................................................. 8
- 4.3 Field Preparation ........................................................................... 9

### 5.0 PROCEDURE ................................................................................... 11

- 5.1 Perform Prior to Sampling .............................................................. 11
- 5.2 Perform Sampling ........................................................................... 11
- 5.3 Perform Liquid Sampling ................................................................. 14
- 5.4 Perform Soil/Sediment Sampling ................................................... 18
- 5.5 Perform Liquid/Sediment/Sludge Sampling ..................................... 24
- 5.6 Perform Representative Sampling of Miscellaneous Solid Materials 25
- 5.7 QA/QC Sampling ............................................................................ 29
- 5.8 Perform Post Sampling Activities .................................................. 32
- 5.9 Waste Management ................................................................. 34
- 5.10 Records ....................................................................................... 34
1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions to collect samples for chemical and radiological analysis. This procedure may also be used as guidance for sample collection when the samples must be used for other scientific purposes. This procedure can be performed in multiple locations. A work area and/or location specific hazard analysis must be performed prior to starting the activity per TFC-ESHQ-S_SAF-C-02.

This procedure must be worked in conjunction with an approved work package.

1.2 Scope

1.2.1 This procedure applies to sampling personnel responsible for collecting samples of various media from a variety of locations.

1.2.2 This procedure can be performed in multiple locations. A work area and/or location specific hazard analysis must be performed prior to starting the activity per TFC-ESHQ-S_SAF-C-02.
2.0 INFORMATION

2.1 Terms and Definitions

COLIWASA Composite Liquid Waste Sampler
The COLIWASA can be used to sample most containerized liquids. It is commercially available and can be fabricated from polyvinyl chloride, glass, or Teflon™. A COLIWASA typically consists of a section of tubing, a locking mechanism, and a stopper. Manipulation of the locking mechanism opens and closes the sampler by raising and lowering the stopper at the other end of the tube. While simple and inexpensive, this sampling device is difficult to decontaminate and does not function well with high-viscosity fluids.

Open-Tube (Liquid Thief Sampler)
The open-tube sampler is the most versatile of hazardous liquid samplers because of its wide range of applications, relative low cost, and ease of operation. The open-tube sampler is made of hollow glass (or plastic tubing), usually 4 feet long. The inside diameter is generally ¼ to ½ inch; the selection of a sampler diameter depends on the viscosity of the sample to be taken. These samplers have a constricted orifice to facilitate plugging the opening to maintain a vacuum in the tube. The disadvantage of open tubes is that sample leakage may occur.

Dip Sampler
The dip sampler consists of an adjustable clamp attached to the end of a wooden, plastic, or metal pole of desired length. Samples are collected in a jar or beaker that is secured in the clamp. Dip samplers are used primarily to collect grab samples or point-source samples.

Manual Pump
Manual pumps require large amounts of disposable hose, which must be compatible with the media being sampled.

Grain Sampler
The grain sampler consists of two slotted telescoping tubes, usually made of brass or stainless steel. The outer tube has a conical, pointed tip on one end that permits the sampler to penetrate the material being sampled. The sampler is opened and closed by rotating the inner tube. Grain Samplers do not work well with moist or sticky samples.
2.1 Terms and Definitions (Cont.)

Sampling Trier
The sampling trier is similar to the grain sampler, but has a long, sharpened tube slot extending the full length of the tube. It is used in sticky solid material for particles with diameters less than one-half the width of the trier. The trier is not useful for stony, dry, or sandy samples.

Trowel/Scoop/Spoon/Shovel
This simple method uses only a scoop or shovel to obtain samples. This method can be used for most any material, but is generally limited to sampling near the surface and results in disturbed sample profiles.

Screw Auger
Screw augers include ship augers (with a helical flight on a solid stem) and spiral augers (most useful for more unconsolidated material). Augers are used in hard-packed material (not cemented) and when an undisturbed sample is not required.

Solids Thief Sampler
Thief samplers consist of a piece of pipe that has been angled at one end to form a point. Thief samplers are used in medium-packed material when an undisturbed sample is not required.

Veihmeyer Sampler
The Veihmeyer sampler is used to collect soil samples in various types of non-liquid media using different drive-point attachments. The Veihmeyer sampler can be used to obtain a vertical core sample from the container.

2.2 General Information

2.2.1 A hazard assessment was completed on Lithium Bromide (LiBr) 0.3 M aqueous solution that determined the required PPE is covered under the GHA for chemicals use.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

**WARNING** - Handling portions of the COLIWASA that may have come in contact with the liquid could result in personnel contamination.

