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Los Alamos
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Environmental Programs

Standard Operating Procedure

for **FIELD DECONTAMINATION OF EQUIPMENT**

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1.0 PURPOSE AND SCOPE

The purpose of this procedure states the responsibilities and describes the process for the general field decontamination of drilling and sampling equipment within the Los Alamos National Laboratory (Laboratory) Environmental Programs (EP) Directorate. This procedure addresses decontamination for both radioactive and hazardous chemical constituents. A dry decontamination process is used first for the primary purpose of removing soil that may be contaminated by radioactive and/or hazardous constituents, followed by a wet decontamination process intended to remove the remaining constituents.

2.0 BACKGROUND AND PRECAUTIONS

2.1 Background

This procedure is to be used in conjunction with an approved Site-Specific Health and Safety Plan (SSHASP) and Integrated Work Document (IWD). Also, consult the SSHASP for information on and use of all personal protective equipment. Decontamination procedures shall be conducted in accordance with the applicable SSHASP to help ensure that personnel performing the decontamination are protected from equipment-related accidents and from exposures to radioactive, hazardous, and/or mixed wastes. Implementation of these procedures may involve steam cleaning of drilling, excavation, and sampling equipment.

To help ensure that samples collected for the purpose of characterizing a potentially contaminated site are representative of the point place where they are collected, the equipment used to collect those samples should be decontaminated between each sampling event. Decontamination helps minimize the potential for cross-contamination between sampling locations and helps protect site and community personnel by requiring that equipment not be removed from the site without proper decontamination. The decontamination process should be tailored to the types of contaminants anticipated. The volume of contamination wastes generated should be kept at a minimum.

Dry contamination is essentially the mechanical and/or chemical cleaning of the equipment without the excessive use of liquids. Dry decontamination is used first to minimize liquid waste production, especially the production of liquid mixed wastes. The solid waste produced by the dry decontamination process, however, may contain both radioactive and hazardous chemical constituents and become a mixed waste. Wet decontamination is essentially a washing process to remove constituents that are not removed by the dry decontamination process.

2.2 Precautions

None.

3.0 EQUIPMENT AND TOOLS

- High-pressure portable steam cleaner;
- Liquid containment vessel and support rack;
- Buckets, tubs, plastic wading pools, as needed;
- Solids containment vessel and support rack shovel;
- Electrical generator (if power source is not available) and fuel;
- Power cord (to connect steam cleaner to generator);
- Two sturdy equipment tables for tool assembly and
- Wooden spatula or paint stirring sticks;
- Box of clean, dry, lint-free rags and/or disposable towelettes;
- Sponges;
- Roll of heavy plastic sheeting;
- Heavy-duty stapler and staples;
- Drums and liners (for liquids and solids) and covers;
- Wooden pallets (for drums);

disassembly; • Portable liquids pump and 10' (minimum) discharge hose; • Steel brushes and standard scrub brushes; • Alconex detergent or equivalent + acid solution, if required by the FSP; • Pesticide-grade methanol + acid solution, if required by the FSP; • Potable water (from an approved source with known chemistry) for steam cleaning; • Organic-free distilled deionized water; • Garden-type sprayer for deionized and potable water, and water "squirt" bottle for methanol; • Fantastik™ and/or Radiac™ wash cleansers, or equivalent;	• Secondary containment for drums containing liquids; • Labels and marking pens; • One-gallon sealable plastic bags; • Plastic trash bags; • Paper towels; • Duct tape; • Bound field logbooks and ink pens; • Any personal protective equipment listed or required in the SSHASP; • Any additional supplies listed in associated procedures, as needed; and • Saw horses or racks for drill stem and other drilling hardware.

4.0 STEP-BY-STEP PROCESS DESCRIPTION

4.1 Decontamination Areas

Field Team Leader	1.	Establish decontamination areas for "dry" and/or "wet" decontamination, depending on the decontamination needs at the site.
	2.	Before decontamination, place clean plastic sheeting on the ground or inside the solids containment vessel to collect material removed from the equipment. [NOTE: Waste material removed from the equipment should be managed as specified in procedure SOP-5238, Characterization and Management of ER Project Waste.]
	3.	Place an equipment table covered with clean plastic sheeting near the dry decontamination area to facilitate disassembly of the contaminated sampling equipment.
	4.	Place drums nearby to contain waste material.
	5.	Use a liquid containment vessel to contain wet decontamination waste. [NOTE: Wet decontamination may involve a high-pressure steam cleaner, a pump to transfer liquid wastes, and drums or other containers with liners for storing liquid wastes. The drums should have secondary containment.]

