Surface Soil Sampling

SSFL SOP 2
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Signature/Date

1.0 Objective

The purpose of this technical standard operating procedure (SOP) is to define the general techniques and requirements for the collection of surface soil samples at the Santa Susana Field Laboratory (SSFL) site.

2.0 Background

2.1 Definitions

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

Slide Hammer- A sampling tool used to drive and retract a 6-inch long thin-walled stainless steel sample collection sleeve (approximately 2-inches in diameter).

Surface Soil- Soil that occurs at 0 to 6 inches below ground surface (bgs).

EnCore® Sampler- A single-use plastic sampling device, typically with a capacity of 5 grams, used to obtain undisturbed, unconsolidated material samples (e.g., soil) for laboratory analyses. The sampler is inserted into a metal T-handle and the open end of the sampler pushed directly into the soil.

2.2 Associated Procedures

- SSFL SOP 1, *Procedures for Locating and Clearing Phase 3 Samples*
- 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

Soil samples will be collected to determine the type(s) and level(s) of contamination in surface soil. 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 surface soil samples in accordance with the Field Sampling Plan (FSP) Addendum and this SOP.

Site Geologist – The person responsible for collecting and logging the soil samples.

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 at the Sampling Location

- Site-specific plans (including Field Sampling Plan [FSP Addendum, health and safety plan, and all SOPs)
- Insulated cooler
- Plastic zip-top bags
- Personal protective clothing and equipment
- Slide hammer with stainless steel sleeves
- EnCore samplers and T-handle
- Securely-sealed bags of ice
- Plastic sheeting
- Appropriate sample containers
- Global Positioning System (GPS) unit
- Trash Bags
- Monitoring/screening instruments required by health and safety plan
- Nitrile or other appropriate protective gloves
- Field logbook
- Indelible blue or black ink pen and/or marker
- Decontamination supplies
- Paper towels or Kim wipes
- Disposable plastic spoons and knives
- Sample labels
- Teflon squares and sleeve end caps
- 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. Don the appropriate personal protective clothing as specified in the site-specific health and safety plan.

3. 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).

4. Use clean (decontaminated) sampling tools to obtain sample material from each specified sample location.

5. Carefully remove stones, vegetation, debris, etc. from the ground surface in the sampling location area. Clear the sample location using a new and/or appropriately decontaminated tool as described to expose a fresh sampling surface.

6. 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, 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.

The following steps must be taken to prepare the slide hammer for sampling.

1. Obtain the slide hammer, sample tube with the shoe, and stainless steel liners.

2. Remove the sample tube shoe and insert a clean liner. Screw the shoe back onto the sample tube.

3. Screw the assembled sample tube onto the slide hammer.

4. After sampling, remove the sampling liner from the sample tube for sample collection.

5. Decontaminate the sample tube and shoe.

5.2 Sample Collection

The following general steps must be followed when collecting surface soil samples.

1. Wear new, clean 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 applicable information in the designated field logbook. Document any and all deviations from the SOPs and the sampling plan in the field logbook and include rationale for changes. See SSFL SOP 8 for guidance on entering information into field log books.

3. Because sampling for volatile organic compounds (VOCs) is not anticipated for most surface soil locations, the procedure for non-VOC sample collection is described first (Section 5.2.1). When sampling of VOCs is required (i.e., identified in Table 1 of FSP Addendum, observed stained soil, petroleum odor, or elevated photoionization detector [PID] reading) at any location, collect the required sample aliquot for volatile analyses (Section 5.2.2) first, as well as any other samples that may be degraded by aeration, followed by the collection of samples for other analyses.

5.2.1 Method for Collecting Samples for Nonvolatile Organic or Inorganic Compound Analyses

The requirements for collecting samples of surface soil for nonvolatile organic or inorganic analyses are as follows:

1. Use a clean slide hammer and decontaminated stainless steel sleeves to drive a sample from 0 to 6-inches bgs. Several sleeves may be required from this interval to collect the amount of surface soil to satisfy the analytical protocol (refer to Table 1 in the FSP Addendum. Quickly screen the open end of the sleeve and the sample borehole for VOCs and radioactivity (SSFL SOPs 6 and 7).

2. Collect subsamples for chromium (Cr^{3+}) and/or hexavalent chrome (Cr^{6+}) and/or pH from the center of the stainless steel sleeve into a glass jar using a disposable plastic spoon or knife. Ensure that the soil that was in contact with the sleeve is not collected in the jar.

3. Prior to capping the sleeve for the remaining non-volatile parameters, place a Teflon® cover sheet over each end of the sample. Secure the respective cap on each sample container immediately after collection. Label the sample sleeve with “top” and “bottom” designations.

4. Wipe the sample containers with a clean paper towel or Kimwipe to remove any residual soil from the sample container surface.

5. Fill out the sample label with the appropriate sample information (i.e., sample identification, date/time of sample collection, requested analyses) per FSP Addendum Table 1 and attach to sample sleeve.

6. Place sample containers in individual zip-top plastic bags and seal the bags. Place baggies onto ice in an insulated cooler to maintain at 4°C (±2°C).

7. Decontaminate all non-disposable sampling equipment in accordance with SSFL SOP 12.

5.2.2 Method for Collecting Soil Samples for Volatile Organic Compound Analysis

The following text contains the recommended SW-846 Test Method 5035 procedure for sampling and field preservation of soil samples for VOC analysis, which includes the EnCore™ Sampler Method for low-level VOC analyses.

1. When collecting grab sampling for VOC analysis, it is necessary to minimize sample disturbance and consequently minimize analyte loss.