3.1.1 Failure to use proper PPE when handling pre-preserved sample containers can result in personnel injury (Refer to appropriate SDS/MSDS for required PPE). Preservatives may include Hydrochloric Acid (HCl), Sulfuric Acid (H₂SO₄), Sodium Hydroxide (NaOH), and/or Nitric Acid (HNO₃).

3.1.2 Samples collected using this procedure may be chemically or radiologically contaminated and pose a risk of personnel exposure. Personnel must wear the proper personal protective equipment (PPE) and handle samples using appropriate precautions to avoid exposure.

3.1.3 A job specific Hazard Analysis is required.

3.2 Equipment Safety

**CAUTION** - When driving the solids thief sampler, damage to the container can occur by puncturing the bottom of the container.

**CAUTION** - Use of sampling equipment containing high-density polyethylene to collect organic compound samples can result in contaminated samples.

3.2.1 Sampling equipment shall be decontaminated prior to use in accordance with the requirements of LO-080-157, Cleaning of Containers and Sample Collection Equipment.

3.2.2 Commercially purchased, disposable sampling equipment that comes in direct contact with the sample media should be of laboratory quality and shall be packaged in a manner that prevents cross contamination.

3.2.3 Pre-cleaned high-density polyethylene sampling equipment should not be used to collect samples being analyzed for organic compounds or other analytics that may be incompatible with the material from which the equipment has been manufactured.
3.3 Radiation and Contamination Control

3.3.1 Work in radiological areas or with radioactive materials, will be performed using a Radiation Work Permit in the activity specific work package following review by Radiological Control per ALARA work planning procedure TFC-ESHQ-RP_RWP-C-03.

3.4 Environmental Compliance

3.4.1 All environmental controls for container sampling will be identified in the activity specific work package.
4.0 PREREQUISITES

4.1 Special Tools, Equipment and Supplies

The following supplies may be needed to perform this procedure:
- Pre-certified silica sand
- High purity water
- Sampling equipment
- Surgeons gloves, nitrile gloves, leather gloves
- Safety glasses with side shields
- Scissors
- Ice chest
- Evidence tape
- Bung wrench
- Absorbent pads
- Ratchet wrench/open-end wrench
- Field Logbook
- Camera
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
- LO-080-157, Cleaning of Containers and Sample Collection Equipment
- TO-100-052, Perform Waste Generation, Segregation, Accumulation and Clean-up
- TFC-OPS-WM-C-22, TOC Chain of Custody for Tank Farm Vadose Zone and Multi-Media Sampling
- TO-080-900, Sample Packaging and Shipping
- TO-080-903, Use of Sample Storage Units
- TO-080-905, Multi-Media VOC Soil and Sediment Sampling
- TFC-BSM-IRM_DC-C-02, Records Management
- TFC-ESHQ-S-STD-30, Implementation of DOE-0344, Excavating, Trenching, and Shoring
- TFC-OPS-OPER-C-17, Operating Logbooks
- TFC-OPS-WM-C-23, Control of Certificates of Analysis for Tank Farm Vadose Zone and Multi-Media Sampling.
4.3 Field Preparation

NOTE - Steps in section 4.3 may be performed in any logical order.

Preparation for Field Sampling

4.3.1 ENSURE personnel using this procedure have completed the Multi-Media Sampling Certification (Course 350515).

OR

IF personnel have not completed the course, ENSURE they work under the direct supervision of a certified individual.

4.3.2 ENSURE a work area and/or a location specific hazards analysis per TFC-ESHQ-S-SAF-C-02 has been performed.

4.3.3 CONFIRM that all required sampling documentation[e.g. Chains of Custody (COC’s)], Sample Labels, Sample Authorization Forms (SAF) and any other project information that will provide direction or assistance with meeting project requirements], has been provided.

4.3.4 REVIEW Field Sampling and Analysis Plan and other applicable sampling paperwork for sampling event.

4.3.5 ENSURE sampling equipment has been cleaned prior to use in accordance with the requirements of LO-080-157, Cleaning of Containers and Sample Collection Equipment,

OR

ENSURE that commercially purchased, disposable sampling equipment (e.g. Terra Core samplers) that come in direct contact with the sample media have a Certificate of Analysis on file.

4.3.6 CONFIRM use of pre-preserved sample containers meet the following conditions:

- Sample containers are certified clean
- Any preservative used has a Certificate of Analysis provided by the vendor.
4.3 Field Preparation (Cont.)

4.3.7 CONFIRM appropriate sample containers are prepared and staged for the sampling to be performed.

4.3.8 IF work is performed in a radiological area with radiological materials, ENSURE sampling site has been prepared with the controls and postings specified in the RWP prior to commencement of sampling activities.

