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| Identifier: **SOP-06.09** | Revision: **3,** IPC-1 | |
| Effective Date: 9/15/2010 | Next Review Date: 6/25/2015 | |

# Environmental Programs Directorate
# Corrective Actions Projects

## Standard Operating Procedure

for

# SPADE AND SCOOP METHOD FOR THE COLLECTION OF SOIL SAMPLES

**APPROVAL SIGNATURES:**

| **Subject Matter Expert:** | **Organization** | **Signature** | **Date** |
|---|---|---|---|
| Rebecca Coel-Roback | PMFS-DO | Signature on File | 6/21/2010 |
| **Responsible Line Manager:** | **Organization** | **Signature** | **Date** |
| Craig Douglass | CAP | Signature on File | 6/21/2010 |

## 1.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) states the responsibilities and describes the process for spade-and-scoop collection of shallow (i.e., typically zero to 12 inches) soil samples. The success of this process directly ties to the participation of each employee within the Los Alamos National Laboratory (LANL), Environmental Programs Directorate (ADEP).

- **ADEP projects participants** shall implement this mandatory SOP.
- **Subcontractors** performing work under the ADEP's quality program shall follow this SOP.

  or

- **Subcontractors** may use the subcontractor's procedure as long as the substitute meets the requirements prescribed by the ADEP's Quality Management Plan, and the Associate Director Environmental Programs Quality Assurance (QA) Team Leader and a technical staff person approve the procedure before the subcontractor begins the designated activity.

## 2.0 BACKGROUND AND PRECAUTIONS

### 2.1 Background

ADEP project participants shall use this SOP in conjunction with an approved Site-Specific Health and Safety Plan (SSHASP).

The "spade-and-scoop" method is the simplest method of sample collection. Collect a sample by digging a hole to the desired depth, as prescribed in the sampling and analysis plan, and collect a discrete grab or portion of a composite sample. Stainless-steel shovels, spades, bowls, and scoops are recommended because of the ease with which they are decontaminated. If stainless steel is not appropriate, use disposable sampling tools constructed of materials such as polystyrene or Teflon.

The spade-and-scoop method works in any soil type, including cobbles which stop a hand auger. If a spade does not work in a given area, use an alternate tool (e.g., a concrete saw for concrete, a pickax for asphalt, a Maddox for roots and rocks, or a backhoe or posthole digger for deep holes or hard soil; a hand auger or backhoe may be more effective for digging holes deeper than two or three feet). Handle all waste generated by sampling operations in accordance with SOP-5238 Characterization and Management of Environmental Restoration Project Waste.

Depending upon the constituents expected at a sampling location (e.g., high explosives, radionuclides), a site-specific safety screening (e.g., high-explosives spot test, rad screening) may be required prior to sample collection. The SSHASP details these requirements, on a site-specific basis.

## 3.0 EQUIPMENT AND TOOLS

Attachment A provides a checklist of suggested equipment and supplies needed to implement this procedure.

## 4.0 STEP-BY-STEP PROCESS DESCRIPTION

### 4.1 Perform Pre-Operational Activities

| | | |
|---|---|---|
| Field Team Member(s) | 1. | Review SOPs EP-ERSS-SOP-5056, Sample Containers and Preservation, EP-ERSS-SOP-5057 Handling, Packaging, and Transporting Field Samples, and EP-ERSS-SOP-5058 Sample Control and Field Documentation for guidance regarding appropriate sample containers and documentation, packaging, and shipping of collected samples.<br><br>**NOTE**: For further guidance regarding sample containers, sample preservation, and coordination of sample shipping to analytical laboratories, coordinate with both the data-support technician assigned to the appropriate focus area and the Sample Management Office (SMO). |
| | 2. | Gather and decontaminate the needed supplies and equipment, as specified in EP-ERSS-SOP-5061, Field Decontamination of Equipment. |
| Project Team Leader | 3. | Monitor the proper implementation of this procedure and ensure that the appropriate personnel complete all applicable training assignments. |

### 4.2 Perform Sampling Activities

| | | |
|---|---|---|
| Field Team Member(s) | 1. | Using the most effective tool available, excavate to the required depth (e.g., with the scoop, excavate either down or to the side of undisturbed soil to collect the sample material). |
| | 2. | If collecting the sample suite for volatile organic compound (VOC) analysis, collect this fraction first and transfer the material directly into the sample bottles.<br><br>• Ensure to bottle and cap the sample quickly, without homogenizing the soil, leaving no airspace in the sample container, if possible.<br><br>**NOTE 1:** The cap must have a Teflon liner to facilitate laboratory analysis of the VOCs.<br><br>**NOTE 2:** ~~En Core~~ sampling is recommended for VOC samples collected for environmental characterization. IPC-1 |
| | 3. | Collect blanks and other field QA samples as prescribed in EP-ERSS-SOP-5059, Field Quality Control Samples. |
| | 4. | Remove enough material to completely fill the remaining sample bottles. |

Field Team Member(s) (cont.)

