

Identifier: **SOP-06.09**

Revision: **2**

Effective Date: **01/14/04**

Document Catalog Number: **ER2003-0694**

Author: **Mark Thacker**



**Risk Reduction and Environmental Stewardship—
Remediation Services Project**

Standard Operating Procedure

for **Spade and Scoop Method for the
Collection of Soil Samples**

Revision Log

Revision No.	Effective Date	Prepared By	Description of Changes	Affected Pages
0	02/14/1995	Steve Wagner	New SOP.	All
1	02/08/2001	Donald Hickmott	Updated to reflect current process.	All
2	01/14/2004	Mark Thacker	"Minor" changes; updated to new format.	All

Spade and Scoop Method for the Collection of Soil Samples

Table of Contents

1.0	PURPOSE	4
2.0	SCOPE.....	4
3.0	TRAINING.....	4
4.0	DEFINITIONS	4
5.0	RESPONSIBLE PERSONNEL.....	5
6.0	BACKGROUND AND PRECAUTIONS	5
7.0	EQUIPMENT	6
8.0	PROCEDURE	6
8.1	Perform Pre-Operational Activities	6
8.2	Perform Sampling Activities	6
8.3	Perform Post-Operational Activities.....	7
9.0	LESSONS LEARNED.....	8
10.0	RECORDS.....	8
11.0	REFERENCES	8
12.0	ATTACHMENTS	9
	Attachment A: Equipment and Supplies Checklist.....	10

List of Acronyms and Abbreviations

FIMAD	facility for information, management, analysis, and display
LANL	Los Alamos National Laboratory
PPE	personal protective equipment
PTL	Project Team Leader
QP	quality procedure
QPPL	Quality Program Project Leader
RRES-RS	Risk Reduction and Environmental Stewardship—Remediation Services Project
SMO	Sample Management Office
SOP	standard operating procedure
SSHASP	site-specific health and safety plan
VOC	volatile organic compound

Spade and Scoop Method for the Collection of Soil Samples

1.0 PURPOSE

This standard operating procedure (SOP) states the responsibilities and describes the process for spade-and-scoop collection of shallow (i.e., typically 0 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), Risk Reduction and Environmental Stewardship, Remediation Services (RRES-RS) project.

2.0 SCOPE

- 2.1 All **RRES-RS project participants** shall implement this mandatory SOP.
- 2.2 **Subcontractors** performing work under the RRES-RS project's quality program shall follow this SOP.

OR

- 2.3 **Subcontractors** may use the subcontractor's procedure as long as the substitute meets the requirements prescribed by the RRES-RS Quality Management Plan, and the RRES-RS Quality Program Project Leader (QPPL) and a RRES-RS technical staff person approve the procedure before the subcontractor begins the designated activity.

3.0 TRAINING

- 3.1 **RRES-RS project participants** shall train to and use the current version of this SOP; contact the author if the SOP text is unclear.
- 3.2 **RRES-RS project participants** using this SOP shall document training in accordance with QP-2.2.
- 3.3 The responsible **Project Team Leader (PTL)** shall monitor the proper implementation of this procedure and ensure that the appropriate personnel complete all applicable training assignments.
- 3.4 **RRES-RS project participants** may request any needed assistance with implementation of this procedure from RRES-RS Quality Integration and Improvement (QII).

4.0 DEFINITIONS

- 4.1 *Site-specific health and safety plan (SSHASP)*—Health and safety plan that is specific to a site or RRES-RS-related field activity that has been approved by an RRES-RS 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.

5.0 RESPONSIBLE PERSONNEL

The following personnel are responsible for activities identified in this procedure:

- Field Team Leader
- Field Team Member
- Project Team Leader
- Quality Program Project Leader
- RRES-RS Project Participants
- User

6.0 BACKGROUND AND PRECAUTIONS

- 6.1 **RRES-RS project participants** shall use this SOP in conjunction with an approved SSHASP.
- 6.2 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 (SAP), 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.
- 6.3 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 2 or 3 ft.) Handle all waste generated by sampling operations in accordance with SOP-01.06.
- 6.4 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.

7.0 EQUIPMENT

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

8.0 PROCEDURE

Field team members shall perform the following activities and make any deviations from this SOP in accordance with QP-5.7 and/or SOP-01.01.