NOTE - Logbook entries should be concise and chronological, enabling anyone to reconstruct events as they occurred for legal defensibility.

NOTE - The LABCORE Completed Batch Report documents the equipment has been cleaned.

4.3.9 IF picking up decontaminated sampling equipment, CONFIRM the LABCORE Completed Batch Report is included in the Field Log Book.

4.3.10 RECORD field logbook entry for the following in accordance with TFC-OPS-OPER-C-17.

• Day, date and time task started
• Weather conditions
• Names, titles and organizations of personnel performing the sampling.
Perform Multi-Media Sampling

5.0 PROCEDURE

5.1 Perform Prior to Sampling

5.1.1 CONFIRM container/location to be sampled.

5.1.2 INSPECT outside of container for any previously unidentified leaks, bulging, or other hazards.

5.1.3 OBSERVE environment for any possible contamination problems (dust, odors, liquid, breezes, etc.).

5.1.4 PRIOR to opening drums, ENSURE the appropriate monitoring personnel is/are present.

5.2 Perform Sampling

5.2.1 WHEN sampling VOA’s, whenever possible, LOCATE support vehicles and gasoline-powered equipment downwind from containers being sampled to prevent exhaust gases from affecting sample integrity.

5.2.1.1 IF support vehicles and gasoline-powered equipment cannot be located downwind RECORD all information pertinent to inability to locate downwind in field logbook AND NOTIFY FWS.

5.2.2 IF directed by FWS, ESTABLISH a temporary control zone around the sampling location to control visitor or unauthorized personnel access.

5.2.3 IF performing quality assurance/quality control (QA/QC) sampling, GO TO Section 5.7.
5.2 Perform Sampling (Cont.)

5.2.4 SELECT one of the following sampling methods UNLESS the field sampling and analysis plan identifies a different sampling method. (Refer to Sections 5.3 through 5.6 for sampling methods).

<table>
<thead>
<tr>
<th>✓</th>
<th>Sampling Method Chosen</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>5.3 Perform Liquid Sampling</td>
</tr>
<tr>
<td></td>
<td>5.4 Perform Soil/Sediment Sampling</td>
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<tr>
<td></td>
<td>5.5 Perform Liquid/Sediment/Sludge Sampling</td>
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<tr>
<td></td>
<td>5.6 Perform Representative Sampling of Miscellaneous Solid Materials</td>
</tr>
</tbody>
</table>

5.2.4.1 IF none of the methods apply to the sampling situation, CONTACT the FWS to determine the method that will result in the most representative sample.

5.2.4.2 RECORD method chosen in field logbook.

5.2.4.3 NOTIFY appropriate project personnel of method chosen.

5.2.5 IF it is determined there is an insufficient amount of containerized material to fulfill the volume requirements identified on the sample documents, CONTACT the FWS AND PROCEED as directed.

5.2.5.1 RECORD FWS direction in the field logbook.

5.2.6 ENSURE proper personal protective equipment (PPE) is donned per Globally Harmonized System - Safety Data Sheets (GHS-SDS) and/or Material Safety Data Sheet (MSDS) when handling pre-preserved sample containers.
5.2 Perform Sampling (Cont.)

5.2.7 **FILL** sample containers with filtered or unfiltered samples in the following order unless otherwise specified in the sampling plan:

<table>
<thead>
<tr>
<th>Order</th>
<th>Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Volatile organics (VOAs)</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Total organic halogens (TOX)</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Total organic carbon (TOC)</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Semi-volatile organics (Semi-VOAs)</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Other glass containers (i.e., other organics)</td>
</tr>
<tr>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Other samples</td>
</tr>
<tr>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Filtered samples.</td>
</tr>
</tbody>
</table>

5.2.8 **IF** samples are collected in an order that is different from the above, **RECORD** sampling order and justification in the field logbook.

5.2.9 **GO TO** Section 5.3, 5.4, 5.5, or 5.6 as determined in Step 5.1.4.
5.3 Perform Liquid Sampling

NOTE - The Composite Liquid Waste Sampler (COLIWASA) can be used to sample most containerized liquids. It is commercially available and can be fabricated from polyvinyl chloride, glass, or Teflon™. A COLIWASA typically consists of a section of tubing, a locking mechanism, and a stopper. Manipulation of the locking mechanism opens and closes the sampler by raising and lowering the stopper at the other end of the tube. While simple and inexpensive, this sampling device is difficult to decontaminate and does not function well with high-viscosity fluids.

Procedure for using the Composite Liquid Waste Sampler (COLIWASA)

WARNING
Handling portions of the COLIWASA that may have come in contact with the liquid could result in personnel contamination.

