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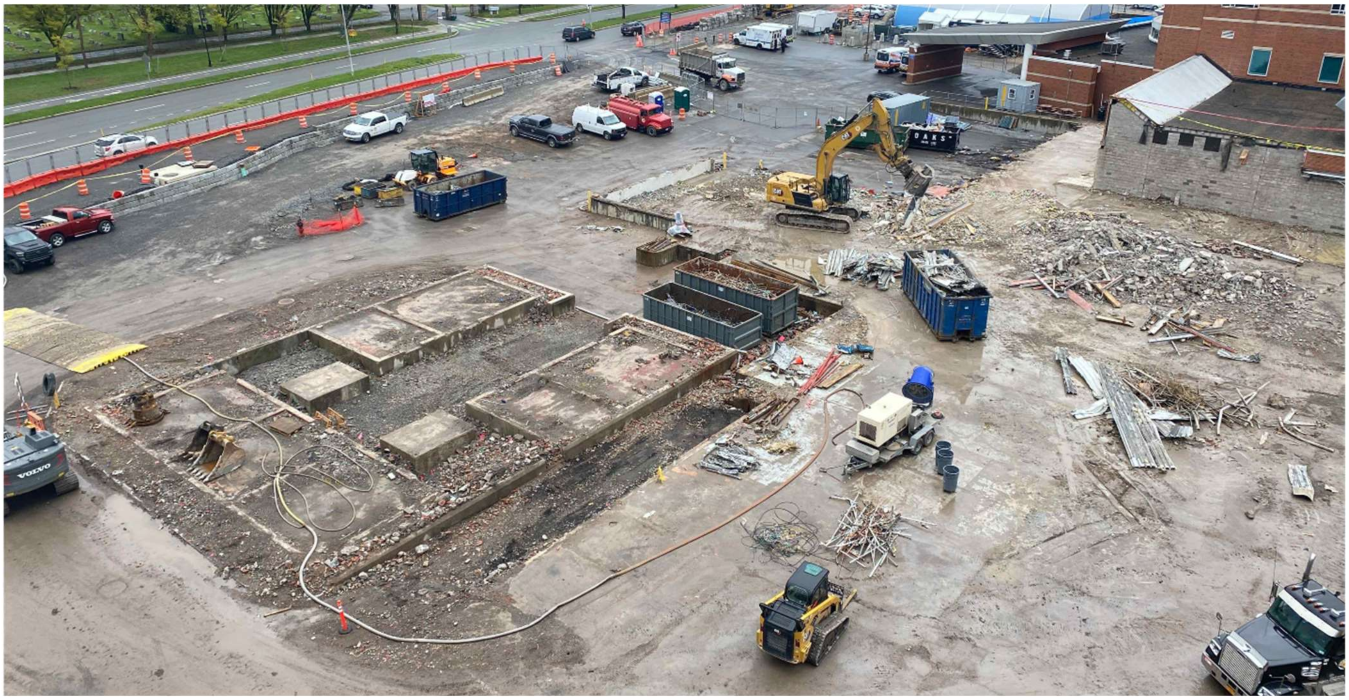
Coffer Concrete Investigation and Sampling Work Plan

University of Rochester Medical Center Emergency Department Expansion Project

110 Crittenden Boulevard, Rochester, New York



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June 27, 2023

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1.0 Introduction

At the request of the University of Rochester Medical Center (URMC), Bergmann has prepared this Coffer Concrete Investigation and Sampling Work Plan (Work Plan) for the URMC Hospital Emergency Department Expansion Project, located at 110 Crittenden Boulevard, Rochester, Monroe County, New York (Site). This Work Plan is an addendum to the Excavation Work Plan (EWP). The EWP has been prepared to manage soil during the proposed Emergency Department (ED) Expansion Project and has been reviewed and approved by the New York State Department of Environmental Conservation (NYSDEC). The purpose of this Coffer Concrete Investigation and Sampling Work Plan is to assess the concrete quality of the coffers within the Former Transformer Area to determine concrete waste disposal. All work will be completed in accordance with the NYSDEC-approved EWP.