5. For site characterization, discrete samples shall be collected for field screening and laboratory analyses. Samples may be broken up, as necessary, to allow for containerization, and rocks and woody material may be removed. Homogenization of discrete samples shall be performed by the analytical laboratory, if necessary. Samples collected for tritium, VOC, and SVOC analyses shall not be homogenized.

   ~~Homogenize the sample material in a stainless-steel bowl.~~ IPC-1

   ~~**NOTE**: Field sieving of the sample can be performed at this stage if it is desired to remove rocks and woody material before analysis. Use of a 2-millimeter (mm) (No. 10) sieve allows separation of sand-size and finer particles from coarser particles. Shaking of the sieve is performed until only particles >2 mm in size remain on the screen. A brass sieve can be used if the potential addition of copper and zinc to the sample from the sieve is not considered to be a problem. Otherwise, a stainless steel sieve should be used. Following sieving, decontamination of the sieve is performed as specified in EP-ERSS-SOP-5061.~~

6. When collection of composite samples is required (e.g., waste characterization), field homogenization of the samples may be necessary. Homogenize the sample material in a stainless-steel bowl.

   **NOTE**: Field sieving of the sample can be performed at this stage if it is desired to remove rocks and woody material before analysis. Use of a 2-millimeter (mm) (No. 10) sieve allows separation of sand-size and finer particles from coarser particles. Shaking of the sieve is performed until only particles >2 mm in size remain on the screen. A brass sieve can be used if the potential addition of copper and zinc to the sample from the sieve is not considered to be a problem. Otherwise, a stainless steel sieve should be used. Following sieving, decontamination of the sieve is performed as specified in EP-ERSS-SOP-5061.

   ~~Containerize the remaining sample suites.~~

   ~~**NOTE 1**: If collecting multiple samples by this method, avoid cross-contamination by either decontaminating the spade, bowl, and scoop before collecting the next sample (see EP-ERSS-SOP-5061) or using dedicated or disposable sampling material for each event. If the sampler's gloves come into contact with the sampled material during sampling, the gloves should also be changed before sampling at a different location or depth.~~ IPC-1

   ~~**NOTE 2**: Field sieving of the sample (see step 5) can be performed at this stage if it is desired to remove rocks and woody material before analysis.~~

7. Collect any additional samples for field quality control, as specified in EP-ERSS-SOP-5059.

8. Label sample containers and complete documentation according to SOPs EP-ERSS-SOP-5056 and EP-ERSS-SOP-5058.

9. Whenever a sample is collected for analyses, create a custody record using a Chain of Custody/Request for Analysis Form and affix a sample label to the sample container, following the guidance specified in EP-ERSS-SOP-5058.

| **4.3 Post-Operational Activities** | | |
|---|---|---|
| Field Team Member(s) | 1. | Decontaminate all equipment as specified in EP-ERSS-SOP-5061. |
| | 2. | Pack samples and ship them to the analytical laboratory as specified in EP-ERSS-SOP-5057. |
| | 3. | Return all supplies and equipment to proper storage locations. |
| | 4. | Ensure the proper staking of sampling locations. |
| | 5. | Ensure visibility of the location identification on the location stake. |
| | 6. | Survey all sample locations and upload the survey data into the Sample Management Data Base (SMDB). |
| **4.4 Records Management** | | |
| Field Team Leader | 1. | Maintains and submits records and/or documents generated by this procedure to the Records Processing Facility according to EP-DIR-SOP-4004, Records Transmittal and Retrieval Process.<br>• Chain of Custody/Request for Analysis Form (Attachment C of EP-ERSS-SOP-5058)<br>• Daily Activity Log (Attachment E of EP-ERSS-SOP-5058) or field notebook, including any deviations or other pertinent information<br>• Sample Collection Log (Attachment B of EP-ERSS-SOP-5058)<br>• Field Site Closeout Checklist (Attachment A of SOP-01.12) |

## 5.0 DEFINITIONS

**Site-Specific Health and Safety Plan**—Health and safety plan that is specific to a site or ADEP-related field activity that has been approved by a ADEP health and safety representative. This document contains information specific to the project including scope of work, relevant history, descriptions of hazards by activity associated with the project site(s), and techniques for exposure mitigation (e.g., personal protective equipment [PPE]) and hazard mitigation.