Field Team Leader (Cont.)	6.	Place an equipment table covered with clean plastic sheeting next to the wet decontamination area to facilitate reassembly and wrapping of the decontaminated equipment pending further use.
	7.	Use tubs, buckets, brushes, and spray bottles to wet decontaminate hand augers or other small equipment.
	8.	Use separate buckets or tubs for washing and rinsing the equipment.
	9.	Use spray bottles (if possible) for rinsing to minimize the generation of water that must be collected for disposal.
	10.	Establish the decontamination area downwind of site personnel whenever possible, giving consideration to the following: • the anticipated contaminants; • detection of airborne contaminants above background; • wind and weather conditions; and • other site considerations (e.g., site layout, access, and other site activities).
	11.	Do not locate the decontamination area downwind of dust-producing site operations that could contaminate the equipment.
	12.	Locate the decontamination area adjacent to the designated and secured drum storage area to reduce the need to move drums around the site.
	13.	Obtain the approval and oversight of the Radiological Control Technician (RCT) to remove decontaminated equipment from a contaminated area to a controlled or uncontrolled area.
	14.	Obtain a screening of the decontaminated equipment by a Radiological Control Technician before release if radiation is potentially present at the sampling site. [NOTE: The radiological screening may include swipe and/or smear surveys as well as direct instrument surveys. If radiological screening conducted before wet decontamination shows that no radioactive contamination is present, a second radiological screening following wet decontamination is not required.]

4.2 Drilling/Excavation Equipment Decontamination

Field Team Leader	1.	Ensure decontamination pads are large enough on which to decontaminate drill pipe, well casing, well development pumps, bailers, geophysical tools, rods, augers, and drill bits.
	2.	Place drilling and excavation equipment on a sawhorse or rack for inspection and decontamination.
	3.	Before commencing sampling operations for a project, those parts of the drilling or excavation equipment that will come in contact with the sampled media, shall be screened for radiological contamination and volatile organics.

Field Team Leader (Cont.)	4.	If soil adhering to the equipment is found to be contaminated during the field screening, perform dry contamination.
	5.	If hazardous chemicals or residual radioactive contaminants are potentially present, follow dry contamination with wet decontamination.
	6.	Perform a visual inspection of the entire piece of equipment.
	7.	Remove gross residuals (i.e., dirt from previous operations) if it could affect the objectives of the sampling operation or has the potential of falling from the equipment and contaminating the site.
	8.	If contamination is suspected or found on the surface of the equipment, or in the soil on the equipment, decontaminate the piece of equipment in the dry decontamination area.
	9.	Gently remove the coarse contaminated material using a steel brush.
	10.	Remove the more cohesive material with a flat scraper such as a wooden spatula or paint stirring stick.
	11.	Use a water spray bottle to lightly moisten dry soil being removed from the equipment to control dust. [NOTE: Only the minimum amount of water spray should be used to keep the waste moisture content low.]
	12.	After the coarse contaminated material has been removed, remove the remaining contamination by washing with Fantastik™ (an alkaline, waxless household cleaner) and/or Radiac™ (a commercial cleaner for removing radioactive particles), or similar product, followed by air drying or other appropriate methods.
	13.	If radioactive contaminants are present, periodically survey the equipment with hand-held radiation detectors during the course of decontamination to determine where contaminated areas are located.
	14.	Upon completing the decontamination process, collect swipe and/or smear samples from the equipment at the discretion of the RCT.
	15.	Submit swipe and/or smear samples to a laboratory for radiological analysis or count on-site if appropriate portable equipment is available.
	16.	If hazardous and/or residual radioactive contamination is still present after dry decontamination, use the wet decontamination process.
	17.	Empty the liquid containment vessel at the start of each wet decontamination campaign, especially if the previous wet decontamination did not require a methanol rinse. [NOTE: This will minimize the volume of wastes generated by the decontamination process.]
	18.	Conduct wet decontamination using a non-phosphate detergent and water wash with a water rinse, steam cleaning by washing with Alconox™ detergent, or by another appropriate method followed by a water wash using a standard scrub brush.

