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CP4-ES-2702 **Rev. 0**	**TITLE:** Decontamination of Sampling Equipment and Devices	Page 1 of 14

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure establishes methodologies for cleaning and decontaminating sampling equipment and devices that come into contact with non-fissile sample media and/or contaminants.

The objectives of decontamination are to remove contaminants from surfaces, mitigate the spread of contaminants to other uncontaminated surfaces, prevent cross-contamination of sample matrices, and to minimize personnel exposure and waste volume.

1.2 Scope

This procedure shall be used for decontamination of sampling equipment and devices used for characterization and cleanup verification activities performed by Fluor Paducah Deactivation Project (FPDP) personnel and subcontractors.

This procedure is **NOT** intended to provide direction on the decontamination of large field equipment and equipment components (e.g., backhoes, forklifts, track hoes, front loaders, graders, well drilling equipment, drill bits, drilling rods, etc.). For those decontamination activities, see CP4-ER-2701, *Large Equipment Decontamination.*

2.0 REFERENCES

2.1 Use References

- CP3-HS-2003, *Hazard Communication*
- CP3-HS-2004, *Job Hazard Analyses*
- CP3-HS-2005, *Personal Protective Equipment*
- CP3-HS-2032, *Hazardous Material Information and Inventory Process*
- CP3-RP-1108, *Posting and Labeling*
- CP3-RP-1109, *Radioactive Contamination Control and Monitoring*
- CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*
- CP4-ES-2700, *Logbooks and Data Forms*
- CP4-ES-2704, *Trip, Equipment and Field Blank Preparation*
- Equipment or instrument-specific instructions provided by manufacturer
- Job Hazard Analysis (JHA)-11028, *Decontamination of Equipment*

2.2 Source References

- CP4-ER-2701, *Large Equipment Decontamination*
- Toxic Substances Control Act, Title 40 Code of Federal Regulations Part 761
- U.S. Army Corps of Engineers, February 2001, EM 200-1-3, *Requirements for the Preparation of Sampling and Analysis Plans*
- U.S. Environmental Protection Agency, November 2001, *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, Region 4, Environmental Compliance Branch, Athens, GA., Appendices B and C

3.0 COMMITMENTS

None

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Precautions

4.1.1 The sampling team performing the task of cleaning and decontaminating sampling equipment shall comply with the requirements of the CP3-HS-2005, *Personal Protective Equipment*, and any job-specific JHAs that address safety and health.

4.1.2 The sampling team also shall comply with additional requirements as described in the JHA; project-specific work plan, if applicable; and the radiological work permit (RWP) if required; which define the work area(s) and discuss expected radiological and non-radiological hazards, required training, personal protective equipment (PPE) requirements, hazard controls, etc.

4.2 Limitations

4.2.1 JHA-11028, *Decontamination of Equipment,* RWP, and project-specific work plan, as applicable, should be referred to for detailed limitations and other requirements associated with the work environment.

4.2.2 Additional cleaning and decontamination procedures and methods may be required because of differing contaminant characteristics.

5.0 PREREQUISITES

5.1 Contact **and** submit material safety data sheets (MSDS) / safety data sheets (SDS) to Health and Safety in accordance with CP3-HS-2032, *Hazardous Material Information and Inventory Process,* and CP3-HS-2003, *Hazard Communication,* for solvents that will be used for cleaning and decontamination.

5.2 Participate in the development and/or review and approval of the task-specific JHA in accordance with CP3-HS-2004, *Job Hazard Analyses*.

5.3 Prior to beginning work, read **and** sign off on the RWP, if required, and task-specific JHA.

NOTE:

The items listed may be used as a guide, but may **NOT** be a complete list.

5.3.1 Refer to the task-specific JHA(s); project-specific work plan, if applicable; and the RWP (if one is required) to determine what instruments, supplies, materials, and equipment are needed to safely execute the decontamination activities.

- Soap (phosphate-free laboratory detergent such as Liquinox®)
- Solvent, as applicable
- Tap water
- Analyte-free (deionized) water
- Organic-/analyte-free water
- Nitric acid, as applicable
- Steam cleaner or high pressure hot water washer capable of generating a pressure of at least 2500 pounds per square inch (PSI) and producing hot water and/or steam ≥ 200°F, with a soap compartment, as applicable
- Natural bristle brushes
- Buckets
- Aluminum foil, plastic wrap, zipper-type plastic bags, and clean plastic trash-size bags
- Plastic sheeting or other impermeable liner for decontamination area
- Paper towels, clean cloths, or rags
- Spill control kit
- Absorbent pads
- PPE and other safety equipment specified by the JHA and RWP
- MSDS, as applicable
- Indelible marking pens

5.3.2 Assemble the necessary equipment, tools, and supplies to ensure that sufficient materials and equipment are available for the decontamination activities.