5.3.1 DON all PPE per requirements of RWPs and job specific hazards analysis.

5.3.2 OPEN the COLIWASA.

NOTE - If the level inside the sampler tube is lower than outside the sampler, the sampling rate is too fast and a non-representative sample will be obtained.

5.3.3 SLOWLY LOWER the COLIWASA to the bottom of the container so that the liquid inside and outside the tube is at the same level.

5.3.4 WHEN the COLIWASA is at the bottom of the container, CLOSE AND LOCK the sampler.

5.3.5 KEEP the COLIWASA vertical to prevent dislodging air bubbles that may break the seal inside the tube.

5.3.6 SLOWLY WITHDRAW the COLIWASA from the container.

5.3.7 POSITION the COLIWASA over a suitable sample container.

5.3.8 OPEN AND CAREFULLY DISCHARGE the sample into the container as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).

5.3.9 REPEAT Steps 5.3.2 through 5.3.8 UNTIL all sample containers have been filled.
5.3 Perform Liquid Sampling (Cont.)

NOTE - The open-tube sampler is the most versatile of hazardous liquid samplers because of its wide range of applications, relative low cost, and ease of operation. The open-tube sampler is made of hollow glass (or plastic tubing), usually 4 feet long. The inside diameter is generally ¼ to ½ inch; the selection of a sampler diameter depends on the viscosity of the sample to be taken. These samplers have a constricted orifice to facilitate plugging the opening to maintain a vacuum in the tube. The disadvantage of open tubes is that sample leakage may occur.

Procedure for using the Open-Tube (Thief Sampler)

5.3.10 SLOWLY LOWER the tube to the desired depth in the liquid AND

PLUG the tube with a rubber stopper or gloved thumb. (This creates a vacuum in the tube and enables withdrawal of the sample from the container.)

5.3.11 KEEP the open-tube sampler vertical to prevent dislodging air bubbles that may break the seal inside the tube.

5.3.12 AVOID handling portions of the open-tube sampler that come in contact with the liquid.

5.3.13 SLOWLY WITHDRAW the tube from the container.

5.3.14 TRANSFER the sample into a sample container as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).

5.3.15 REPEAT Steps 5.3.10 through 5.3.14 UNTIL all sample containers have been filled.
5.3  Perform Liquid Sampling (Cont.)

NOTE - The dip sampler consists of an adjustable clamp attached to the end of a wooden, plastic, or metal pole of desired length. Samples are collected in a jar or beaker that is secured in the clamp. Dip samplers are used primarily to collect grab samples or point-source samples.

Procedure for using Dip Sampler

5.3.16  ATTACH AND SECURE the sample container to the clamp.
5.3.17  SLOWLY LOWER the pole to the desired depth in the container to be sampled.
5.3.18  ALLOW time for the container to fill.
5.3.19  FILL sample container as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).
5.3.20  REPEAT Steps 5.3.16 through 5.3.19 UNTIL all sample containers have been filled.
5.3 Perform Liquid Sampling (Cont.)

Special Instructions

Manual pumps require large amounts of disposable hose, which must be compatible with the media being sampled.

Procedure for using a Manual Pump

5.3.21 OPERATE the pump according to the manufacturer's instructions.

5.3.22 PLACE a hose-weight on the end of the hose so that the hose does not float on the liquid surface. (The weight used must be decontaminated and made of a material that does not impact sample quality.)

5.3.23 PLACE an inlet hose into the liquid AND START the pumping mechanism.

5.3.24 DRAW the sample through the inlet hose to a sample container as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).

5.3.25 REPEAT Steps 5.3.21 through 5.3.24 UNTIL all sample containers have been filled.

5.3.26 DRAIN liquid in the inlet hose back into the container after pumping. (A peristaltic pump can be run in reverse to empty the tubing back into the container.)
5.4 Perform Soil/Sediment Sampling

NOTE - The grain sampler consists of two slotted telescoping tubes, usually made of brass or stainless steel. The outer tube has a conical, pointed tip on one end that permits the sampler to penetrate the material being sampled. The sampler is opened and closed by rotating the inner tube. Grain Samplers do not work well with moist or sticky samples.

Procedure for using a Grain Sampler

5.4.1 WHILE the sampler is in the closed position INSERT it into the granular or powdered media being sampled.

5.4.2 ROTATE the inner tube of the sampler to the OPEN position.

5.4.3 WIGGLE the sampler a few times to allow media to enter the open slots.

5.4.4 ROTATE the inner tube of the sampler to the CLOSED position AND WITHDRAW from the material being sampled.

5.4.5 PLACE the sampler in a horizontal position with the slots facing upward.

5.4.6 ROTATE AND SLIDE the outer tube from the inner tube.

5.4.7 TRANSFER the collected sample from the inner tube into a suitable sample container as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).