The above-ground section of the buildings has been demolished and the floors, coffers, and foundation remain. The coffers are sections of the foundations of the switchgear buildings, which are enclosed by four concrete walls and a concrete bottom. Prior to the concrete sampling, the soil inside of the coffers will be sampled in accordance with the Coffer Soil Investigation and Sampling Plan (provided under a separate cover) and will be removed prior to the concrete sampling. Figure 1 provides a diagram of the concrete coffers and each surface of the concrete is labeled.

The use of this concrete sampling plan will be limited to coffers that contained soil with concentrations of total PCB concentrations of less than 1 part per million (ppm).

If concrete is in contact with soil that has concentrations of total PCBs greater than 1 ppm, it is assumed that the concrete has concentrations greater than 1 ppm and the concrete will be disposed of as TSCA waste.

It is also assumed that the concrete floor of the coffers and the concrete walls that face inward to the former transformer yard have been in contact with soil that has a total PCB concentration greater than 1 ppm and will be disposed of as TSCA waste. The sections of the outer walls that do not intersect with coffers (surfaces T-1 and T-2) will also be disposed of as TSCA waste.

2.0 Coffer Concrete Investigation

The concrete coffer investigation will include the collection of concrete samples from each concrete surface, except where noted in Section 1. The number of concrete samples is based on the square footage of the surface, at a minimum one (1) concrete sample will be collected per each ten (10)-foot grid spaced. Below is a summary table of the number of grid samples per each Coffer Area.

Coffer Designation	Total Number of Concrete Samplings Per Coffer Area
A	14
B	8
C	10
D	9
E	16
F	9
G	16
Total Number of Concrete Samples	82

Table 1 provides a summary of the square footage of each of the surfaces of the coffers and the number of samples to be collected for each surface. Provided on Figure 1 is the layout of the coffers and a designation of each of the surfaces.

Concrete samples will be collected using a hand-held hammer drill from a one-foot by one-foot area to provide enough volume for the analysis of polychlorinated biphenyls (PCBs) using extraction method SW-846 3546 and analysis method PCBs EPA Method 8082. The required sample weight is 1 gram. Each sample will be weighed at the time of collection to ensure the required sample size has been collected. A sufficient volume of concrete will be collected for the analysis of field duplicate and matrix spike/matrix spike duplicate samples on one (1) quality assurance and quality control (QA/QC) set per twenty (20) concrete samples. Due to the configuration of the coffers, once they are excavated down to eight (8) feet, they are considered a confined space. Only personnel with both confined space training and 40-hour HAZWOPER training will enter the coffers.

The coffers will be sampled in two (2) events. During the first sampling event the concrete surfaces within the transformer area will be sampled and the concrete surfaces of the coffer walls facing out of the former transformer area will be sampled in the second event. The concrete surfaces facing outward from the former transformer area will be sampled when the area around the former transformer yard is excavated. The surfaces facing the alleyway along the southern section of the transformer area (surfaces C-7, F-7, and G-8) will be sampled from the alleyway as part of the first event.

2.1 CONCRETE SAMPLING

The concrete will be screened using visual, olfactory, instrument-based (e.g., photoionization detector), and the analytical results of the soil coffer characterization. Sampling will be collected in accordance with the Standard Operating Procedures for *Sampling Porous Surfaces for Polychlorinated Biphenenyls (PCBs) EPA Region 1, Dated May 2011* (Appendix 1).

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE or PG who is licensed and registered in New York State, or a qualified person who directly reports to a PE/PG who is licensed and registered in New York State will perform the concrete sampling.