## 6.0 PROCESS FLOW CHART

To be included at a later date.

## 7.0 ATTACHMENTS

Attachment 1 Spade and Scoop Method Equipment and Supplies Checklist Form

## REVISION HISTORY

| Revision No. *(Enter current revision number, beginning with Rev.0)* | Effective Date *(DCC inserts effective date for revision)* | Description of Changes *(List specific changes made since the previous revision)* | Type of Change *(Technical [T] or Editorial [E])* |
|---|---|---|---|
| 0 | 02/14/1995 | New SOP. | All |
| 1 | 02/08/2001 | Updated to reflect current process. | All |
| 2 | 01/14/2004 | "Minor" changes; updated to new format. | All |
| 3 | 6/25/2010 | Document supersedes SOP-06.09 R2; new document control number assigned; updated organization name and references to procedures. | E |
| 3, IPC-1 | 9/15/2010 | Updated Section 4.2.5 & 4.2.6 to clarify the homogenization process; updated 4.2.2 to delete En Core. | Page 3 & 4 |

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ATTACHMENT 1:

**SOP-06.09, R3-1**

SPADE AND SCOOP METHOD EQUIPMENT AND SUPPLIES CHECKLIST

Records Use only

Los Alamos NATIONAL LABORATORY EST.1943

**Spade and Scoop Method Equipment and Supplies Checklist**

| CHECK | ITEM DESCRIPTION | | | QUANTITY |
|---|---|---|---|---|
| [✔] | [Insert first item's description, including size, manufacturer, etc. as appropriate.] | | | [X] |
| ☐ | Stainless-steel or disposable polystyrene (i.e., or other inert material) scoop or lab spoon (scoopulas). | | | |
| ☐ | Stainless-steel shovel or fat-pointed mason trowel. | | | |
| ☐ | Stainless-steel spade. | | | |
| ☐ | Tape measure (graduated in tenths of inches). | | | |
| ☐ | Sturdy work boots (steel-toed). | | | |
| ☐ | Work gloves. | | | |
| ☐ | Alternate tool and eye protection (if needed). | | | |
| ☐ | Stakes or other markers, as appropriate, for identifying sample locations. | | | |
| ☐ | Sledge hammer for driving in stakes. | | | |
| ☐ | Safety glasses. | | | |
| ☐ | Teflon sheets or stainless-steel sampling bowls. | | | |
| ☐ | Plastic sheet. | | | |
| ☐ | Alconox (de-ionized water). | | | |
| ☐ | Brushes (long-handled, scrub, and wire). | | | |
| ☐ | Galvanized tub. | | | |
| ☐ | Trash bags. | | | |
| ☐ | Buckets (galvanized, stainless-steel, and plastic). | | | |
| ☐ | Garden pressure sprayer. | | | |
| ☐ | Cleaning wipes. | | | |
| ☐ | Chem Wipes. | | | |
| ☐ | Storage containers for waste-decontaminated solutions. | | | |
| ☐ | Blue ice or equivalent. | | | |
| ☐ | Disposable laboratory gloves. | | | |
| ☐ | Camera and film. | | | |
| ☐ | Sample containers and preservatives. | | | |
| ☐ | Daily Activity Log Forms or field notebooks. | | | |
| ☐ | Chain of Custody/Request for Analysis Forms. | | | |
| ☐ | Sample Collection Logs. | | | |
| ☐ | Custody seals. | ☐ | Sample labels. | |
| ☐ | Ziploc bags (12 x 12 in. | | | |
| ☐ | Any PPE listed in, or required by, the SSHASP. | | | |
| ☐ | List of emergency phone numbers. | | | |
| ☐ | Baseball cap. | ☐ | Sunscreen | |
| ☐ | Hand soap. | | | |
| ☐ | Locking coolers. | ☐ | Padlock | |
| ☐ | Ludlum 139, ESP-1, ESP-2, or equivalent, as necessary for rad screening. | | | |
| ☐ | High explosives spot test as necessary for HE screening. | | | |
| ☐ | Cellular phone, two-way radio. | | | |
| ☐ | Drinking water, Gatorade. | | | |
| ☐ | Barricade tape, signs, stanchions or other postings. | | | |
| ☐ | Masking or duct tape. | ☐ | Sharpie markers or pens (blk). | |
| ☐ | Any additional supplies listed in associated procedures, as needed. | | | |