2. Wear new, clean 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.

3. VOC samples shall be collected first as grab samples. After clearing sample site, use a clean slide hammer and decontaminated stainless steel sleeves to drive a sample from 0 to 6-inches bgs. Once the sleeve is retrieved, quickly

screen the open end of the sleeve and the sample borehole for VOCs and radioactivity (SSFL SOPs 6 and 7). EnCore samplers will be used to collect subsamples for the required analytical protocol (e.g., VOCs/1,4-dioxane and/or total petroleum hydrocarbons-gasoline range organics [TPH-GRO]). The VOC sample will be collected from the bottom of the 6-inch stainless steel sleeve. Several slide hammer samples (stainless steel liners) may be required at the location to obtain the required sample volume for all VOC samples.

4. Remove the EnCore sampler and cap from package and attach T-handle to sampler body. Ensure that the sampler is locked into the T-Handle before sampling.

5. Push the sampler into the freshly-exposed soil in the bottom of the sampler sleeve until the O-ring is visible within the hole on the side of the T-handle. If the O-ring is not visible within this window, then the sampler is not full.

6. Extract the sampler and wipe the sampler sides with a clean paper towel or Kimwipe so that the sampler cap can be tightly attached.

7. While still locked into the T-handle, push the sampler cap on the head of the sampler with a twisting motion to secure it to the sampler body.

8. Remove the sampler from the T-handle and rotate the sampler stem counterclockwise until the stem locks in place to retain the sample within the sampler body.

9. Repeat procedure for each of the remaining samplers.

10. When collecting soil samples using the EnCore Sampler method, collection of soil for moisture content analysis is required. Results of the moisture analysis are used to adjust “wet” concentration results to “dry” concentrations to meet analytical method requirements. The moisture sample will be collected in a separate 4 oz. glass jar. Following EnCore sample collection (, fill one 4 oz. jar with soil from bottom of a stainless steel sleeve for moisture analysis using a disposable plastic spoon or knife.

11. Any remaining soil may be used for the non-volatile analyses (Section 5.3).

12. Complete the sample labels by filling in the appropriate information (.., sample identification, date and time of sample collection, and requested analyses [per FSP Addendum]) and secure the label to the container.

13. Store samples at 4°C (±2°C) until samples are delivered to the FTL or sample coordinator (per SOP 10) for sample packing and shipment (per SOP 11) to the designated analytical laboratory. Encore samplers must be shipped and delivered to the analytical laboratory for extraction within 48 hours.

14. Decontaminate all non-disposable sampling equipment in accordance with SSFL SOP 12.

Note: A water trip blank will be included with sample coolers containing VOC samples.

5.2.3 DPT Procedure for Surface Soil Collection

Collection of surface soil samples with the Direct Push Technology (DPT) is allowed when hard soil conditions prevent collection of soil via slide hammer. Refer to SOP 4, Section 5.4 for procedures.

6.0 Restrictions/Limitations

Before conducting the soil sampling at each location, underground utilities and structures must be demarcated on the ground surface. In addition, archeological and cultural resources as well as Native American cultural concerns must be cleared. A subcontractor will be used to locate and mark the utility lines. The selected sampling location shall be a safe distance from the demarcated utility. In some cases, records regarding utility locations may not exist.

Also, as presented in Section 5.2.2 of this SOP, when grab sampling for VOC analysis or other compound(s) that may be

compromised by aeration, it is necessary to minimize sample disturbance and consequently minimize analyte loss. The representativeness of a VOC grab sample is difficult to determine because the collected sample represents a single point, is not homogenized, and has been disturbed.

7.0 References

U.S. Department of Energy. 1996. Hazardous Waste Remedial Actions Program. *Quality Control Requirements for Field Methods*, DOE/HWP-69/R2. September.

_____. Hazardous Waste Remedial Actions Program. *Standard Operating Procedures for Site Characterizations*, DOE/HWP-100/R1. September 1996 or current revision.

U. S. Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)*, Third Edition, November 1986, (as amended by Updates I, II, IIA, IIB, III, and IIIA, June 1997). Method 5035 (***Note***: § 6.2.1.8 of this method says samples stored in EnCore™ samplers shall be analyzed within 48 hours or transferred to soil sample vials in the laboratory within 48 hours): December 1996, Revision O, Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples.

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SSFL Phase 3 Chain of Custody

CDM Smith
DateShipped:
CarrierName:
AirbillNo:

Contact Name:
Contact Phone:

COC No:
Cooler #:
Lab:
Lab Phone:
Lab Address

Sample	Date/ Time	Matrix	Preserv.	Type/No of Containers	Turn Around Time	Metals 6010 and 6020	Mercury 7470 (Soil)	Mercury 7470 (Water)	Fluoride 300.0/9056	SVOC 8270	TIC 8270	PAHs 8270 SIM	1,4 Dioxane 8270 SIM	Dioxins 1613	PCB's/PCTs 8082	Perchlorate 314.0/331	Perchlorate Confirm 6850/6860	pH 9045 (Soil)	pH 9040 (Water)	Hex Cr 7196/7199	Herbicides 8151	Pesticides 8081	VOCs 8260	1,4 Dioxane 8260 SIM	TPH-GRO 8015	TPH-DRO 8015	Glycols 8015	Alcohols 8015	Terphenyls 8015	Nitrates 300.0/9056	Energetics 8330	Cyanide 9012	Formaldehyde 8315	NDMA 1625	Organotin	Methyl Mercury 1630	Other Analysis/Notes

Special Instructions:	Sampler:

Relinquished by	Date	Time	Received by	Date	Time	Relinquished by	Date	Time	Received by	Date	Time

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