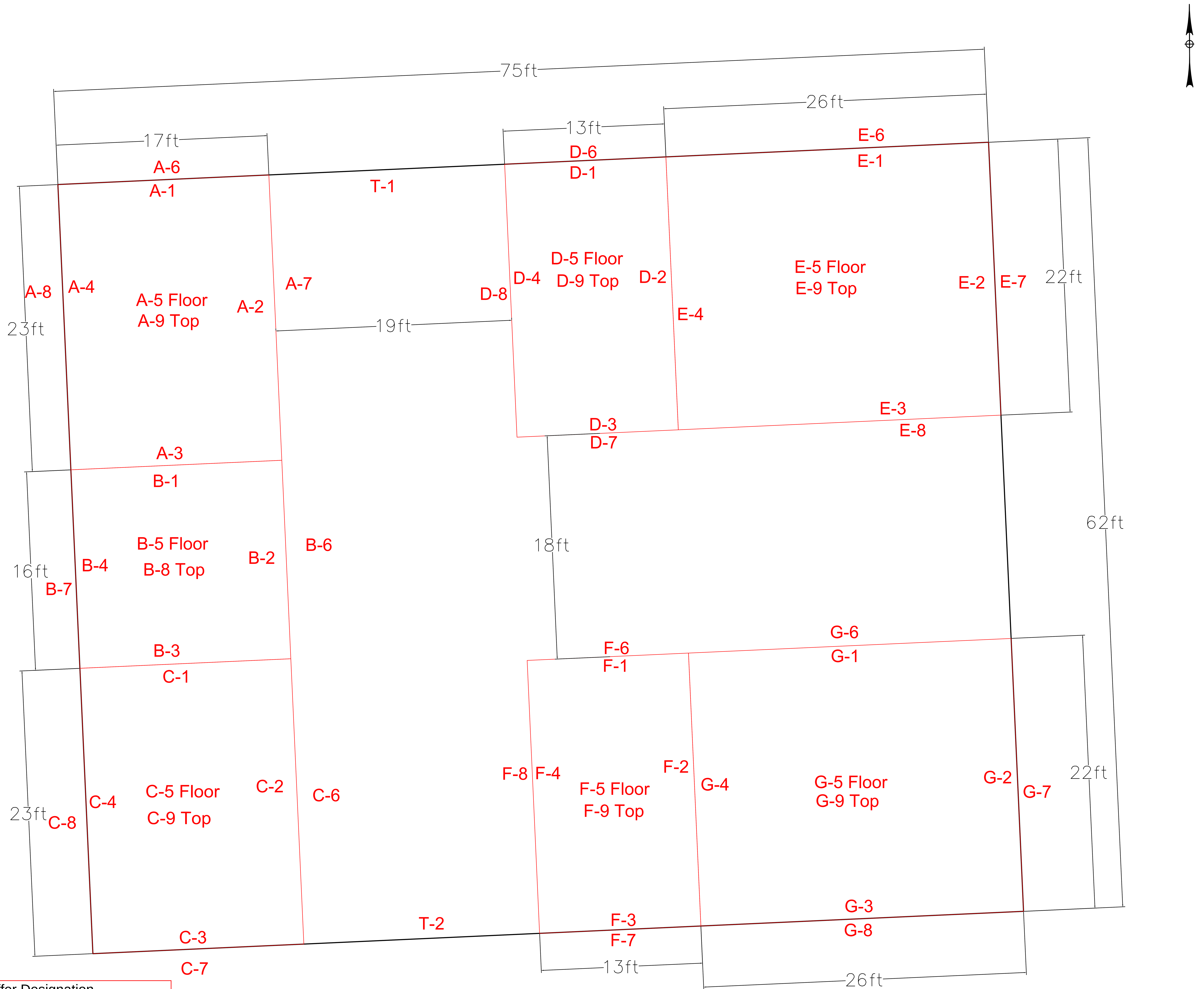
2.2 REPORTING

Following the completion of the sampling, a memorandum will provide a summary of the concrete sample collection:

- A summary table of the concrete analytical data
- Recommendations for concrete management

Additional details on the Coffer Concrete Sampling will be included in the Excavation Summary Report that will be prepared when the excavation has been fully completed.