5.4.8 REPEAT Steps 5.4.1 through 5.4.7 UNTIL all sample containers have been filled.
Perform Soil/Sediment Sampling (Cont.)

NOTE - The sampling trier is similar to the grain sampler, but has a long, sharpened tube slot extending the full length of the tube. It is used in sticky solid material for particles with diameters less than one-half the width of the trier. The trier is not useful for stony, dry, or sandy samples.

Procedure for Using a Sampling Trier

5.4.9 INSERT the trier into the media at approximately 0 to 45-degree angle from horizontal.

5.4.10 ROTATE the trier once or twice to cut a core of material.

5.4.11 SLOWLY WITHDRAW the trier while ensuring the slot is facing upward.

5.4.12 EMPTY contents into a clean stainless-steel bowl. (Several cores may need to be taken to collect enough sample.)

5.4.13 ENSURE sample is homogenized by mixing the contents in the stainless-steel bowl.

5.4.14 TRANSFER sample to a suitable container with the aid of a cleaned spatula or brush as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).

5.4.15 REPEAT Steps 5.4.9 through 5.4.14 UNTIL all sample containers have been filled.
5.4 Perform Soil/Sediment Sampling (Cont.)

NOTE - This simple method uses only a scoop or shovel to obtain samples. This method can be used for most any material, but is generally limited to sampling near the surface and results in disturbed sample profiles.

Procedure for Using a Trowel/Scoop/Spoon/Shovel

CAUTION
Use of sampling equipment containing high-density polyethylene to collect organic compound samples can result in contaminated samples.

5.4.16 WHEN gathering samples to be analyzed for organic compounds or other analytics, ENSURE that the material used in the manufacture of the sampling equipment is not incompatible with the samples being collected (i.e., do not use sampling equipment containing high-density polyethylene to collect samples to be analyzed for organic compounds).

5.4.17 REMOVE the top layer of a sample to the desired depth with a clean spade or shovel.

5.4.18 REMOVE AND DISCARD a thin layer of the material that comes in contact with the shovel using a stainless-steel or pre-cleaned, disposable scoop or trowel.

5.4.19 COLLECT the sample with a pre-cleaned trowel, scoop, spoon or equivalent.

5.4.20 EMPTY contents into a clean stainless-steel bowl. (Several scoops may need to be taken to collect enough sample material.)

5.4.21 TRANSFER sample to an appropriate sample bottle with a clean stainless-steel or pre-cleaned, disposable spatula or spoon as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).

5.4.22 REPEAT Steps 5.4.17 through 5.4.21 until all of the required samples have been collected.
5.4 Perform Soil/Sediment Sampling (Cont.)

NOTE - Screw augers include ship augers (with a helical flight on a solid stem) and spiral augers (most useful for more unconsolidated material). Augers are used in hard-packed material (not cemented) and when an undisturbed sample is not required.

Procedure for Using a Screw Auger

5.4.23 DRILL OR HAND-TURN the auger to the desired depth.

5.4.24 PULL the auger from the material while continuing to hand turn it in the same direction used to advance the auger once the desired depth has been reached.

5.4.25 DISCARD the disturbed material.

5.4.26 EMPTY remaining contents of the auger into a clean stainless-steel bowl.

5.4.27 HOMOGENIZE the contents by stirring together.

5.4.28 PLACE the material into sample container(s) as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).

5.4.29 REPEAT Steps 5.4.23 through 5.4.28 UNTIL all sample containers have been filled.
5.4 Perform Soil/Sediment Sampling (Cont.)

NOTE - Thief samplers consist of a piece of pipe that has been angled at one end to form a point. Thief samplers are used in medium-packed material when an undisturbed sample is not required.

Procedure for Using a Solids Thief Sampler

5.4.30 **TAKING** care when approaching the bottom of the container to avoid puncturing the container, **DRIVE** the thief sampler through the material until it reaches the bottom of the container or the thief sampler cannot be driven any further. (This can be done by hand or with a hammer.)

5.4.31 **WIGGLE** the thief sampler slightly to loosen the material outside the thief sampler.

5.4.32 **REMOVE** the thief sampler from the container.

5.4.33 **EMPTY** contents of the thief sampler into a clean stainless-steel bowl. (Several cores may need to be taken to obtain enough sample material.) (The sides of the thief sampler may have to be tapped with a hammer to dislodge the sample media.)

5.4.34 **HOMOGENIZE** by mixing the contents in the stainless-steel bowl as directed by the SAF.