5.4 Conduct decontamination of sampling equipment and devices at the designated decontamination area for the facility, if available.

5.4.1 **If** it is necessary to construct a temporary decontamination area, **then** locate area close to the work site to ensure that contaminants are not spread or transferred to other equipment.

5.4.2 Determine whether sampling equipment and devices are expected to be radiologically and/or chemically contaminated.

5.4.3 **If** known or potential radiological contamination is suspected, **then** construct decontamination area using clean material locating in an area that is posted as a Contaminated Area.

5.4.4 Select a location that has little to no surface contamination.

5.4.5 **If** temporary decontamination area is constructed in an un-posted area, **then** contact a radiological controls technician (RCT) to screen and post area according to CP3-RP-1108, *Posting and Labeling*.

5.4.6 **If** known or potential chemical contamination only is suspected, **then** construct decontamination area in an area known to be free of surface contamination.

5.4.7 Construct temporary decontamination area on a generally level surface that facilitates the capture, removal, and control of wastewater and precipitation (if any).

NOTE:

Impermeable plastic sheeting should **NOT** have any seams, rips, or tears.

5.4.8 Place impermeable plastic sheeting on surface to ensure decontamination area is capable of containing all decontamination fluids.

5.4.9 **If** potentially contaminated sampling equipment and devices need to be removed from a Radiological Area for decontamination, **then** contact a RCT to perform a survey.

NOTE:

Release of surveyed sampling equipment and devices to other areas must be approved by the RCT in accordance with CP3-RP-1109, *Radioactive Contamination Control and Monitoring*.

5.4.10 Ensure surveyed sampling equipment and devices are tagged according to CP3-RP-1108, *Posting and Labeling* prior to being re-located.

5.4.11 Ensure sawhorses or racks constructed to hold sampling equipment or devices while being decontaminated are high enough above the floor of the decontamination area (i.e., at least two feet) to prevent equipment from being splashed.

5.4.12 Refer to the manufacturer's instruction manual before selecting a cleaning or decontamination approach for specific field test equipment or instrumentation (e.g., pH meters, thermometers, dissolved oxygen meters) to avoid the possibility of damage to instrument components.

6.0 INSTRUCTIONS

6.1 General Requirements

Sampler

NOTE:

MSDS(s)/SDS(s) are readily available and accessible to employees to review prior to working with chemicals.

MSDS(s)/SDS(s) are located electronically or by maintaining printed hard copies.

When sampling equipment or devices are used to collect samples containing oil, grease or other hard to remove materials, rinsing the equipment several times using pesticide-grade acetone, hexane, or petroleum ether may be needed before proceeding with initial cleaning.

6.1.1 Clean sampling equipment or devices with tap water and soap using a brush to remove particulate matter and surface films.

NOTE:

Sampling equipment and devices may be cleaned with soap and high pressure steam or hot water as an alternative to brushing if appropriate and necessary.

Sampling equipment and devices that are cleaned with soap and high pressure steam or hot water should be placed on racks or saw horses at the decontamination area.

PVC or plastic items should **NOT** be cleaned with steam or hot water pressure.

6.1.2 Rinse sampling equipment or devices thoroughly with tap water.

NOTE:

Solvent and 10% nitric acid rinsates are to be collected in separate containers for treatment or proper disposal as investigation-derived waste (IDW).

Solvent or nitric acid rinsates should **NOT** be placed in the temporary decontamination area.

6.1.3 **If** required by the task-specific WP, **then** rinse Teflon® and glass sampling equipment and devices with a 10% nitric acid solution.

6.1.4 Rinse sampling equipment and devices thoroughly with analyte-free water.

NOTE:

Do **NOT** solvent rinse polyvinyl chloride (PVC) or plastic items.

6.1.5 **If** required by the task-specific WP, **then** rinse sampling equipment and devices thoroughly with an appropriate solvent (e.g., when collected samples undergo trace organic or inorganic constituent analyses).

