

Clean Sampling Method for Methyl Mercury and Organotin Analyses

SSFL SOP 18
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1.0 Objective

The purpose of this technical standard operating procedure (SOP) is to define the techniques and requirements for collecting sediment samples for methyl mercury and organotins analyses at the Santa Susana Field Laboratory (SSFL) site. This SOP addresses sample collection and handling techniques, but specific sample collection tools; sample collection equipment will be addressed in subsequent field sampling plan (FSP) addenda, as there may be a variety of conditions under which sediment samples are to be collected (e.g., submerged, not submerged).

Attached to this SOP is EPA method 1669 which describes the sampling of ambient water for trace metals. The “clean hands” and “dirty hands” technique for collection of water samples as described in EPA Method 1669 has been adapted for the collection of sediments to minimize to the maximum extent possible cross-contamination of the sample media. The use of laboratory pre-cleaned equipment (e.g., trowels) and sample bottles is required.

2.0 Background

2.1 Definitions

Grab Sample - A discrete portion of sample material or an aliquot taken from a specific sample location at a given point in time.

Trowel - A small Teflon[®], Teflon[®]-lined, or plastic disposable utensil measuring approximately 6 inches in length with a stem-like handle (for manual operation). Samples are handled and combined collected using a scooping action.

2.2 Associated Procedures

- SSFL SOP 1, *Procedures for Locating and Clearing Phase 3 Samples*
- SSFL SOP 2, *Surface Soil Sampling*
- SSFL SOP 6, *Field Measurement of Total Organic Vapors*
- SSFL SOP 7, *Field Measurement of Residual Radiation*
- SSFL SOP 8, *Field Data Collection Documents, Content, and Control*
- SSFL SOP 9, *Lithologic Logging*
- SSFL SOP 10, *Sample Custody*
- SSFL SOP 11, *Packaging and Shipping Environmental Samples*
- SSFL SOP 12, *Field Equipment Decontamination*
- SSFL SOP 13, *Guide to Handling Investigation Derived Waste*
- SSFL SOP 15, *Photographic Documentation of Field Activities*
- SSFL SOP 16, *Control of Measurement and Test Equipment*

2.3 Discussion

Sediment samples are being collected and analyzed to determine the type(s) and level(s) of methyl mercury and organotin impacts in sediment. All SOPs will be on hand with the field sampling team.

3.0 General Responsibilities

Field Team Leader - The field team leader (FTL) is responsible for ensuring that field personnel collect and handle sediment samples in accordance with this SOP.

Site Geologist – The person responsible for collecting and logging the sediment lithology.

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Site Health and Safety Technician– The person who will use field screening instruments to monitor all field activities for VOCs and radiological contaminants and pre-shipment sample coolers. This person is a trained radiological technician who works under the guidance of Science Application International Corporation's (SAIC's) Certified Health Physicist (CHP).

4.0 Required Equipment

- Site-specific plans (including Field Sampling Plan [FSP] Addendum and health and safety plan)
- Insulated cooler
- Plastic zip-top bags
- Personal protective clothing and equipment
- Clear, waterproof tape
- Bags of ice
- Plastic sheeting
- Appropriate sample containers (provided by the subcontract laboratory)
- Global Positioning System (GPS) unit
- Trash Bags
- Field Sampling Data Sheets
- Boring and Sample Description Logs
- Rubber Boots
- Monitoring/screening instruments required by health and safety plan
- Nitrile (non-talc) gloves
- Field logbook
- Indelible blue or black ink pen and/or marker
- Decontamination supplies
- Paper towels or Kim wipes
- Custody seals
- Disposable plastic trowels (provided by the subcontract laboratory)
- Sample labels
- Teflon squares and sleeve end caps
- Chain of custody forms
- 2-way radios

5.0 Procedures

5.1 Preparation

The following steps must be followed when preparing for sample collection:

1. Review site-specific health and safety plan and project plans (FSP Addendum) before initiating sampling activity.
2. Review EPA Method 1669 (attached) for the proper sampling procedures.
3. Designate the “clean hands” and “dirty hands” sample personnel. The sampler designated the “clean hands” person is responsible for all operations involving contact with sample bottle and transfer of the sample from the sample collection device to the sample bottle. The “dirty hands” sampler is responsible for preparation of the sampler (except the sample containers itself) operation of machinery, and all other activities that does not involve direct contact with the sample.
4. Don the appropriate personal protective clothing as specified in the site-specific health and safety plan. Clean non-talc gloves must be worn at all times when handling sampling equipment and containers
5. Locate sampling location(s) in accordance with FSP Addendum and document pertinent information in the field logbook (SSFL SOP 8). Confirm GPS coordinates of each location (SSFL SOP 1).
6. Use clean (decontaminated) sampling tools that have been provided by the subcontract laboratory to obtain sample material from each specified sample location.
7. Carefully remove stones, vegetation, debris, etc. from the sediment surface (below water level) in the sampling location area, if possible. Clear the sample location using a new and/or appropriately decontaminated tool (trowel/scoop provided by the subcontract laboratory) as described to expose a fresh sampling surface. Whenever possible stand downstream of the sample location to minimize introduction of contamination and to minimize disturbing the sediment to be sampled. Sediment deposits that have been disturbed in any manner (e.g., splashed, walked-on, or agitated) by field personnel should not be sampled.