5.4.35 **TRANSFER** the sample to an appropriate sample bottle with a clean stainless-steel spatula or spoon as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).

5.4.36 **REPEAT** Steps 5.4.30 through 5.4.35 **UNTIL** all sample containers have been filled.
5.4 Perform Soil/Sediment Sampling (Cont.)

NOTE - The Veihmeyer sampler is used to collect soil samples in various types of non-liquid media using different drive-point attachments. The Veihmeyer sampler can be used to obtain a vertical core sample from the container.

Procedure for Using a Veihmeyer Sampler

5.4.37 OPERATE the Veihmeyer sampler in accordance with manufacturer's specifications.

5.4.38 DRIVE the Veihmeyer sampler through the material until it reaches the bottom of the container. (This procedure can be done by hand or with a hammer.)

5.4.39 WIGGLE the Veihmeyer sampler slightly to loosen the material outside the sampler.

5.4.40 REMOVE the Veihmeyer sampler from the container.

5.4.41 EMPTY contents of the Veihmeyer sampler into a clean stainless-steel bowl. (Several cores may need to be taken to obtain enough sample material.)

5.4.42 HOMOGENIZE the contents by stirring together as directed by the SAF.

5.4.43 TRANSFER sample to appropriate sample bottles with a clean stainless-steel spatula or spoon as specified in the Sample and Analysis Plan (SAP) or Sample Authorization Forms (SAF).

5.4.44 REPEAT Steps 5.4.37 through 5.4.43 UNTIL all sample containers have been filled.
5.5 Perform Liquid/Sediment/Sludge Sampling

NOTE - When collecting samples from liquid, a sediment or sludge layer may be encountered on the bottom of the container.

5.5.1 IF sediment/sludge is encountered, **PERFORM** the following steps.

5.5.1.1 **NOTIFY** FWS.

5.5.1.2 The Project Lead/Facility FWS **SELECT** which of the following phases are to be sampled:

<table>
<thead>
<tr>
<th>✓</th>
<th>Phase to be sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liquid phase only</td>
</tr>
<tr>
<td></td>
<td>Sediment phase only</td>
</tr>
<tr>
<td></td>
<td>Both liquid and sediment phases submitted as separate samples. (Containers that contain liquids and solids may be sampled for both matrices.) (The collection of the liquid and solid samples shall be performed in accordance with Sections 5.3 and 5.4.)</td>
</tr>
<tr>
<td></td>
<td>Both liquid and sediment phases homogenized and submitted as a single sample. (One sample may be collected from a container that contains sediment that is suspended in the liquid or has been mixed thoroughly to ensure homogenization.) (Collecting this material shall be performed in accordance with Sections 5.3 and 5.4.) (The consistency of the matrix will determine how the sample is collected.)</td>
</tr>
</tbody>
</table>

5.5.1.3 **RECORD** the following in the field logbook:

- Sampling phase chosen
- Sampling collection method chosen from Sections 5.3 and 5.4.
5.6 Perform Representative Sampling of Miscellaneous Solid Materials

NOTE - Depending on the media in the container, sampling of miscellaneous materials may be conducted in several ways. Listed below are some of the scenarios that have been encountered and the steps to follow.

5.6.1 IF the sampling situation is not covered in the field sampling and analysis plan or by one of the scenarios presented in this section of this procedure or by another portion of this procedure, sampling personnel shall:

5.6.1.1 PROCEED in such a way as to collect a sample(s) that is the most representative of the contents of the container(s).

5.6.2 CONTACT the following for input on how to proceed with the sampling if unsure about which procedure to follow

- Field Work Supervisor
  OR
- Requestor identified on the Sampling Authorization Form (SAF)
  AND/OR
- Engineering Project Analytical Lead for Sampling

5.6.3 NOTIFY the following of the sampling method used.

- Field Work Supervisor
  OR
- Requestor identified on the Sampling Authorization Form (SAF)
  AND
- Engineering Project Analytical Lead for Sampling

5.6.3.1 DOCUMENT the sampling method used and the reason for the selected method in the field logbook.

5.6.4 IF sampling personnel encounter a container(s) filled with various other containers of miscellaneous liquids, and this condition was not identified in the sampling document, the sampling personnel shall perform the following steps:

5.6.4.1 DO NOT HANDLE OR OPEN any unknown inner containers AND

NOTIFY FWS.
Perform Multi-Media Sampling

5.6 Perform Representative Sampling of Miscellaneous Solid Materials (Cont.)

5.6.4.2 RECORD the following information:
- Condition of the inner containers
- Type of inner containers
- Total number of inner containers (estimated if not easily determined)
- Markings on the containers (both manufacturer's labels and handwritten)
- Physical presence of external container and inner containers (e.g., crystals on the lids, discoloration, etc.)
- PIN numbers, estimated volumes of the containers, colors of the liquid.