NOTE:

Do **NOT** apply a final rinse with analyte-free water following a rinse with organic/analyte-free water.

A. **After** solvent rinse, **then** rinse sampling equipment and devices with an organic/analyte-free water and air dry.

B. **If** organic/analyte-free water is **NOT** available, **then** allow sampling equipment and devices to completely air dry.

6.1.6 Tag **and** label decontaminated sampling equipment and devices.

6.1.7 **If** sampling equipment is used in a contamination area (CA), **then** contact a RCT to survey equipment before tagging and labeling according to CP3-RP-1109, *Radioactive Contamination Control and Monitoring*.

6.1.8 Handle decontaminated sampling equipment and devices wearing clean, chemical resistant gloves to prevent recontamination.

6.1.9 Store new or cleaned (decontaminated) sampling equipment and devices separately from contaminated equipment.

6.1.10 Prepare equipment rinsate blanks in accordance with CP4-ES-2704, *Trip, Equipment and Field Blank Preparation*.

6.1.11 Additionally, document any deviations or difficulties encountered in the field concerning sample collection or related activities on the sample data form.

6.2 Well Sounder or Tape Decontamination

NOTE:

Only the portion of the well sounder cable or tape that has a potential to come into contact with contamination needs to be cleaned.

Sampler

6.2.1 Wash with soap and tap water.

6.2.2 Rinse with tap water.

6.2.3 Rinse with analyte-free water **and** air dry.

6.2.4 Tag **and** label decontaminated equipment and devices.

6.2.5 **If** sampling equipment is used in a CA, **then** contact a RCT to survey equipment before tagging and labeling.

6.2.6 Handle decontaminated sampling equipment and devices wearing clean, resistant gloves to prevent recontamination.

6.3 Pump Decontamination

CAUTION:

In order to avoid damage to pumps or other devices operated by a controller, make sure that the controller does not become wet during cleaning and decontamination activities.

6.3.1 Pump soapy water through the hose to flush out any residual purge water.

6.3.2 Scrub the exterior of the contaminated hose, pump, and electrical cord, with soap and tap water, using a brush or wipe.

6.3.3 Rinse the soap from the outside of the hose, pump, and electrical cord with tap water.

6.3.4 Rinse the hose with analyte-free water.

6.3.5 Pump tap water through the hose to flush out soapy water (approximately 1 gallon).

6.3.6 Pump analyte-free water through the hose to flush out the tap water.

6.3.7 **If** the pump has a reverse mode, **then** purge with the pump in reverse mode.

6.3.8 Rinse the tap water residue from the outside of hose, pump, and electrical cord with analyte-free water (approximately ¼ gallon) **and** let dry.

6.3.9 Tag **and** label equipment.

6.3.10 **If** sampling equipment is used in a CA, **then** contact a RCT to survey before tagging and labeling.

6.4 Polychlorinated Biphenyl Contaminated Sampling Equipment

6.4.1 Contact Waste Management for guidance on handling PCB waste.

NOTE:

Polychlorinated Biphenyl (PCB) contaminated sampling equipment (CSE) must be decontaminated and verified clean according to Toxic Substance Control Act (TSCA) specifications.

Any equipment to be reused that was suspected to have come in contact with material labeled as PCB and/or a PCB source $\geq$50 ppm is considered to be PCB CSE.

Do **NOT** leave PCB CSE unattended.

6.4.2 Following the sampling event:

- Wipe all PCB CSE free of loose liquids and materials at the sampling point.
- Double-wrap PCB CSE in plastic bags.
- Place PCB label on plastic bags.
- Transport bags to decontamination location.

NOTE:

The production of free liquid waste should be avoided.

- Decontaminate PCB CSE by swabbing with 100% penetone, hexane or approved equivalent with dampened rags.
- Double-wrap decontaminated equipment in plastic.
- Place PCB label on plastic.
- Store decontaminated equipment in a cabinet labeled PCB Dedicated Equipment Storage Cabinet.

6.4.3 Perform verification sampling on sampling equipment.

1. Obtain a 100-cm^2 wipe sample from an area on the equipment that was most likely contaminated.

2. Submit sample to the laboratory for analysis.

   - **If** the result for the 100-cm^2 wipe is <10 ug/wipe, **then** deem equipment non-TSCA **and** decontaminate sampling equipment.

   - **If** the result for the 100-cm^2 wipe is >10 ug/wipe, **then** dispose of the PCB CSE as PCB waste.