Field Team Leader (Cont.)	19.	Perform a second rinse using distilled or de-ionized water, particularly in cases where the chemistry of the water supply is not monitored on a regular basis.
	20.	If used, wipe the solvent off or allow the solvent to evaporate completely, and follow with a water rinse. [NOTE: Methanol-soaked rags or towelettes should be bagged and placed into a separate lined drum.]
	21.	Before using an acid or solvent, confirm the particular acid or solvent used is not a contaminant of concern at the site. [NOTE: Decontamination rinsate containing solvents or acids may need to be analyzed for pH and/or ignitability tests prior to disposal.]
	22.	Allow the equipment to air dry or dry with clean rags, towelettes, paper towels, or by other appropriate methods. [NOTE: Only those parts of the equipment that come into direct contact with the potentially contaminated media need to be decontaminated in this manner.]
	23.	If an equipment (rinsate) blank is required by the governing sampling and analysis plan or quality assurance project plan, collect a sample of the de-ionized water rinsate.
	24.	Decontaminate drilling and excavating equipment not in active use (e.g., hollow-stem auger sections, drill rods, down-hole hammers, and bits).
	25.	Wrap in plastic or otherwise protect the equipment from dirt and dust until needed.
	26.	In the event radioactive contamination is fixed on the equipment surface and cannot be removed using these field decontamination procedures, wrap the equipment in clean plastic sheeting or otherwise isolate it from cross contamination.
	27.	Label the equipment according to the Radiological Control Technician's instructions, and set the equipment aside pending a decision to conduct further decontamination at a decontamination facility or to dispose and replace the equipment.
Radiological Control Technician	28.	Verify the successful decontamination of radiologically contaminated equipment using field survey techniques. [NOTE: The equipment is considered radioactively clean and suitable for sampling use if it meets the acceptance criteria for release from the Laboratory property as specified by the RCT.]
Field Team Leader	29.	Following the initial decontamination, do not decontaminate drilling or excavation equipment again until completion of the specific borehole or excavation, unless cross contamination within a single borehole or excavation is of concern. [NOTE: The need to decontaminate during drilling or excavation may be determined by the Field Team Leader from field screening or may be indicated in drilling plans, excavation plans, or other work plans.]
	30.	Screen the internal surfaces of augers that have the potential to come in contact with contaminated soil periodically before demobilization.

Field Team Leader (Cont.)	31.	Prior to mobilization at another site, decontaminate drilling equipment using the appropriate methods for the type of contamination potentially present.
	32.	Survey the equipment with a hand-held instrument capable of detecting residual radioactive material at levels low enough to detect the radiological constituents of concern.
	33.	Collect swipe or smear samples from the equipment at the discretion of the Radiological Control Technician, and submit to a laboratory or count on-site if appropriate portable equipment is available.
	34.	Visually inspect each piece of equipment.
	35.	Upon completion of site sampling and decontamination activities, secure the decontamination area.

4.3 Sampling Equipment Decontamination

Field Team Leader	1.	Minimize the amount of sampling equipment used during sampling activities in order to minimize the time required for decontamination and minimize the generation of wastes. Prior to sampling, decontaminate sampling equipment in accordance with applicable instructions in Section 4.2 Decontamination of sampling equipment is not required for dedicated sampling components once installed.
	2.	Do not decontaminate sample preparation equipment used to collect sub-samples that will constitute a single composite sample between each sub-sample collection.

4.4 Records

Field Team Leader	1.	Submit the following records generated by this procedure to the Records Processing Facility: • Training documentation checklist; • Field notebook; and • Daily Activity Log.

5.0 PROCESS FLOW CHART

Flow chart is to be included at a later date.

6.0 ATTACHMENTS

None.

7.0 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)]*
0.0	2/9/07	Reformatted, new document number, and supersedes SOP-01.08	E
1	6/23/10	Added Sampling Equipment Decontamination to Section 4.3 and statement in Step 3. Prior to sample collection, sample equipment shall be decontaminated in accordance with applicable instructions in Section 4.2. Changed references from ERSS to Environmental Programs (EP).	T/E

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