8.1 Perform Pre-Operational Activities

8.1.1 Review SOPs-01.02, -01.03, and -01.04 which cover issues of appropriate sample containers, as well as documentation, packaging, and shipping of collected samples.

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).

8.1.2 Gather and decontaminate the needed supplies and equipment, as specified in SOP-01.08.

8.2 Perform Sampling Activities

8.2.1 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.

8.2.2 If collecting the sample suite for volatile organic compound (VOC) analysis, collect this fraction first and transfer the material directly into the sample bottles.

Note: Ensure to bottle and cap the sample quickly, without homogenizing the soil, leaving no airspace in the sample container, if possible. The cap must have a Teflon liner to facilitate laboratory analysis of the VOCs.

Note: En Core sampling is recommended for VOC samples collected for environmental characterization. Collect blanks and other field quality assurance (QA) samples as prescribed in SOP-01.05.

8.2.3 Remove enough material to completely fill the remaining sample bottles.

8.2.4 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-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 ER-SOP-1.08.

8.2.5 Containerize the remaining sample suites.

Note: If collecting multiple samples by this method, avoid cross-contamination by either decontaminating the spade, bowl, and scoop before collecting the next sample (see SOP-01.08) 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.

Note: Perform sample field sieving of the sample at this stage if it is desired to remove rocks and woody material before analysis. Use of a 2 mm (No. 10) sieve which 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. Use a brass sieve if the potential addition of copper and zinc to the sample from the sieve is not considered to be a problem. Otherwise, use a stainless steel sieve. Following sieving, decontamination of the sieve is performed as specified in SOP-01.08.

8.2.6 Collect any additional samples for field quality control, as specified in SOP-01.05.

8.2.7 Label sample containers and complete documentation according to SOPs-01.02 and -01.04.

8.2.8 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. Follow the guidance supplied in SOP-01.04.

8.3 Perform Post-Operational Activities

8.3.1 Decontaminate all equipment as specified in SOP-01.08.

8.3.2 Pack samples and ship them to the analytical laboratory as specified in SOP-01.03.

8.3.3 Return all supplies and equipment to proper storage locations.

- 8.3.4 Ensure the proper staking of sampling locations.
- 8.3.5 Ensure visibility of the location ID on the location stake.
- 8.3.6 Survey all sample locations and upload the survey data into FIMAD (the Facility for Information, Management, Analysis and Display).

9.0 LESSONS LEARNED

- 9.1 Before performing work described in this SOP, **RRES-RS project participants** should go to the Department of Energy Lessons Learned Information Services home page, located at <http://www.tis.eh.doe.gov/ll/ll.html>, and/or to the LANL Lessons Learned Resources web page, located at http://www.lanl.gov/projects/lessons_learned/, and search for applicable lessons.
- 9.2 During work performance and/or after the completion of work activities, **RRES-RS project participants**, as appropriate, shall identify, document, and submit lessons learned in accordance with the LANL, Lessons Learned System located at http://www.lanl.gov/projects/lessons_learned/.

10.0 RECORDS

The **FTL** shall submit the following records to the Records Processing Facility, in accordance with QP-4.4:

- Chain of Custody/Request for Analysis Form (Attachment C of SOP-01.04)
- Daily Activity Log (Attachment E of SOP-01.04) or field notebook, including any deviations or other pertinent information
- Sample Collection Log (Attachment B of SOP-01.04)
- Field Site Closeout Checklist (Attachment A of SOP-01.12)

11.0 REFERENCES

To properly implement this SOP, **RRES-RS project participants** should become familiar with the contents of the following documents located at http://erinternal.lanl.gov/home_links/Library_proc.shtml:

- RRES-RS Project, Quality Management Plan
- QP-2.2, Personnel Orientation and Training
- QP-4.4, Record Transmittal to the Records Processing Facility
- QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities

- SOP-01.01, General Instructions for Field Investigations
- SOP-01.02, Sample Containers and Preservation
- SOP-01.03, Handling, Packaging, and Transporting Field Samples
- SOP-01.04, Sample Control and Field Documentation
- SOP-01.05, Field Quality Control Samples
- SOP-01.06, Management of Environmental Restoration Project Wastes
- SOP-01.08, Field Decontamination of Drilling and Sampling Equipment
- SOP-01.12, Field Site Closeout Checklist

12.0 ATTACHMENTS

The **user** of this SOP may locate all forms associated with this procedure at <http://erinternal.lanl.gov/Quality/user/forms.asp>.

