



**STANDARD OPERATING PROCEDURE FOR:
DECONTAMINATION OF EQUIPMENT**

TVA-KIF-SOP-08, Revision 1

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for
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Revision Log SOP for Decontamination of Equipment (TVA-KIF-SOP-08)		
Revision and Date	Page Reference	Revision Description
1, January 2010	Throughout	Removed reference to the Field Sampling Plan and replaced with references to project work control documents or applicable SOPs. Added Project Manager for some of responsibilities.
	Section 3.0	Streamlined test describing role of QA/QC Lead in procedural variations.
	Section 3.3.1	Removed Steps <i>d</i> and <i>e</i> requiring rinsing of equipment with nitric acid followed by water.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to describe the methods to be used when decontaminating field equipment that has had the potential to contact investigated media (including soil, groundwater, surface water, sediment, and other media) at Kingston Fossil Plant (KIF) in Tennessee. It is important to follow these procedures from a quality control (QC) perspective to ensure that environmental data generated in the field are of the highest quality and are not misrepresented or misinterpreted due to cross-contamination.

2.0 GENERAL CONSIDERATIONS

Potential hazards associated with the planned tasks should be thoroughly evaluated prior to conducting KIF field activities. The site-specific Health and Safety Plan (HASP) provides a description of potential hazards and associated safety and control measures.

Sampling personnel must wear powder-free nitrile gloves while performing the procedures described in this SOP. Specifically, nitrile gloves must be worn while preparing sample bottleware, preparing and decontaminating sampling equipment, collecting and processing samples, and packing samples. At a minimum, nitrile gloves must be changed prior to the collection of each sample or as necessary to prevent the possibility of cross-contamination with the sample, the sample bottleware, or the sampling equipment.

Consideration should be given to the order in which the samples are collected. In general, samples should be collected from areas suspected to be least impacted by contamination followed by areas suspected to be most impacted by contamination, thereby minimizing the potential for cross-contamination.

Prior to field activities, the field team should consider how investigation-derived waste (such as decontamination fluids) is to be handled.

If containerization of decontamination fluids associated with decontaminating large equipment (such as drilling rigs and backhoes/excavators) is required, it is imperative to ensure that the subcontractor will have appropriate equipment onsite. This equipment may include a portable electric generator and a high-pressure steam-cleaner or steam-jenny. In addition, a decontamination pad or portable containment system should be used to collect fluids. Typical decontamination pads are constructed of polysheeting draped over hay bales or a wooden frame and sloped to accommodate the collection of liquids by sump or other suitable means.

3.0 PROCEDURES

The following sections describe the procedures for decontamination of equipment. Any variation in these procedures must be approved by the Project Manager (PM) and Quality Assurance/Quality Control (QA/QC) Lead and must be fully documented.

Decontamination activities cannot progress until deviations are approved or resolved.

3.1 Pre-Job Preparation

Prior to initiating sampling activities, the PM will ensure that the following activities have been completed.

- a. Verify that an adequate supply of equipment, solvents, and water (both potable and deionized [DI]) necessary for completing decontamination are available for the planned sampling activities at the site. See Table 1 for an example checklist of decontamination equipment and materials.
- b. Review project work control documents such as the *Quality Assurance Project Plan* (QAPP), *Health and Safety Plan* (HASP), and appropriate SOPs in an effort to determine the project-specific requirements, procedures, and goals.

3.2 Field Preparation and Set-up

The field set-up for decontamination will vary depending on the type of equipment to be used as described in the following steps.

- a. Establish a centralized equipment decontamination area at KIF for the day-to-day decontamination of general sampling equipment. Set up the decontamination area away from and preferably upwind from areas of remediation, construction, and site operation activities.
- b. For decontamination of hand-held sampling equipment, spread plastic sheeting on the ground and place the decontamination tubs and/or buckets and rinse bottles in order of use on top of the plastic. Prepare an ample volume of decontamination solution containing a non-phosphate detergent (such as LiquiNox® detergent solution) and potable water. Record the source of the water in the field logbook.
- c. For decontamination of drilling rigs or backhoes/excavators, establish an area for decontamination that will meet the program and site-specific requirements for collection of decontamination fluids. If necessary, set up a decontamination pad at the KIF decontamination area as discussed in Section 2.0. Conduct gross

decontamination (such as removing general mud from large equipment) prior to demobilization from the site back to the KIF decontamination area.

3.3 Decontamination

All equipment used for sampling, testing, or measuring, including excavating and drilling equipment, that comes in contact with potentially sampled media will be decontaminated prior to use unless the equipment is prepackaged and sealed by a manufacturer of environmental sampling equipment. Reusable sampling equipment will also be decontaminated between sampling locations. If disposable sampling equipment (clean prepackaged materials) is used, this equipment will not be decontaminated before use and will be disposed of properly after one use. Disposable equipment will not be used at more than one sampling location.

Dedicated sampling equipment, such as individual sampling/purging pumps that are used to sample one well, will be decontaminated prior to the first use, but will not require decontamination between uses at the same well. Dedicated sampling equipment will be secured in clean resealable plastic bags between uses and will be replaced monthly (<32 days) or when visual indications of stains are observed or there are indications of contamination from equipment blanks.