Figure 1: Former Transformer Area Coffer Concrete Sample Locations



A - Coffer Designation
A-1 - Concrete Surface Designation

ARCH D 24x36

C:\Users\jgervasi\OneDrive - Colliers Engineering & Design\Desktop\Old Projects\EmergencyExpansion\Cement Slab Sampling Map 1.dwg

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UNIVERSITY OF ROCHESTER

Emergency Dept. Bed Tower Expansion

110 CRITTENDEN BLVD
CITY OF ROCHESTER,
MONROE CO, NY

Date Revised:	Description
04/03/2023	SAMPLING GRID

Figure 1

Project Manager	Discipline Lead
Designer	Reviewer
Date Issued 04/03/2023	Project Number

Sheet Name

Drawing Number

Table 1: Concrete Samples Locations for Coffer Areas

Table 1
Former Transformer Area Concrete Sample Summary
U of R - Emergency Department Bed Tower Expansion
110 Crittenden Boulevard
City of Rochester, NY

Slab Number	wide (ft)	long (ft)	SQ ft	Number of samples per 10 ft grid	Rounded
A-1	8	17	136	1.36	2
A-2	NS	NS	NS	NS	NS
A-3	8	17	136	1.36	2
A-4	8	23	184	1.84	2
A-5	NS	NS	NS	NS	NS
A-6	8	17	136	1.36	2
A-7	NS	NS	NS	NS	NS
A-8	8	23	184	1.84	2
A-9	17	23	391	3.91	4
				total =	14
B-1	8	17	136	1.36	2
B-2	NS	NS	NS	NS	NS
B-3	8	17	136	1.36	2
B-4	8	16	128	1.28	2
B-5	NS	NS	NS	NS	NS
B-6	NS	NS	NS	NS	NS
B-7	8	16	128	1.28	2
				total =	8
C-1	8	17	136	1.36	2
C-2	NS	NS	NS	NS	NS
C-3	8	17	136	1.36	2
C-4	8	23	184	1.84	2
C-5	NS	NS	NS	NS	NS
C-6	NS	NS	NS	NS	NS
C-7	8	17	136	1.36	2
C-8	8	23	184	1.84	2
C-9	NS	NS	NS	NS	NS
				total =	10
D-1	8	13	104	1.04	2
D-2	8	22	176	1.76	2
D-3	NS	NS	NS	NS	NS
D-4	NS	NS	NS	NS	NS

Table 1
Former Transformer Area Concrete Sample Summary
U of R - Emergency Department Bed Tower Expansion
110 Crittenden Boulevard
City of Rochester, NY

Slab Number	wide (ft)	long (ft)	SQ ft	Number of samples per 10 ft grid	Rounded
D-5	NS	NS	NS	NS	NS
D-6	8	13	104	1.04	2
D-7	NS	NS	NS	NS	NS
D-8	NS	NS	NS	NS	NS
D-9	13	23	299	2.99	3
				total =	9
E-1	8	26	208	2.08	2
E-2	8	22	176	1.76	2
E-3	NS	NS	NS	NS	NS
E-4	8	22	176	1.76	2
E-5	NS	NS	NS	NS	NS
E-6	8	26	208	2.08	2
E-7	8	22	176	1.76	2
E-8	NS	NS	NS	NS	NS
E-9	22	26	572	5.72	6
				total =	16
F-1	NS	NS	NS	NS	NS
F-2	8	22	176	1.76	2
F-3	8	13	104	1.04	2
F-4	NS	NS	NS	NS	NS
F-5	NS	NS	NS	NS	NS
F-6	NS	NS	NS	NS	NS
F-7	8	13	104	1.04	2
F-8	NS	NS	NS	NS	NS
F-9	13	22	286	2.86	3
				total =	9
G-1	NS	NS	NS	NS	NS
G-2	8	22	176	1.76	2
G-3	8	26	208	2.08	2
G-4	8	22	176	1.76	2
G-5	NS	NS	NS	NS	NS
G-6	NS	NS	NS	NS	NS