5.6.4.3 DISCONTINUE the sampling effort.

5.6.4.4 NOTIFY Task Manager or Requestor identified on the SAF and the Project Lead of the situation.

Take Heterogeneous Mixture Samples From a Single Container

5.6.5 FROM the side view, DIVIDE the container into three equal sections for sampling (approximately where the bands appear on a drum).

5.6.6 FROM the top view, DIVIDE the container (or drum) into four equal sections. (The result will be 12 sections from which sample media will be collected to form a composite sample for the container.)

5.6.7 NUMBER the 12 sections.

5.6.8 COLLECT a representative sample from each section of the container using forceps, tongs, scissors, pliers, or a gloved hand.

5.6.9 PLACE the sample from each section into a stainless-steel bowl and mix the sample media to ensure a uniform sample.

5.6.9.1 IF it is not practical to homogenize the sample material before placing it in the sample containers, PLACE equal portions of the material from each section directly into each sample container.

5.6.10 PLACE the sample in the appropriate sample container(s).
5.6 Perform Representative Sampling of Miscellaneous Solid Materials (Cont.)

Take Multiple Matrices From a Single Container

5.6.11 **BEFORE** sampling, **LOOK** at the container inventory sheet (if available) and inside the container to determine the percentage of each matrix in the container. (A representative sample shall be obtained by collecting a sample that has approximately the same percentages of each matrix.)

5.6.12 **COLLECT** a representative percentage of each matrix from the container using forceps, tongs, scissors, pliers, or a gloved hand, or as specified in the SAP. (Each matrix shall be collected at three different vertical layers of the container, approximately where the bands would appear on a drum.)

5.6.13 **PLACE** all matrices into a stainless-steel bowl and mix the sample media to ensure a uniform sample.

5.6.13.1 **IF** it is not practical to homogenize the sample material before placing it into the sample containers, **PLACE** the material directly into the sample containers in the same proportion that it is in the container.

5.6.14 **PLACE** the sample in the appropriate sample containers.
Perform Multi-Media Sampling

5.6 Perform Representative Sampling of Miscellaneous Solid Materials (Cont.)

Obtaining Samples of Each Matrix

5.6.15 **BEFORE** sampling, **LOOK** at the container inventory sheet (if available) and inside the container to determine the number of different matrices to be sampled.

5.6.16 **COLLECT** a representative sample of the sample matrix using forceps, tongs, scissors, pliers, or a gloved hand. (The matrix shall be collected at three different vertical layers of the container, approximately where the bands would appear on a drum.)

5.6.17 **PLACE** the material collected from the three layers of the single matrix into a stainless steel bowl.

5.6.18 **MIX** the sample media from the single matrix in the stainless-steel bowl to ensure a homogeneous sample.

5.6.18.1 **IF** it is not practical to homogenize the sample material before placing it into the sample containers, **PLACE** the material directly into the sample containers in the same proportion that it is in the container.

5.6.19 **PLACE** the sample in the appropriate sample container(s).

5.6.20 **REPEAT** Steps 5.6.16 through 5.6.19 **UNTIL** a sample from each matrix has been collected.
5.7 QA/QC Sampling

**Special Instructions**

QA/QC samples may be specified in the project-specific Sampling and Analysis Plan (SAP) or other applicable sampling documentation. The instructions below indicate the sampling directions for several different types of QA/QC samples. Specific sample requirements will vary depending on the project. The person taking the sample will be provided sampling paperwork for the specific type of blank, type of container/preservative and quantity of QA/QC sample to be collected except for the Temperature Blank. A Temperature Blank is utilized with each cooler/freezer of samples designated for transport (See Step 5.7.6).

5.7.1 **DON** proper PPE including nitrile gloves or equivalent and as required by applicable RWP.

**Field Duplicates**

5.7.2 **IF** taking a duplicate soil sample, **COLLECT** the soil samples as close as possible to the same point in time and space as the primary field sample.

**Split Samples**

5.7.3 **IF** taking a split soil sample, **PERFORM** the following:

5.7.3.1 **COLLECT** the samples.

5.7.3.2 **HOMOGENIZE** the samples together.

5.7.3.3 **DIVIDE** the homogenized sample into two samples in the field.
Perform Multi-Media Sampling

5.7 QA/QC Sampling (Cont.)

Equipment Blanks

5.7.4 IF taking an Equipment Blank (EB), **PERFORM** the following:

5.7.4.1 **RUN** reagent water or pre-certified silica sand through or over the new or decontaminated (or lab cleaned) equipment.

