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Standard Operating Procedure for Soil Sampling from Test Pits

This document describes the procedures to be used when collecting soil samples using an excavator for the purpose of laboratory analysis. The reader should be familiar with relevant sections of the following document as it is the source of this field method:

Soil Sampling, SESDPROC-300-R3, USEPA, August 2014 https://www.epa.gov/quality/soil-sampling

The trenches created by a backhoe or excavator offer the capability of collecting samples from specific intervals and allow visual correlation with vertically and horizontally adjacent material. <u>No sample will be collected by entering a trench deeper than 4 feet</u>.

Data Quality Objectives and Quality Assurance protocols in the sampling plan must be followed. This method must be modified if concentrations of VOCs (e.g. benzene) are expected to be less than 0.2 mg/kg.

This SOP shall be submitted to the excavation contractor at least two work days prior to the scheduled date of sampling.

Field Method to Collect Samples from Excavator Bucket

- 1. This SOP is appended to the Health and Safety Plan associated with the field program.
- 2. Documentation of all sampling is required. Documentation includes, at a minimum
 - a. Photographs of each sample with location stamp on the image or within the electronic file of the photograph
 - b. Written notes in a field notebook that
 - i. Describe the sample in terms of texture, grain size, odor, moisture, color, etc.
 - ii. Correlate the name of the sample with location¹, depth, photograph number, date and time of sampling
 - iii. Describe any anomalies of sampling (e.g. excessive slough)
 - iv. Provide other useful information (e.g. split samples with others)
 - c. Chain of Custody forms tied to information in the field notebook
- 3. Inspect the backhoe or excavator to ensure the bucket is clean and free of grease or visual contamination. The intent of this sampling method is to avoid the need to decontaminate the bucket between sampling events.

¹ The name of the sample can be a location from a fixed point, such as 120N/30E. The fixed point should be well head, telephone pole, corner of a foundation or other feature that can be easily identified in the field <u>and</u> on a Google Earth image. Latitude and longitude are generally not adequate for sample locations as the accuracy of hand-held GPS can be plus/minus 20 feet. A cemented benchmark may be installed at the site if multiple sampling events are anticipated.

- 4. Trenches for samples should proceed from the expected cleanest locations to the most impacted locations.
- 5. Place pre-labeled jars for the expected samples from the trench in a clean sample preparation area covered by a disposable drop cloth, inside the original container box, inside a zip-lock bag, or another secure and suitable protected location.
- 6. Near surface samples may be obtained in the following manner
 - a. Excavate a 4-foot deep trench with a ramp to allow access
 - b. Fill the sample jars from a scraped, clean surface of the side wall of the trench using clean spoons/trowels or fresh nitrile gloves
- 7. In general, deeper samples should be obtained from the backhoe bucket in the following manner
 - a. Excavate the sampling trench to form two benches:
 - i. The upper bench is 0.5-1 foot above the proposed depth of sampling
 - ii. The lower bench is 1-2 feet below the upper bench and more distant from the equipment and will capture slough from the excavation and allow the operator to cut into the soil at the upper bench with greater accuracy
 - b. Cause the operator to clean slough from the upper bench and expose the earth material slightly above the desired sampling depth. Direct the operator with hand signals as necessary.
 - c. Direct the operator to remove a 0.5-1 foot layer of earth from the upper bench into the bucket and then to the ground surface
 - d. Examine the earth in the bucket and
 - i. Remove any slough and any smear from the bucket with a clean (decontaminated) trowel or knife to expose relatively undisturbed material
 - ii. Obtain samples of undisturbed material for VOCs (e.g. BTEX) first and non-volatile constituents in a separate container next²
 - iii. Do not obtain samples from within 1-inch of the bucket surface
 - iv. Label sample jars for depth and location then place in a cooler on ice in a separate zip-lock bag for each sample suite
 - v. Describe the material in the bucket with respect to grain size, color, odor, texture, etc.
 - vi. Obtain a reasonable close-up photograph of the material
 - e. Inspect the bucket to cause cleaning or decontamination as required to satisfy data quality objectives.
 - f. Dispose of the drop cloth, spilled material or other debris and recondition the sample preparation area with a clean drop cloth and the next set of labeled sample jars.

² See preservation, container material and sample size requirements on the accompanying chart. The earth material must be packed into a single 2-oz. glass container with a screw cap and septum seal. The sample container must be filled quickly and completely to eliminate head space.

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g. Repeat steps a-f for the next sampling depth

Some precision with respect to actual depth of the sample may be reduced with this method but if the soil to be sampled is uniquely distinguishable from the adjacent or nearby soils, it is possible to adequately characterize the material as to location and depth.

If sampling for low concentrations of VOC (i.e. <0.2 mg/kg of benzene) special sampling containers, samplers and protocols are required.

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Equipment Checklist

- Site-specific plans (e.g, Health and Safety and Sampling Plan)
- Plastic zip-top bags to hold samples in cooler
- Field logbook
- Personal protective clothing (see HASP)
- Indelible black ink pens and markers
- Plastic or paper as drop cloth for sample preparation area and other uses
- Clear, waterproof tape to cover sample labels if necessary
- Disposable nitrile or appropriate gloves
- Appropriate sample containers with labels
- Bags of ice
- Decontamination supplies: three buckets, "simple green" soap, Alconox or equivalent, fresh water, distilled water
- Chain of custody forms
- Wipes or paper towels
- Insulated cooler(s)
- Global Positioning System (GPS) unit (iPhone may be acceptable)
- >20-ft measuing tape
- Trash Bags which can also serve as a drop cloth
- Spoons and/or knives that can be completely decontaminated
- Monitoring/screening instruments as required by the health and safety plan