

## APPENDIX A STANDARD FIELD CLEANING (DECONTAMINATION) PROCEDURES

### PERFORMANCE OBJECTIVE:

- To remove contaminants of concern from sampling, drilling and other field equipment to concentrations that do not impact study objectives using a standard cleaning procedure.

### Introduction

Sufficient clean equipment should be transported to the field so that an entire study can be conducted without the need for decontamination. However, this is not possible for some items such as portable power augers, well drilling rigs, soil coring rigs, and other large pieces of field equipment. This Appendix describes the materials, methods, and procedures to be used when cleaning sampling and other equipment in the field. Deviations from these procedures should be documented in field logbooks, inspection records and investigative reports.

Cleaning and decontamination of all equipment should occur at a designated area or decontamination pad on the site. The decontamination pad should meet the specifications of Section A.2.

Potable tap water brought on the site for drilling and cleaning purposes should be from a municipal water treatment system and contained in a pre-cleaned tank.

A steam cleaner and/or high-pressure hot water washer used should be capable of generating a pressure of at least 2500 PSI and producing hot water and/or steam (200 degrees F plus), and have a soap compartment.

**Caution-Exercise care when working with flammable materials! Avoid any activities that would produce sparks or excess heat. Avoid hazardous atmospheres.**

### A.1 Specifications For Cleaning Materials:

#### A.1.1 The specifications for standard cleaning materials referred to in this appendix are as follows:

Soap shall be a standard brand of phosphate-free laboratory detergent (e.g., Liquinox.) Use of other detergent must be justified and documented in the field logbooks and inspection or investigative report. The use of Liquinox detergent may remove the need to rinse with pesticide-grade isopropanol.

Solvent shall be pesticide-grade isopropanol or isopropyl alcohol. Use of a solvent other than pesticide-grade isopropanol for equipment cleaning purposes must be justified and documented in the field logbook.

Tap water may be used from any municipal water treatment system.

Analyte free water (deionized water) is tap water that has been treated by passing it through a standard deionizing resin column and followed by an activated carbon column.

**Solvents, nitric acid solution, laboratory detergent, and rinse waters used to clean equipment cannot be reused.**

### **A.1.2 Handling and Containers for Cleaning Solutions:**

Improperly handled cleaning solutions may easily become contaminated. Storage and application containers must be constructed of the proper materials to ensure their integrity. Following are acceptable materials used for containing the specified cleaning materials:

Soap must be kept in clean containers until use. It should be poured directly from the container.

Solvents must be stored in the unopened original containers until used. Solvents may be applied using a Teflon nozzle, or by using Teflon squeeze bottles.

Tap water may be kept in clean tanks, hand pressure sprayers, squeeze bottles, or applied directly from a hose.

Analyte free water should be stored in cleaned containers that can be closed when not being used. It may be applied from squeeze bottles.

Organic/analyte free water should be stored in cleaned glass, Teflon®, or stainless steel containers prior to use. It may be applied using Teflon® squeeze bottles, or directly from the system.

Nitric acid should be kept in the glass container it is received in, and placed in squeeze bottles prior to application.

### **A.1.3 Disposal of Spent Cleaning Solutions:**

All spent cleaning solutions, including wash water, rinse water, spent acid solutions, and spent solvents, should be properly disposed.

## **A.2 Safety Procedures for Cleaning Operations:**

All appropriate safety procedures should be implemented.

### **A.3 Specifications for Decontamination Pads**

If the site has a designated area for decontamination of equipment it should be used. If there is no decontamination area at the site, decontamination pads constructed for field cleaning of sampling and drilling equipment should meet the following minimum specifications:

- The pad should be constructed in an area believed to be free of surface contamination.
- The pad should not leak.
- If possible, the pad should be constructed on a level, paved surface and should facilitate the removal of wastewater. This may be accomplished by either constructing the pad with one corner lower than the rest, or by creating a sump or pit in one corner or along one side. Any sump or pit should also be lined.
- Sawhorses or racks constructed to hold equipment while being cleaned should be high enough above ground to prevent equipment from being splashed.

- Water should be removed from the decontamination pad frequently.
- A temporary pad should be lined with a water impermeable material with no seams within the pad. This material should be disposable or repairable.

At the completion of site activities, the decontamination pad should be deactivated. All waste/rinse water should be pumped into containers and properly managed as Investigative Derived Waste. The pit or sump should be backfilled with the appropriate material designated by the project leader. If the decontamination pad has leaked excessively, soil disposal may be required.

#### **A.4 Downhole Drilling Equipment**

These procedures are to be used for drilling activities involving the collection of soil samples and for the construction of monitoring wells to be used for the collection of groundwater samples.