Table 1

Former Transformer Area Concrete Sample Summary

U of R - Emergency Department Bed Tower Expansion

110 Crittenden Boulevard

City of Rochester, NY

Slab Number	wide (ft)	long (ft)	SQ ft	Number of samples per 10 ft grid	Rounded
G-7	8	22	176	1.76	2
G-8	8	26	208	2.08	2
G-9	22	26	572	5.72	6
				total =	16
T-1	NS	NS	NS	NS	NS
T-2	NS	NS	NS	NS	NS
				total =	**82**

1) ft = feet

2) SQ ft = square feet

3) NS = No spacing planned was/ will be disposed of as TSCA waste.

Appendix 1: Standard Operating Procedures for Sampling Porous Surfaces for Polychlorinated Biphenenyls (PCBs) EPA Region 1 Dated May 2011. EPA Standard Operating Procedures for Field Equipment Cleaning and Decontamination

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square, Suite 100
Boston, MA 02109-3912

STANDARD OPERATING PROCEDURE FOR SAMPLING POROUS SURFACES FOR POLYCHLORINATED BIPHENYLS (PCBs)

May 2011

STANDARD OPERATING PROCEDURE FOR SAMPLING POROUS SURFACES FOR POLYCHLORINATED BIPHENYLS (PCBs)

The Office of Environmental Measurement and Evaluation
EPA New England – Region 1
11 Technology Dr.
North Chelmsford, MA 01863

Prepared by:	Dan Granz, Environmental Engineer	5/5/11 Date
Reviewed by:	Kim Tisa, TSCA PCB Coordinator	5/5/11 Date
Reviewed by:	Jerry Keefe – EIA Team Leader	05/23/11 Date
Approved by:	Dan Boudreau, EIA Chemistry Team Leader	5/23/11 Date

Revision Page

Date	Rev#	Summary of Changes	Sections
12/97	1	Initial Approval, draft	
3/20/08	2	Major update, only for PCBs, added TSCA sampling	All sections
7/17/08	3	Disposal of dust filter and decon of vac hose	11.0 and 14.0
5/04/11	4	Vacuum Trap Design and Clean-out	9.4

Table of Contents

1.0 Scope and Application

1.1 This Standard Operating Procedure (SOP) is suitable for collection of a porous matrix sample for analysis of Polychlorinated Biphenyls (PCBs).

1.2 This SOP describes sampling techniques for both hard and soft porous surfaces.

1.2.1 Hard surfaces, and most soft surfaces, can be sampled using an impact hammer drill to generate a uniform, finely ground, powder to be extracted and analyzed for PCBs. This procedure is primarily geared at providing enough sample quantity for two analyses. Hard porous surfaces include concrete, brick, asphalt, cement, sandstone, limestone, unglazed ceramics, and other possible PCB suspected material. This procedure may also be used on other softer porous surfaces, such as wood.

1.2.2 Soft surfaces can be sampled using a chisel or sharp knife to generate a representative sample to be extracted and analyzed for PCBs. Soft porous surfaces include wood, wall plasterboard, low density plastics, rubber, caulking, and other PCB suspected material.

1.3 This SOP provides for collection of surface samples (0 – 0.5 inches) and delineation of PCB contamination throughout the core of the porous surface. The procedure can be used to sample the porous surface at distinctly different depth zones.

2.0 Method Summary

A one-inch or other sized diameter carbide drill bit is used in a rotary impact hammer drill to generate a fine powder, or other representative sample, suitable for extraction and analysis of PCBs from porous surfaces. This method also allows the use of chisels or knives for the collection of samples from soft porous surfaces for PCB analysis.

3.0 Definitions

3.1 Field/Bottle Blank: A sample container of the same lot as the containers used for the environmental samples. This evaluates PCB contamination introduced from the sample container(s) from a common lot.

