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Environment & Remediation Support Services

Standard Operating Procedure

for # LEACHING OF SOIL AND ROCK SAMPLES FOR ANIONS

APPROVAL SIGNATURES:

Subject Matter Expert:	**Organization**	**Signature**	**Date**
Patrick Longmire	ERSS	Signature on file	11/30/06
Quality Assurance Specialist:	**Organization**	**Signature**	**Date**
Ed Webb	ERSS	Signature on file	12/13/06
Responsible Line Manager:	**Organization**	**Signature**	**Date**
Craig Eberhart	ERSS	Signature on file	12/6/06

1.0 PURPOSE AND SCOPE

The purpose of this procedure is to describe the process for leaching soil and rock samples and for measuring the amounts of major anions present using the ion chromatograph for the Environment & Remediation Support Services (ERSS) Division of the Los Alamos National Laboratory (Laboratory).

2.0 BACKGROUND AND PRECAUTIONS

2.1 Background

This procedure shall be used in conjunction with an approved Site-Specific Health and Safety Plan (SSHASP). Consult the SSHASP for information on and use of all personal protective equipment.

2.2 Precautions

None.

3.0 EQUIPMENT AND TOOLS

• 400 mL or 600 mL beakers • Deionized water • Balance • 150.00g dropper • Laboratory notebook • Scoops • Foil or parafilm	• Labels • Gloves • Dry glass stirring rods • Ion chromatography sample vial • Any personal protective equipment required in the SSHASP • Any additional supplies listed in associated procedures, as needed.

4.0 STEP-BY-STEP PROCESS DESCRIPTION

4.1 Soil Drying		
Laboratory Technician	1.	Follow soil drying requirements in accordance with ASTM D 2216-90, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock, ASTM 1991.
4.2 Leaching "Approach 1"		
Laboratory Technician	1.	Double wash a series of 400 mL or 600 mL beakers and scoops, and rinse with DI H_20.
	2.	Allow the beakers and scoops to completely dry.

Laboratory Technician (Continued)	3.	Record all weights, dates, and sample numbers in a laboratory notebook.
	4.	Calibrate the balance with several weights that span the range of the objects to be weighed.
	5.	Weigh 100g of each sample directly into a clean, dry 400 mL or 600 mL. [NOTE: The balance should be tared to zero. The weight should be within 0.01g of 100g for each sample weight.]
	6.	After weighing each soil sample, add 150g of DI H_20 to each sample with the same degree of accuracy as the soil. [NOTE: To facilitate reaching precisely 150.00g DI H_20, a dropper can be used.]
	7.	Ensure each sample weight is recorded in a laboratory notebook, as well as on the beaker.
	8.	Check the scale calibration periodically to ensure accuracy.
	9.	Reweigh the samples if calibration is not satisfactory
	10.	Stir each beaker thoroughly with a separate, clean scoop.
	11.	Set up one process blank in a separate 400 mL or 600 mL beaker for every 6 samples. [NOTE: The process blank consists of 200g of DI H_20.]
	12.	Cover each beaker with foil or parafilm to avoid any evaporation while leaching takes place.
	13.	Label beakers on the foil cover and on the actual beaker.
	14.	Wear gloves, and rinse and/or replace them between the different samples to avoid any cross contamination.
	15.	Allow samples to equilibrate for at least 48 hours while leaching takes place and stirred at least twice a day with clean, dry glass stirring rods.
	16.	Use stirring rods only once per sample, and clean with DI H_20 before reuse.
	17.	After letting the samples settle for a few hours or overnight, filter an aliquot of the leachate.
	18.	Calculate estimates of the pore water concentrations using the following calculation: Pore Water Concentration = $\frac{\text{lechate concentration (ppm) x dionized water added}}{\text{water content (\%) x dry weight of sample (g)/100}}$

4.3	**Leaching "Approach 2"**	
Laboratory Technician	1.	Follow the basic cleaning and weighing procedure above, except substitute Erlenmeyer™ flasks instead of beakers and put them on a shaker table to gently mix for 48 hours. [NOTE: 50g of solid and 75 mL of DI H_20 in a 250 mL flask can be used with good results.]

4.4	**Records**	
Project Leader	1.	Submit the following records generated by this procedure to the Records Processing Facility: • Laboratory notebooks; • Calibration records; and • Analytical data or results.

5.0 PROCESS FLOW CHART

Flow chart is to be included at a later date.

6.0 ATTACHMENTS

None.

7.0 REVISION HISTORY

Author: Patrick Longmire

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)]*
0.0	02/09/07	Reformatted and renumbered, supersedes SOP-04.05	E

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