##### **A.4.1 Preliminary Cleaning and Inspection**

The drill rig and drilling equipment should be clean of any contaminants that may have been transported from off-site to minimize the potential for cross-contamination. The drilling equipment should not serve as a source of contaminants. Associated drilling and decontamination equipment, well construction materials, and equipment handling procedures should meet these minimum specified criteria:

- All downhole augering, drilling, and sampling equipment should be sandblasted before use if painted, and/or there is a buildup of rust, hard or caked matter, etc., that cannot be removed by steam cleaning (soap and high pressure hot water), or wire brushing. Sandblasting should be performed prior to arrival on site, or well away from the decontamination pad and areas to be sampled.
- Any portion of the drilling equipment that is over the borehole (kelly bar or mast, backhoe buckets, drilling platform, hoist or chain pulldowns, spindles, cathead, etc.) should be steam cleaned (soap and high pressure hot water) and wire brushed (as needed) to remove all rust, soil, and other material which may have come from other sites before being brought on site.
- Printing and/or writing on well casing, tremie tubing, etc., should be removed before use. Emery cloth or sand paper can be used to remove the printing and/or writing. Most well material suppliers can provide materials without the printing and/or writing if specified when ordered. Items that cannot be cleaned are not acceptable and should be discarded.
- The drill rig and equipment associated with the drilling and sampling activities should be inspected to insure that all oils, greases, hydraulic fluids, etc., on the surface of the equipment have been removed, and all seals and gaskets are intact with no fluid leaks.
- PVC or plastic materials such as tremie tubes should be inspected. Items that cannot be cleaned are not acceptable and should be discarded.

##### **A.4.2 Drill Rig Field Cleaning Procedure**

Any portion of the drill rig, backhoe, etc., that is over the borehole (kelly bar or mast, backhoe buckets, drilling platform, hoist or chain pulldowns, spindles, cathead, etc.) should be steam cleaned (soap and high pressure hot water) between boreholes.

### **A.4.3 Field Decontamination Procedure for Drilling Equipment**

The following is the standard procedure for field cleaning augers, drill stems, rods, tools, and associated equipment. This procedure does not apply to well casings, well screens, or split-spoon samplers used to obtain samples for chemical analyses, which should be decontaminated as outlined in Section A.3.6 of this appendix.

1. Clean with tap water and soap, using a brush if necessary, to remove particulate matter and surface films. Steam cleaning (high pressure hot water with soap) may be necessary to remove matter that is difficult to remove with the brush. Drilling equipment that is steam cleaned should be placed on racks or sawhorses at least two feet above the floor of the decontamination pad. Hollow-stem augers, drill rods, etc., that are hollow or have holes that transmit water or drilling fluids, should be cleaned on the inside with vigorous brushing.
2. Rinse thoroughly with tap water.
3. Remove from the decontamination pad and cover with clean, unused plastic. If stored overnight, the plastic should be secured to ensure that it stays in place.

When there is concern for low-level contaminants it may be necessary to clean this equipment between borehole drilling and/or monitoring well installation using the procedure outlined in Section A.3.6.

### **A.4.4 Field Decontamination Procedure for Drill Rig, Grout Mixer, and Associated Equipment:**

1. A thorough exterior cleaning of the drill rig is required at the end of each study. The exterior (including undercarriage) should be washed with soap and tap water and then rinsed with tap water. The steam generator may be used.
2. The pump on the drill rig should be flushed with tap water until clear, and then drained.
3. The grout and pump mixer should be washed with tap water. The steam generator may be used.

### **A.4.5 Drilling equipment (tools, rods, augers, etc.) should be cleaned as follows:**

1. Clean with tap water and soap, using a brush if necessary, to remove particulate matter and surface films. Steam cleaning (high pressure hot water with soap) may be necessary to remove matter that is difficult to remove with the brush. Drilling equipment that has been steam cleaned should be placed on racks or sawhorses at least two feet above ground. Hollow-stem augers, drill rods, etc., that are hollow or have holes that transmit water or drilling fluids, should be cleaned on the inside and outside.
2. Rinse thoroughly with tap water.
3. Cleaning of this equipment following procedures as specified in Section A.5.2 may be required based on characteristics of the suspected contaminants.

## **A.5 Field Equipment Cleaning Procedures**

### **A.5.1 Well Sounders or Tapes**

The following procedures are recommended for decontaminating well sounders, water level indicators,

interface probes, and tapes:

1. Wash with soap and tap water.
2. Rinse with tap water.
3. Rinse with de-ionized water. (Do not solvent rinse PVC or plastic items.)

Interface probe alternative procedures:

1. Wash with isopropyl alcohol.
2. Rinse with de-ionized water.

### **A.5.2 Sampling Equipment**

1. Clean with tap water and soap using a brush if necessary to remove particulate matter and surface films. Equipment may be steam cleaned (soap and high pressure hot water as an alternative to brushing. Sampling Equipment that is steam cleaned should be placed on racks or sawhorses at least two feet above the floor of the decontamination pad. PVC or plastic items should not be steam cleaned.
2. Rinse thoroughly with tap water.
3. Rinse thoroughly with analyte-free water.
4. Rinse thoroughly with solvent. Do not solvent rinse PVC or plastic items.
5. Allow to air-dry overnight, if not to be reused immediately.

### **A.6 Handling of Decontaminated Equipment**

After decontamination, to prevent re-contamination, only personnel wearing clean nitrile gloves should handle equipment. In addition, the equipment should be moved away (preferably upwind) from the decontamination area to prevent re-contamination. If the equipment is not to be immediately re-used it should be covered with plastic sheeting or wrapped in aluminum foil to prevent re-contamination. The area where the equipment is kept prior to re-use must be free of contaminants.

### **References**

1. U.S. Environmental Protection Agency, Region IV, Science and Ecosystem Support Division, Field Equipment Cleaning and Decontamination, November 2007, (SESDPROC-205-R1).
2. U.S. Environmental Protection Agency, Region IV, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, November 2001.
3. S.C. Department of Health and Environmental Control, Environmental Quality Control, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, 2006.