NOTE:
All waste produced from the decontamination operations of PCB contaminated sampling equipment is considered PCB waste.

7.0 ACCEPTANCE CRITERIA

None

8.0 POST PERFORMANCE WORK ACTIVITIES

Sampler

8.1.1 Record all decontamination activities on the sample data form in accordance with CP4-ES-2700, *Logbooks and Data Forms*.

8.1.2 Ensure sampling equipment and devices are surveyed by a radiological controls technician (RCT) after decontamination and meet the criteria in CP3-RP-1109, *Radioactive Contamination Control and Monitoring.*

NOTE:
Decontaminated sampling equipment and devices may be wrapped in aluminum foil or plastic after surveyed and by RCT.

RCT

8.1.3 **If** sampling equipment and devices are **NOT** going to be reused immediately in a Radiological Area, Soil Contamination Area, or Radiological Buffer Area **then** tag and label in accordance with CP3-RP-1108, *Posting and Labeling*.

Sampler/Waste Technician

8.1.4 Handle disposable sampling equipment and devices as investigation-derived waster (IDW) in accordance with the requirements in the approved, task-specific WP.

8.1.5 Collect **and** label any IDW generated by the decontamination process.

8.1.6 Segregate into appropriate containers **and** dispose of (or treat prior to disposal) according to CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*.

8.1.7 Prior to transporting IDW, contact the transportation specialist.

8.1.8 Restore decontamination area by removing plastic sheeting.

9.0 RECORDS

9.1 Records Generated

The following records may be generated by this procedure:

Sample Data Form

9.2 Records Disposition

The records are to be maintained in accordance with CP3-RD-0010, *Records Management Process*.

Appendix A – Acronyms/Definitions

ACRONYMS

CA - contamination area

CSE – contaminated sampling equipment

DOE - U.S. Department of Energy

FPDP – Fluor Paducah Deactivation Project

IDW – investigation-derived waste

JHA – job hazard analysis

MSDS – material safety data sheet

PPE – personal protective equipment

RCT – radiological controls technician

RWP – radiological work permit

TSCA – toxic substances control act

WP – work package

DEFINITIONS

Analyte-Free (Deionized) Water – Tap water treated by passing through a standard deionizing resin column. It should contain no detectable heavy metals or other inorganic compounds at or above method detection limits as defined by a standard inductively coupled Argon Plasma Spectrophotometer (or equivalent) scan.

Equipment Rinsate Blank – A sample of analyte-free water poured over and/or through decontaminated sampling equipment. The purpose of the equipment rinsate blank is to assess the adequacy of the decontamination process.

MSDS/SDS – A technical bulletin that contains information about a hazardous material such as chemical composition, chemical and physical characteristics, health and safety hazards, and precautions for safe handling and use.

Nitric Acid (10%) Solution – A solution made from reagent-grade nitric acid and deionized water.

Organic-/Analyte-Free Water – Tap water treated with activated carbon and deionizing units. At a minimum, it must meet the analytical criteria of analyte-free water and should contain no detectable pesticides, herbicides, or extractable organic compounds, and no volatile organic compounds above minimum detectable levels as determined by the U.S. Environmental Protection Agency Region 4 laboratory for a given set of analyses.

PCB CSE – Any equipment to be reused that is suspected to have come in contact with PCB- labeled material and/or a PCB source 2 to 50 ppm.

Appendix A – Acronyms/Definitions (continued)

Solvent – Pesticide-grade isopropanol. Use of a solvent other than pesticide-grade isopropanol (e.g., pesticide-grade acetone, hexane, petroleum ether) for sampling equipment cleaning and decontamination purposes must be justified in the WP.

Tap Water – Water from any municipal water treatment system. Untreated potable water is not an acceptable substitute for tap water.

Appendix B – QC Data Form

QC DATA FORM

SAMPLE ID: _____ PROJECT ID: _____

LCOC NUMBER: _____

SAMPLE DATE: _____ SAMPLE TIME: _____

DI WATER SOURCE: _____

LOCATION OF QC SAMPLE PREPARATION: _____

IF Rinseate, description of equipment being deconned: _____

SAMPLED BY: _____

FIELD COMMENTS AND OBSERVATIONS:

SIGNATURE: _____ DATE: _____

Data Form Verification
SIGNATURE: _____ DATE: _____

PEMS Entry Inititals: _____ DATE: _____

QC Data Form generated from ESPEMS database