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8. The Site Health and Safety Technician will perform contaminant screening using hand-held instruments at each sample location before sampling and for each sample collected (SSFL SOPs 6 and 7). The most recent spoils materials will be segregated to minimize cross-contamination. The breathing zone and excavated materials will be monitored continuously. If levels are detected above health and safety plan action levels (HASP page 8), work will be temporarily discontinued. If radiation levels, exceed two times (2X) background levels (HASP page 8), the Department of Energy (DOE), The Boeing Company (Boeing), and the California Department of Toxic Substances Control (DTSC) will be contacted. Site work will not resume at that location until further guidance is provided by DOE or Boeing. Contact information is in the health and safety plan.

5.2 Sample Collection

Because of the potential variety of conditions (i.e., not submerged, partially submerged, and submerged) under which sediment samples may be collected, the specific sample collection equipment has not been designated herein. However, regardless of the equipment used to obtain the sample material, for example, scoops, dredges, cores, the post-collection handling will be the same. The following general steps must be followed when collecting sediment samples for methyl mercury and organotins analyses.

1. Wear new, clean, non-talc gloves during handling of all sample containers and sampling devices. Change out gloves at each sampling location, or each time a new sample is to be collected to avoid cross-contamination.
2. Document the sampling process by recording the location, hydraulic condition, sampling equipment, and depth in the designated field logbook.
3. The "dirty hands" person collects the sample using the designated, decontaminated sampling equipment. Describe and log the sediment using the Unified Soil Classification System (USCS; SSFL SOP 9) on boring logs and a field sampling data sheet (FSDS). Document any and all deviations from the SOPs and the FSP Addendum in the field logbook and include rationale for changes (SSFL SOP 8).
4. The Site health and safety technician screens the exterior of the sampler for the presence of VOC and radiological contaminants (SSFL SOPs 6 and 7), and documents measured concentrations.
5. The "clean hands" person uses a clean, non-metallic trowel/scoop (provided by the subcontract laboratory) to scoop sample from the designated sample depth and transfer the material to the appropriate sample bottles. Several scoops may be required from this interval to collect the amount of sediment required to satisfy the analytical protocol (refer to Table 1 in the FSP Addendum). Minimize the inclusion of any pore water into the sample bottle by carefully decanting the water from the trowel before transfer to the sample bottle. Quickly cap the sample bottle.
6. Fill out the sample label with the appropriate sample information (e.g., sample identification, date/time of sample collection, requested analyses) per FSP Addendum Table 1. Attach the label to the sample bottle that has been externally cleaned using a paper towel or Kimwipe.
7. Place sample containers in individual zip-top plastic bags (provided by the subcontract laboratory) and seal the bags. Place baggies onto ice in an insulated cooler (provided by the subcontract laboratory) to maintain at 4°C ($\pm 2^{\circ}\text{C}$).
8. Because all sampling equipment used for the collection of methyl mercury and organotin samples is disposable, decontamination of the equipment is not required and contaminated equipment should be handled per SSFL SOP 13.
9. Any excess sediments material should be discarded back in the hole and no sediment IDW is expected.

5.2.1 Collection of Field Blanks

To demonstrate that sample contamination has not occurred from ambient air during sampling and sample handling, one field blank will be generated for every 10 collected samples. The water used for field blanks is certified clean and provided by the subcontract laboratory and transported to the sampling location.

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1. Transfer the required volume of field blank water to the appropriate pre-cleaned sample container (provided by the subcontract laboratory).
2. Fill out the sample label with the appropriate sample information (e.g., sample identification, date/time of sample collection, requested analyses) per FSP Addendum Table 1 and attach to sample bottle.
3. Place sample containers in individual zip-top plastic bags (provided by the contracted laboratory) and seal the bags. Place the bagged samples on ice in an insulated cooler (provided by the subcontract laboratory) to maintain at 4°C ($\pm 2^\circ\text{C}$).

5.2.2 Sample Packing and Shipment

1. Store samples at 4°C ($\pm 2^\circ\text{C}$) until samples are delivered to the designated analytical laboratory.
2. Pack all samples per SSFL SOP 11 and/or laboratory requirements. Include properly completed documentation and affix signed and dated custody seals to the cooler lid. See SSFL SOP 10 for guidance on sample custody procedures.

6.0 Restrictions/Limitations

The method requires “clean hands” and “dirty hands” sample personnel to properly implement this technique. All sampling equipment (e.g., scoops/trowels, sample jars, field blank water, sample coolers) must come from the subcontract laboratory. The two exceptions to subcontract laboratory-provided equipment are the specific sampling tool used to collect the media (unless the laboratory scoop is appropriate) and the ice used to preserve the samples. In addition, the specific sampling tool to collect the sediment samples must be described in the FSP Addendum.

7.0 References

United States Environmental Protection Agency. Method 1669 *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels*. July 1996.

8.0 Attachments

Attachment A – Method 1669 – Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels