

**ROCKY FLATS
ENVIRONMENTAL TECHNOLOGY SITE
PRO-1455-FDO**

FIELD DECONTAMINATION OPERATIONS

Responsible K-H Organization: Environmental Restoration Program Effective Date: 11/01/01

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1. PURPOSE

This standard operating procedure (SOP) describes the method that SHALL be used at the Rocky Flats Environmental Technology Site (hereinafter referred to as the Site) for decontaminating sampling equipment and other small equipment in the field.

2. SCOPE

The collection of environmental samples requires that all equipment associated with collecting these samples be decontaminated prior to and following their use. This requirement minimizes the potential for contaminants to be introduced into the sample from external sources and for cross-contamination of areas. In addition, miscellaneous tools and small equipment used on remediation projects may need to be decontaminated prior to removal from the project site. This procedure establishes the field decontamination methods for achieving this goal.

3. RESPONSIBILITIES AND QUALIFICATIONS

The K-H Team project manager has the overall responsibility for implementing this SOP. The project manager SHALL be responsible for assigning project staff to implement this SOP and for ensuring that all site and subcontractor personnel follow the procedures.

All personnel performing these procedures are required to have the appropriate health and safety documentation and training as specified in the Site-specific Health & Safety Plan. In addition, all personnel are required to have a complete understanding of the tasks described within this SOP and receive specific training regarding these tasks, if necessary.

All project staff are responsible for reporting nonconformances relative to this SOP to the K-H Team project manager for inclusion in the project files.

4. OVERVIEW

This procedure applies to the Site employees and subcontractors who are engaged in environmental activities at the Site. This procedure addresses decontamination of the following items and equipment:

- Field sampling equipment;
- Automatic water sampling equipment; and
- Miscellaneous tools and equipment.

5. INSTRUCTIONS

5.1 INTRODUCTION

This procedure describes the method for physically removing both chemical and radioactive contaminants from sampling equipment, tools and other small equipment. If the equipment is not discarded and replaced with new equipment (it is not reusable), it SHALL be decontaminated before sample collection, and before being removed from the sampling location.

Ideally, sufficient clean sample equipment are transported to the field so that an entire study can be conducted without the need for field cleaning. However, this may not be feasible or practical for some larger sampling equipment. During particularly large-scale studies, it may not be practical or possible to transport to the field all of the necessary clean field equipment, i.e., it may be necessary to decontaminate smaller items of equipment inside the contamination reduction zone in order to have these items ready for repeated use. In addition, it may be necessary to decontaminate small tools and equipment from remedial actions in order to have these items ready for repeated use.

5.1.1 Definitions

Laboratory detergent means a standard brand of non-phosphate laboratory detergent, such as Liquinox or an equivalent.

Tap water is defined as the Site or offsite supplied drinking water. It may not be obtained from hydrants or the Site fire department. The use of an untreated potable water supply is

not an acceptable substitute for the Site drinking water. The substitution of a higher-grade water (such as deionized or distilled water) for tap water is permitted and need not be noted as a variation.

5.1.2 General Requirements

- Tools and equipment used in radiological areas and/or in areas where the potential for radiological contamination may exceed the release limits of Table 2-2 of the Site Radiological Control Manual must be surveyed by a Radiological Control Technician (RCT). Decontamination of any item which exceed these limits must be conducted under the proper control of a Radiological Work Permit (RWP) specific to these decontamination operations.
- Decontamination procedures specified for a specific project, e.g., via task-specific Operating Procedures or project-specific work control documents (such as Work Plans or Operation Orders) take precedence over requirements stated in this procedure.
- The brushes used to clean equipment as outlined in the various sections of this procedure SHALL not be of the wire-wrapped type.
- Plastic sheeting SHALL be laid down in the area where decontamination is performed if no other adequate means of secondary wash/rinse water containment is available.
- Solvents, nitric acid solution, laboratory detergent, and rinse waters used to clean equipment SHALL not be re-used, except as specifically permitted.
- Used non-decontaminated field equipment SHALL not be stored with clean equipment, sample tubing, or sample containers. Unused materials SHALL not be replaced in storage without being decontaminated if these materials were in an area where contamination or suspected contamination was present, and the items had potential for exposure to the contamination (for example, a sealed case of tubing was opened in a contaminated area).
- Decontaminated sample containers and field equipment SHALL be stored in an area and handled in a manner that protects them from exposure to contaminants. Sample containers and field equipment SHALL be stored separately from all other equipment and supplies.
- Sample containers that contain a sample, regardless of the assumed or known level of hazard associated with that sample, SHALL have all surfaces decontaminated. For

sample containers used in areas other than a controlled access area, a wipedown with disposable rags or toweling, or rinse with deionized or distilled water followed by drying with disposable rags or toweling, will suffice. Any visible dirt, water droplets, stains, or other extraneous materials SHALL be removed. For containers used in controlled access areas, a more rigorous decontamination and/or radiation monitoring may be required.

- Solvents, including water and mineral acids used for equipment decontamination purposes other than as described in this SOP SHALL be justified and approved by the responsible K-H Team project manager and SHALL be documented in logbooks. If decontamination fluid samples are required, the laboratory to which the samples are sent SHALL be informed of the type of liquid used as well.
- Decontamination water shall be managed as described in Section 5.6.

5.2 DECONTAMINATION PROCEDURES FOR FIELD SAMPLING EQUIPMENT WITHOUT THE USE OF STEAM

- [1] To the extent possible, scrape visible dirt and contamination from equipment while in the exclusion zone.
- [2] Transfer equipment from the exclusion zone to the contamination reduction zone, place the equipment in a wash basin containing non-phosphate detergent and deionized or distilled water, and remove residual visible contamination using a brush.
- [3] Transfer the equipment to a second wash basin containing non-phosphate detergent, and decontaminate equipment to remove any remaining particulate matter or surface film.
- [4] While holding the equipment over this wash basin, rinse equipment thoroughly with deionized or distilled water using a sprayer.
- [5] Transfer the equipment to a third wash basin containing deionized or distilled water for a final rinse.
- [6] Equipment may now be either wrapped in plastic to prevent cross-contamination during storage and/or transport, or re-used immediately.

Note: For sampling equipment that is not visibly contaminated, Steps 3 and 5 can be eliminated.

If the field equipment cannot be decontaminated utilizing this process, it should be either

steam cleaned (see Section 5.3) or properly discarded in accordance with the Site-level waste management procedure 1-PRO-079-WGI-001 (WGI-001), *Waste Characterization, Generation, and Packaging*. If the equipment is not decontaminated immediately after use, rinse the sampling equipment thoroughly with tap water in the field as soon as possible after use. This process will make later decontamination easier and SHALL help prevent the spread of contamination.

5.3 DECONTAMINATION OF SAMPLING EQUIPMENT IN THE FIELD USING PRESSURIZED STEAM

When sampling equipment is used to collect samples that contain oil, grease, or other hard-to-remove materials, it may be necessary to steam clean the field equipment.

Pressurized steam may be used onsite to steam clean equipment such as:

- Split spoons;
- Hand augers;
- Slide hammers;
- Shovels; and
- Other small miscellaneous equipment

This method is to be used when the procedures described in Section 5.2 are not successful (i.e., films, residues, or other forms of contamination remain on the equipment after completing the decontamination process) or the equipment warrants more thorough decontamination. Steam-cleaning in the field is only permitted when access is available to a self contained mobile station consisting of:

- Steam/pressure generating unit that has been approved for use by the Rocky Flats Fire Department
- Curtained cleaning station that is open on one side only
- Source of clean supply water to the generator unit
- Used water collection system consisting of a drain in the bottom of the wash station leading to a gray water tank.

Site requirements, such as those imposed by the Fire Department shall be followed in the operation and use of steam cleaning equipment. In addition, personnel selected to use this equipment shall be trained in its operation and experienced with the specific

equipment to be used. The Health and Safety Plan and JHA under which the work is being performed shall specifically address the operation and use of the steam cleaning equipment to be used.