3.2 Equipment/Rinse/Rinsate Blanks: A sample that is collected by pouring hexane over the sample collection equipment after decontamination and before sample collection. The sample is collected in the appropriate sample container identical to the sample containers. This represents background contamination resulting from the field equipment, sampling procedure, sample container, and shipment.

3.3 Field Replicates/Duplicates: Two or more samples collected at the same sampling location. Field replicates should be samples collected side by side. Field replicates represent the precision of the whole method, site heterogeneity, field sampling, and the laboratory analysis.

3.4 Field Split Samples: Two or more representative subsamples taken from one environmental sample in the field. Prior to splitting, the environmental sample is homogenized to correct for sample heterogeneity that would adversely impact data comparability. Field split samples are usually analyzed by different laboratories (interlaboratory comparison) or by the same laboratory (intralaboratory comparison). Field splits are used to assess sample handling procedures from field to laboratory and laboratory comparability.

3.5 Laboratory Quality Samples: Additional samples that will be collected for the laboratory's quality control program: matrix spike, matrix spike duplicate, laboratory duplicates, etc.

3.6 Proficiency Testing (PT)/Performance Evaluation (PE) Sample: A sample, the composition of which is unknown to the laboratory or analyst, provided to the analyst or laboratory to assess the capability to produce results within acceptable criteria. This is optional depending on the data quality objectives. If possible, it is recommended that the PE sample be of similar matrix as the porous surface(s) being sampled.

3.7 Porous Surface: Any surface that allows PCBs to penetrate or pass into itself including, but not limited to, paint or coating on metal; corroded metal; fibrous glass or glass wool; unglazed ceramics; ceramics with porous glaze; porous building stone such as sandstone, travertine, limestone, or coral rock; low density plastics such as Styrofoam and low density polyethylene; coated (varnished or painted) or uncoated wood; painted or unpainted concrete or cement; plaster; plasterboard; wallboard; rubber; caulking; fiberboard; chipboard; asphalt; or tar paper.

3.8 Shipping Container Temperature Blank: A water sample that is transported to the laboratory to measure the temperature of the samples in the cooler.

4.0 Health and Safety

4.1 Eye, respiratory, and hearing protection are required at all times during sample drilling. A properly fitted respirator is required for hard porous surface sampling. A respirator is recommended whenever there is a risk of inhalation of either particulate or volatilized PCBs during sampling.

4.2 All proper personal protection clothing and equipment must be worn.

4.3 When working with potentially hazardous materials or situations, follow EPA, OSHA, and specific health or safety procedures.

4.4 Care must be exercised when using an electrical drill and sharp cutting objects.

5.0 Interferences and Potential Problems

5.1 This sampling technique produces a finely ground uniform powder, which minimizes the physical matrix effects from variations in the sample consistency (i.e., particle size, uniformity, homogeneity, and surface condition). Matrix spike analysis of a sample is highly recommended to monitor for any matrix related interferences.

5.2 Nitrile gloves are recommended. Latex gloves must not be used due to possible phthalate contamination.

5.3 Interferences may result from using contaminated equipment, solvents, reagents, sample containers, or sampling in a disturbed area. The drill bit must be decontaminated between samples. (see Section 11.0.)

5.4 Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment.

6.0 Personnel Qualifications

6.1 All field samplers working at hazardous materials/waste sites are required to take a 40 hour health and safety training course prior to engaging in any field activities. Subsequently, an 8 hour refresher health and safety course is required annually.

6.2 The field sampler should be trained by an experienced sampler before initiating this procedure.

6.3 All personnel shall be responsible for complying with all quality assurance/quality control requirements that pertain to their organizational/technical function.