The following presents decontamination procedures for manual sampling equipment and heavy equipment.

3.3.1 Manual Sampling Equipment

The following general decontamination steps should be applied to all equipment prior to initial use (unless using clean prepackaged environmental sampling equipment) or that have been utilized to collect sample media for analytical purposes. Site-specific project control documents may specify modifications to these procedures and should be followed when applicable. It is important to note that no acids or solvents will be used to decontaminate any electrical or electronic instrumentation unless specified by the manufacturer.

- a. Physically remove visible material from the sampling equipment to the extent practical before decontaminating the equipment with decontamination fluids. If this material appears to be impacted based on visual observation, instrument readings, or other credible indication, collect and manage this material in accordance with the *Management of Investigation-Derived Waste* SOP (TVA-KIF-SOP- 012).

- b. Immerse (to the extent practicable) the equipment in the detergent solution and scrub the equipment thoroughly with a stiff brush until visible residual material is removed and the equipment is visibly clean. Circulate detergent solution through equipment that cannot be disassembled such as submersible pumps (ASTM, 1990).
- c. Rinse the equipment thoroughly with potable water.
- d. Rinse the equipment with organic desorbing agent (isopropyl alcohol). If samples are not being collected for analysis of organic compounds, omit this step (ASTM, 1990).
- e. Rinse the equipment thoroughly with potable water.
- f. Rinse the equipment with DI water (use reagent-grade DI water from a known source).
- g. To the extent practicable, allow the equipment to air dry in a clean area (equipment does not need to be completely dry before reuse; under certain weather conditions, complete air drying is not possible).
- h. Change the initial decontamination solution daily and/or between sites at a **minimum** and more frequently as needed. Collect decontamination solvents in a separate container from water/detergent solutions and properly containerize, store, and dispose of decontamination solutions in accordance with the *Management of Investigation-Derived Waste* SOP (TVA-KIF-SOP-012).

If decontaminated equipment will not be used immediately, the equipment may be wrapped in aluminum foil (if used for organics only) or sealed in a plastic bag for storage.

Decontamination activities, including date, time, and reagents used, should be documented in the field logbook and decontaminated sampling equipment should be labeled with this information as appropriate.

3.3.2 Decontamination of Heavy Equipment

The following steps for decontamination can be applied to heavy equipment.

- a. Physically remove as much of the visible material as possible from the heavy equipment after use and prior to steam cleaning. If contaminated material is suspected as determined by visual observations, instrument readings, or other means, collect material in an appropriate container. Otherwise, return the material to the area where it originated.
- b. Place the heavy equipment on the decontamination pad in the decontamination area. If wash water is to be collected, ensure that the collection mechanism functions properly and that the decontamination pad has no leaks.
- c. Steam clean parts of the heavy machinery that come into contact with visible material (such as tires, bulldozer bucket, augers, and back of drill rig).
- d. For any portion of the heavy equipment that comes into contact with the sampling media, decontaminate by following steps *b* through *h* of Section 3.3.1.
- e. Containerize fluids, if appropriate. Place solids in a drum or other appropriate container.

3.4 Field Logbook Documentation

Field logbooks will be maintained by the Field Team Leader to record daily activities. In addition to the minimum requirements discussed in the *Field Documentation* SOP (TVA-KIF-SOP-06), the field logbooks should document those decontamination activities specific to this SOP.

The Field Team Leader and/or designee will review the field logbook entries on a weekly basis at a minimum (daily review is preferred) for completeness and accuracy and will indicate this review by initialing the entries. The Field Team Leader or designee is responsible for completion of the required data collection forms.

4.0 REFERENCES

- ASTM. *Standard Practice for Decontamination of Field Equipment Used at Nonradioactive Waste Sites*: D 5088-90, 1990.
- United States Environmental Protection Agency (U.S. EPA). Region 4, *Field Equipment Cleaning and Decontamination Operating Procedure*. Document # SESDPROC-205-R1, November 2007.
- Tennessee Valley Authority (TVA). *Field Documentation SOP* (TVA-KIF-SOP-06). February 2009.
- TVA. *Health and Safety Plan* (HASP), KIF Site Specific, 2009.
- TVA. *Management of Investigation-Derived Waste SOP* (TVA-KIF-SOP-12), 2010.
- TVA. *Quality Assurance Project Plan* (QAPP), 2009.

Table 1: Decontamination Checklist for Equipment and Materials	
Item Description	Check
Health & Safety	
Nitrile gloves	
Hard hat	
Steel-toed boots	
Hearing protection	
Field first-aid kit	
Eyewash	
Safety glasses or face shield (for use when steam cleaning)	
Barricades, cones, flashing lights, signs	
Respirator and cartridges (if necessary)	
Saranex™/Tyvek® suits and booties (if necessary)	
Paperwork	
Health and Safety Plan	
Project work control documents	
Field logbook	
Equipment	
Non-phosphate detergent (such as LiquiNox®)	
Isopropyl alcohol	
Buckets or washtubs	
Spray bottles	
Drums (with labels)	
Plastic sheeting	
Brushes	
Steam cleaner/generator	
Potable water/Deionized water	
Aluminum foil	
Plastic bags	
Drying shelves	

End of Procedure