- [1] Scrape heavy contamination from the equipment (into an IDM drum with other drill cuttings, if appropriate, or other receptacle identified by the project manager, if containment is required) before placing the equipment on the wash stand.
- [2] Place the equipment inside the curtained wash stand.
- [3] Ensure that none of the equipment to be washed extends out of the curtained area.
- [4] Decontaminate the equipment thoroughly, rotating the piece to ensure that all surfaces are decontaminated.
- [5] Ensure that all free water has drained from the equipment before removing from the wash stand.

5.4 DECONTAMINATION PROCEDURES FOR AUTOMATIC WATER SAMPLING EQUIPMENT

5.4.1 General

Decontamination of automatic samplers is only performed when automated samplers are removed from service for general cleaning or if they are redeployed elsewhere. The automated samplers are sealed, and the intake lines are purged with each and every grab sample pulled.

Automatic samplers **SHALL** be cleaned as follows:

- [1] The exterior and accessible interior portions (excluding the waterproof timing mechanism) of automatic samplers **SHALL** be washed with non-phosphate detergent and rinsed with tap water.
- [2] New silastic pump tubing **SHALL** be installed.

Note: Silastic tubing for automatic samplers and other peristaltic pumps is to be discarded after use, i.e., it is not to be decontaminated or reused. Teflon® tubing that is attached to the silastic tubing may be discarded, or decontaminated and reused in accordance with the instructions provided in Section 5.5.2.

5.4.2 Automatic Sampler Headers

- [1] Disassemble header and, using a bottle brush, wash with tap water and non-phosphate laboratory detergent.
- [2] Rinse thoroughly with deionized or distilled water.
- [3] Reassemble header, let dry thoroughly, and wrap with plastic or re-install immediately.

5.4.3 Plastic Composite Containers

Usually reusable plastic containers are supplied "certified" clean by the laboratory. When this is not the case, decontaminate the composite container using the procedures as outlined in Section 5.2 prior to use.

5.4.4 Bottle Siphons Used to Transfer Sample From Composite Container

- [1] Use a new dedicated siphon for each sampling location.
- [2] Use new 3/8-inch Teflon tubing for samples collected for organic compounds analyses. The siphon and tubing should be flushed with sample thoroughly before use.

5.5 DECONTAMINATION PROCEDURES FOR MISCELLANEOUS EQUIPMENT

Miscellaneous equipment such as well sounders, tapes, field tools, analytical equipment, and ice chests and other shipping containers SHALL be decontaminated using the following processes.

5.5.1 Well Sounders or Tapes Used to Measure Groundwater Levels

When this equipment is decontaminated in the field:

- [1] Decontaminate with laboratory non-phosphorus detergent and tap water.
- [2] Rinse with deionized or distilled water.
- [3] Equipment SHALL either be wrapped with non-reactive plastic or placed in a carrying case to prevent contamination during storage or transit.

5.5.2 Equipment Used to Purge Groundwater Wells

Where appropriate, pumps and associated tubing are employed to purge and sample

groundwater-monitoring wells. This equipment SHALL be decontaminated as follows:

- [1] The external surfaces of the equipment SHALL be vigorously hand scrubbed with a solution of a non-phosphate, laboratory grade detergent and tap water, followed by rinsing with water by submerging or spraying. The equipment SHALL then be triple rinsed thoroughly with approved deionized or distilled water.
- [2] Internal surfaces SHALL be decontaminated by pumping a solution of non-phosphate detergent and water through the equipment. The soap solution SHALL be displaced immediately by pumping deionized or distilled water equivalent to at least 10 volumes of the pump storage capacity through the equipment.
- [3] Reusable bailers used to purge and/or sample groundwater monitoring wells SHALL be disassembled prior to decontaminating. All parts SHALL then be scrubbed thoroughly using a brush in a solution of non-phosphate detergent and water. All surfaces SHALL be thoroughly scrubbed, including the interior of the bailer body (using a long bottle brush of the appropriate diameter). Following this soap scrub, each part SHALL be rinsed in deionized or distilled water and excess water SHALL be allowed to runoff. The bailer SHALL then be reassembled and stored so as to prevent cross-contamination during storage and transport.
- [4] The line used to lower and raise the bailer in the well SHALL be scrubbed using non-phosphate laboratory grade detergent and tap water and rinsed in the deionized or distilled water.

