


Laboratory Homogenization For Phase 3 Soil Samples

SSFL SOP 17
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1.0 Objective

The objective of this standard operating procedure (SOP) is to define the requirements and responsibilities for homogenizing multiple sample containers into one discrete surface or subsurface soil for all non-volatile/semi-volatile analyses (and select other) analyses for samples collected from the Santa Susana Field Laboratory (SSFL) site. Physical homogenization of soil material will be performed by subcontract laboratories. Homogenization of the depth-discrete samples by CDM Smith will not be performed in the field or in the field trailer. This SOP is intended to identify the minimum requirements required of the subcontract laboratories and is not intended to replace or supersede existing laboratory specific SOP.

2.0 Background

Soil sample homogenization prior to laboratory analysis has been requested by the California Department of Toxic Substances Control (DTSC) for the SSFL Phase 3 non-volatile chemical analyses. Homogenization was previously performed for selected SSFL Chemical Soil Background Study samples collected in the summer and fall 2011. During the background study, DTSC homogenized soil samples for chemical analyses for semi-volatile organic compounds (SVOCs), dioxins, pesticides/herbicides, and metals, not including hexavalent chromium. The DTSC has determined that homogenizing future soil samples for all inorganic and non-volatile analyses (refer to the Field Sampling Plan [FSP] Addendum) will provide greater consistency and comparability of the analytical results from future studies throughout SSFL sampling programs.

During Phase 3 sampling, surface and subsurface soil samples will be collected following SSFL SOPs 2, 3, 4, and 5 through the use of stainless steel sleeves or placement in glass sample jars. Because of the volume needed for multiple chemical analyses, multiple sleeves or glass jars may be required from each sampling location. Soil samples to be analyzed for metals (not including hexavalent chromium), PCBs, dioxins/furans, pesticides, herbicides, SVOCs, and perchlorate will be subject to homogenization. Soil samples for VOC, TPH, alcohols, glycols, and similar volatiles analyses will not be homogenized.

Homogenization of soil samples will be requested to be performed by each laboratory before analytical testing begins.

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.

Spoon/Scoop/Trowel - A small stainless steel, Teflon[®], Teflon[®]-lined, or plastic 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.

Stainless Steel or Glass Trays, Bowls or Pans – Appropriately-sized mixing containers used in the homogenization process.

2.2 Associated Procedures

- SSFL SOP 2, *Surface Soil Sampling*
- SSFL SOP 3, *Subsurface Soil Sampling with Hand Auger*
- SSFL SOP 4, *Direct Push Technology Sampling*
- SSFL SOP 5, *Backhoe Trenching/Test Pits for Sample Collection*
- SSFL SOP 10, *Sample Custody*

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- SSFL SOP 11, *Packaging and Shipping Environmental Samples*
- SSFL SOP 12, *Field Equipment Decontamination*

3.0 General Responsibilities

Field Team Leader—The field team leader (FTL) is responsible for ensuring that the Field Sample Coordinator is properly trained to manage the Phase 3 samples – identifying those sample sleeves and jars that do not require homogenization and those sample sleeves and jars that do require homogenization by the subcontract laboratory. The FTL also need to confirm that the sampling team is collecting sufficient sample volume for the homogenization measures.

Field Sample Coordinator—The sample coordinator is responsible for ensuring that all contracted laboratories follow this guidance in accordance with this procedure. In addition, all subcontract laboratories are required to have an SOP in place that describes in detail the specific laboratory procedures utilized to comply with this SOP.

Field Sampling Team—The field sampling team is responsible for collecting the proper volume of sample (refer to Table 1 in the FSP Addendum).

Laboratory Project Manager (PM)—The laboratory project manager is responsible for ensuring that all instructions regarding soil sample homogenization are followed by laboratory staff.

4.0 Required Equipment

Because homogenization of samples will occur at the subcontract laboratory, the laboratory supplies at a minimum should include:

- Laboratory logbook, bench sheet forms, other forms for documenting sample homogenization
- Indelible black or blue ink pens and markers
- Appropriate size sample containers (glass and plastic) with labels
- Stainless steel or glass trays, bowls, or pans
- Stainless steel or Teflon lined scoops/spoons/trowels
- Decontamination supplies
- Nitrile or appropriate gloves

5.0 Procedures

5.1 Laboratory Soil Homogenization/Compositing (Cone and Quarter Method)

The following steps will be performed by the analytical laboratory to create a composite soil sample for the non-volatile analyses. The laboratory will use sample quantities submitted in stainless steel sleeves or glass jars to perform this procedure.

1. Decontaminate all laboratory compositing equipment according to appropriate Laboratory SOPs.
2. Don appropriate PPE and gloves. Clean gloves must be worn for each sample composited.
3. With the top 1/3 and bottom 1/3 of sample material in the homogenization tray/bowl/pan, chop-up the sample into small chunks using a clean, stainless steel wallboard knife or other suitable implement.
4. Remove non-soil debris, including sticks and vegetation, as much as possible.
5. Scooping from the edge, form a mound in the center of the tray/bowl/pan.
6. Divide the mound into two equal piles and form each pile into a mound.
7. Divide each into two piles. (At this point there should be four piles in the tray/bowl/pan).
8. Mix the piles together that are opposite from each other into a single mound.

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9. Repeat steps 7, 8 and 9 until the sample is thoroughly homogenized (a minimum of 3 times).
10. Transfer the thoroughly mixed sample to appropriately labeled sample containers for the required analyses.
11. Analyze the samples.

5.2 Contracted Laboratory Compositing Equipment Decontamination

To clean laboratory equipment used in homogenization, remove all gross materials/stains/hardened material using a scrubbing pad or brush and rinsing the equipment with water. After scrubbing and rinsing, the laboratory should implement internal laboratory procedures/SOPs to complete cleaning and decontamination process to ensure the compositing equipment is free of potential cross contamination. At a minimum, the laboratory decontamination process must comply with the requirements of SSFL SOP 12.

6.0 Documentation

Document all compositing activities including decontamination in an appropriate logbook and/or bench sheet.

7.0 References

Lancaster Laboratories Inc. 2011 *SOP-SS-009 Homogenization and Subsampling of Solid Waste Samples from Environmental Sources*. July.

State of California Department of Toxic Substances Control (DTSC), 2012. *Homogenization of Soil Samples for Chemical Characterization, Santa Susana Field Laboratory, Ventura County, California*. February 29, 2012.