5.7.4.2 **COLLECT** the rinsate/silica sand into a cleaned container **AND** **TRANSFER** into sample container(s)

**OR**

**COLLECT** rinsate directly in the sample container(s).

Field Blank

5.7.5 IF taking a Field Blank (FB), **PERFORM** the following:

5.7.5.1 **PRIOR** to going to the field, **FILL** a certified aGs bottle with reagent water or pre-certified silica sand ensuring that the bottle has a positive meniscus.

5.7.5.2 **TRANSPORT** the aGs bottle with reagent water or pre-certified silica sand to the field.

5.7.5.3 **PRIOR** to collecting regular samples, **TRANSFER** the reagent water or pre-certified silica sand from the aGs bottle to vial(s) taking care that no air space is left in the vial(s).

5.7.5.4 **TREAT** the FB in the same manner as the other samples collected during the sampling event.

5.7.5.5 **RECORD** in the log book and on the Chain of Custody (COC) if conditions change from when the FB is collected and the regular sample is collected (i.e., The wind changes taking exhaust fumes from the truck and blows then over the sampling area after the FB was collected).
5.7 QA/QC Sampling (Cont.)

**Temperature Blank**

NOTE - Upon sample receipt, the laboratory will use the temperature blank or thermometer to determine the internal temperature of each cooler.

5.7.6 PROVIDE a Temperature Blank or suitable thermometer with each cooler of samples designated for transport.

5.7.7 ENSURE temperature is maintained at 4 °C ± 2 °C [2 °C (35.6 °F) to 6 °C (42.8 °F)] for all refrigerated samples, and -7 °C (19.4 °F) to -20 °C (-4 °F) for frozen samples.

5.7.8 IF the temperatures are not met, DOCUMENT the actual temperature on the COC and in the logbook.
Perform Multi-Media Sampling

5.8 Perform Post Sampling Activities

5.8.1 **MARK** the container label with the date that it was sampled.

5.8.2 **AFTER** the sample has been placed in the container, **WIPE** the outside of each sample container clean of any visible dirt, grime, or liquid.

5.8.3 **ENSURE** the label(s) are affixed to the bottles and contain the following information:
   - Identification number
   - Date
   - Time
   - Media
   - Preservative (if required)
   - Analysis Required
   - Collectors initials, Printed Name or Signature

5.8.4 **ENSURE** an initialed and dated seal has been placed on each sample container.

5.8.5 **ENSURE** completion of the following:
   - Chain of Custody (COC)/Sample Analysis Report (SAR)
   - Applicable sample report

**NOTE:** An independent review will be performed by supervision or their delegate.

5.8.6 **PRIOR** to leaving sample location, **HAVE** another sampler perform a one over one check to ensure field activities are correctly documented on sample labels, applicable sample report, COC, logbook, etc.

5.8.6.1 **IF** another sampler is not available at the sample location, **ENSURE** the one over one check is performed prior to relinquishing custody of sample(s).
5.8 Perform Post Sampling Activities (Cont.)

5.8.7 **PLACE** samples in a secure location during transportation.

5.8.8 **ENSURE** samples are packaged in accordance with TO-080-900, Sample Packaging and Shipping.

5.8.9 **DELIVER** sample to shipping personnel or appropriate laboratory for analysis as soon as possible.

5.8.10 **IF** sample(s) cannot be delivered the same day (due to time constraints or radiological laboratory screening), **STORE** samples according to TO-080-903, Use of Sample Storage Units AND **CONTACT** FWS.

5.8.11 **ENSURE** the field logbook has been completed within 24 hours of sampling.
5.9 Waste Management

5.9.1 **MANAGE** all waste generated during performance of sampling activities in accordance with TO-100-052, Perform Waste Generation, Segregation, Accumulation and Clean-up and any additional guidance provided by the project assigned waste management specialist (WMS).

5.10 Records

5.10.1 **PERFORM** the following for records identified within this procedure.

5.10.1.1 **RECORD** the number of times the record was generated in applicable column

OR

PLACE a check mark (✓) in the N/A column.

5.10.1.2 **SUBMIT** the package to the FWS/OE/Shift Manager.

<table>
<thead>
<tr>
<th>Records Submittal Checklist</th>
<th>Number of times completed</th>
<th>N/A (✓)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forms and Documents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed Logbook</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chain of Custody</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FWS/OE/Shift Manager <strong>SEND</strong> the completed records to the Central Shift Office for records retention.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

________ / __________ / __________
Signature Print (First and Last) Date
FWS/OE/Shift Manager

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.