5.5.3 Other Field Instrumentation and Tools

The exterior of sealed, watertight equipment should be washed with non-phosphate laboratory detergent and rinsed with tap water before storage. The interior of such equipment may be wiped with a damp cloth if necessary. Ensure that the equipment is dry prior to storage.

Other field instrumentation should be wiped with a clean, damp cloth. Conductivity probes, pH meter probes, dissolved oxygen (DO) meter probes, etc. SHALL be rinsed with deionized or distilled water before storage.

If desiccant is present in flow meters or other equipment, the equipment should be checked each time the equipment is cleaned (once dry) and replaced, if necessary.

For small tools and miscellaneous equipment, as well as equipment used for surface water quality and sediment sampling (such as Kemmerers, buckets, DO dunkers, dredges, etc.), decontaminate with laboratory-grade non-phosphate detergent and water, and rinse with deionized or distilled water between sampling locations. A brush may be used to remove deposits of material or sediment, if necessary. Water samplers should be flushed with ambient water at the next sampling location before the sample is collected.

Flow measuring equipment (such as, weirs, staff gauges, velocity meters, and other stream gauging equipment) **SHALL** be cleaned with tap water after use and between measuring locations.

5.5.4 Ice Chests and Shipping Containers

All ice chests and reusable containers **SHALL** be decontaminated using non-phosphate detergent and water, followed by a deionized or distilled water rinse.

5.5.5 Small Stainless Steel or Teflon Equipment Used to Sample Media Possibly Containing Polychlorinated Biphenyls (PCBs)

When equipment is decontaminated in the field, decontaminate objects by:

- [1] Using a hand held spray bottle, spray equipment with iso-octanol, or a solution of tap water and a non-phosphate laboratory detergent such as pipex or liquinox.
- [2] Thoroughly scrub equipment as appropriate, then wipe equipment with a disposable cloth or other suitable material and discard used wipe properly.
- [3] Using a hand held spray bottle, spray equipment with tap water.
- [4] Thoroughly wipe equipment, properly discarding the cloth.
- [5] Using a hand held spray bottle, spray equipment with deionized or distilled water.
- [6] Thoroughly wipe equipment, and properly discard the cloth.
- [7] If the equipment is not to be used immediately after decontamination, then the equipment should be wrapped in plastic or aluminum foil.

5.6 DISPOSITION OF DECONTAMINATION WATER

Spent decontamination water **SHALL** be managed in accordance with RMRS/OPS-PRO.112, *Handling of Field Decontamination Water and Field Wash Water*. This

procedure addresses transport of the water on Site, and transfer of the water to either the Main Decontamination Facility or the Consolidated Water Treatment Facility for subsequent treatment.

6. QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance (QA) and Quality Control (QC) activities SHALL be conducted according to applicable sampling and analysis plans.

As detailed in these documents, the effectiveness of the sample equipment cleaning generally will be monitored by submitting rinse water to the laboratory for low-level analysis of the parameters of interest. Rinsate samples are collected by pouring deionized or distilled water over the representative equipment.

7. DOCUMENTATION

Analytical results of equipment rinsate samples are considered adequate documentation of the decontamination process.

8. SOURCE REFERENCES

Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual. U.S. Environmental Protection Agency. Athens, GA. 1986

Federal Register, Volume 44, 40 CFR Part 136. "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act."

Test Methods for Evaluating Solid Waste. SW-846, 2nd Edition. U.S. Environmental Protection Agency. Washington, D.C. 1982.

Technical Enforcement Guidance Document (TEGD). EPA, 1986.