Attachment A: Spade and Scoop Method Equipment and Supplies Checklist
Form (1 page)

[Using a token card, click here to record "self-study" training to this procedure.](#)

If you do not possess a token card or encounter problems, contact the RRES-ECR training specialist.

Attachment A: Spade and Scoop Method Equipment and Supplies Checklist

CHECK	ITEM DESCRIPTION	QUANTITY
[✓]	[Insert first item's description, including size, manufacturer, etc. as appropriate.]	[X]
<input type="checkbox"/>	Stainless-steel or disposable polystyrene (i.e., or other inert material) scoop or lab spoon (scoopulas).	
<input type="checkbox"/>	Stainless-steel shovel or fat-pointed mason trowel.	
<input type="checkbox"/>	Stainless-steel spade.	
<input type="checkbox"/>	Tape measure (graduated in tenths of inches).	
<input type="checkbox"/>	Sturdy work boots (steel-toed).	
<input type="checkbox"/>	Work gloves.	
<input type="checkbox"/>	Alternate tool and eye protection (if needed).	
<input type="checkbox"/>	Stakes or other markers, as appropriate, for identifying sample locations.	
<input type="checkbox"/>	Sledge hammer for driving in stakes.	
<input type="checkbox"/>	Safety glasses.	
<input type="checkbox"/>	Teflon sheets or stainless-steel sampling bowls.	
<input type="checkbox"/>	Plastic sheet.	
<input type="checkbox"/>	Alconox (de-ionized water).	
<input type="checkbox"/>	Brushes (long-handled, scrub, and wire).	
<input type="checkbox"/>	Galvanized tub.	
<input type="checkbox"/>	Trash bags.	
<input type="checkbox"/>	Buckets (galvanized, stainless-steel, and plastic).	
<input type="checkbox"/>	Garden pressure sprayer.	
<input type="checkbox"/>	Cleaning wipes.	
<input type="checkbox"/>	Chem Wipes.	
<input type="checkbox"/>	Storage containers for waste-decontaminated solutions.	
<input type="checkbox"/>	Blue ice or equivalent.	
<input type="checkbox"/>	Disposable laboratory gloves.	
<input type="checkbox"/>	Camera and film.	
<input type="checkbox"/>	Sample containers and preservatives.	
<input type="checkbox"/>	Daily Activity Log Forms or field notebooks.	
<input type="checkbox"/>	Chain of Custody/Request for Analysis Forms.	
<input type="checkbox"/>	Sample Collection Logs.	
<input type="checkbox"/>	<input type="checkbox"/> Custody seals.	<input type="checkbox"/> Sample labels.
<input type="checkbox"/>	Ziploc bags (12 x 12 in.	
<input type="checkbox"/>	Any PPE listed in, or required by, the SSHASP.	
<input type="checkbox"/>	List of emergency phone numbers.	
<input type="checkbox"/>	<input type="checkbox"/> Baseball cap.	<input type="checkbox"/> Sunscreen
<input type="checkbox"/>	Hand soap.	
<input type="checkbox"/>	<input type="checkbox"/> Locking coolers.	<input type="checkbox"/> Padlock
<input type="checkbox"/>	Ludlum 139, ESP-1, ESP-2, or equivalent, as necessary for rad screening.	
<input type="checkbox"/>	High explosives spot test as necessary for HE screening.	
<input type="checkbox"/>	Cellular phone, two-way radio.	
<input type="checkbox"/>	Drinking water, Gatorade.	
<input type="checkbox"/>	Barricade tape, signs, stanchions or other postings.	
<input type="checkbox"/>	<input type="checkbox"/> Masking or duct tape.	<input type="checkbox"/> Sharpie markers or pens (blk).
<input type="checkbox"/>	Any additional supplies listed in associated procedures, as needed.	
SOP-06.09, R2	Los Alamos National Laboratory RRES-Remediation Services Project	