7.0 Equipment and Supplies

7.1 This list varies with the matrix and if depth profiling is required

Rotary impact hammer variable speed drill
1-inch or other suitable (1/2, 3/4, etc.) diameter carbide tip drill bits
Steel chisel or sharp cutting knife, and hammer
Brush and cloths to clean area
Stainless steel scoopulas

Aluminum foil to collect the powder sample
1 quart Cubitainer with the top cut out to collect the powder sample
Aluminum weighing pans to collect the powder sample
Cleaned glass container (2 oz or 40 mL) with Teflon lined cap
Decontamination supplies: hexane, two small buckets, a scrub brush, detergent, deionized water, hexane squirt bottle, and paper towels
Dedicated vacuum cleaner with a disposable filter or a vacuum pump with a dust filter
Polyethylene tubing and Pasteur pipettes
Sample tags/labels, custody seals, and Chain-of-Custody form

8.0 Sampling Design

8.1 A sufficient number of samples must be collected to meet the data quality objectives of the project. If the source of the PCB contamination is regulated under the federal TSCA PCB Regulations at 40 CFR Part 761, the sampler should insure that the sampling design is sufficient to meet any investigation or verification sampling requirements. At a minimum, the following is recommended:

8.1.1 Suspected stained area (s) should be sampled.

8.1.2 At each separate location, collect at least 3 samples of each type of porous surface, regardless of the amount of each type of porous surface present.

8.1.3 In areas where PCB equipment was used or where PCBs were stored, samples should be collected at a frequency of 1 sample/100 square feet (ft^2).

9.0 Sample Collection

9.1 Hard Porous Surfaces

9.1.1 Lock a 1-inch or another size diameter carbide drill bit into the impact hammer drill and plug the drill into an appropriate power source. For easy identification, sample locations may be pre-marked using a marker or paint. (Note: the actual drilling point must not be marked.) Remove any debris with a clean brush or cloth prior to drilling. All sampling decisions of this nature should be noted in the sampling logbook.

9.1.2 Use a Cubitainer with the top cut off or aluminum foil to contain the powdered sample. Begin drilling in the designated location. Apply steady even pressure and let the drill do the work. Applying too much pressure will generate excessive heat and dull the drill bit prematurely. The drill will provide a finely ground powder that can be easily collected.

9.1.3 Samples should be collected at ½-inch depth intervals. Thus, the initial surface sample should be collected from 0 – 0.5 inches. A ½-inch deep hole generates about 10 grams (20 mL) of powder. Multiple holes located closely adjacent to each other, may be needed to generate sufficient sample volumes for a PCB determination. It is strongly recommended that the analytical laboratory be consulted on the minimum sample size needed for PCB extraction and analysis.

9.1.4 Wall and Ceiling Sampling: A team of two samplers will be required for wall and ceiling sampling. The second person will hold a clean catch surface (e.g. an aluminum pan) below the drill to collect the falling powder. Alternatively, use the chuck-end of the drill bit and punch a hole through the center of the collection pan. The drill bit is then mounted through the pan and into the drill. For ceilings, the drill may be held at an angle to collect the powder. Thus the driller can be drilling at an angle while the assistant steadies the pan to catch the falling powder. As a precaution, it may be advantageous to tape a piece of plastic around the drill, just below the chuck, to avoid dust contaminating the body of the drill and entering the drill's cooling vents. Caution must be taken to prevent obstruction of the drill's cooling vents.

9.2 Soft Porous Surfaces

9.2.1 The procedure for the hard porous surface may be used for certain soft porous surfaces, such as wood.

9.2.2 Samples should be collected at no more than ½-inch depth intervals using a metal chisel or sharp cutting knife. Thus, the initial surface sample should be collected from 0 – 0.5 inches. It is important to collect at least 10 grams for analysis.

9.2.3 For soft porous surfaces, such as caulking and rubber, a representative sample can be collected using a metal chisel or sharp cutting knife.

9.3 Multiple Depth Sampling

9.3.1 Multiple Depth Sampling may not be applicable to certain porous surfaces, such as caulking.

9.3.2 Collect the surface sample as outlined in Section 9.1 or 9.2.

9.3.3 Use the vacuum pump or cleaner to clean out the hole.

9.3.4 To collect multiple depths there are two options.

9.3.4.1 Option one: drill sequentially ½-inch increments with the 1 inch drill.

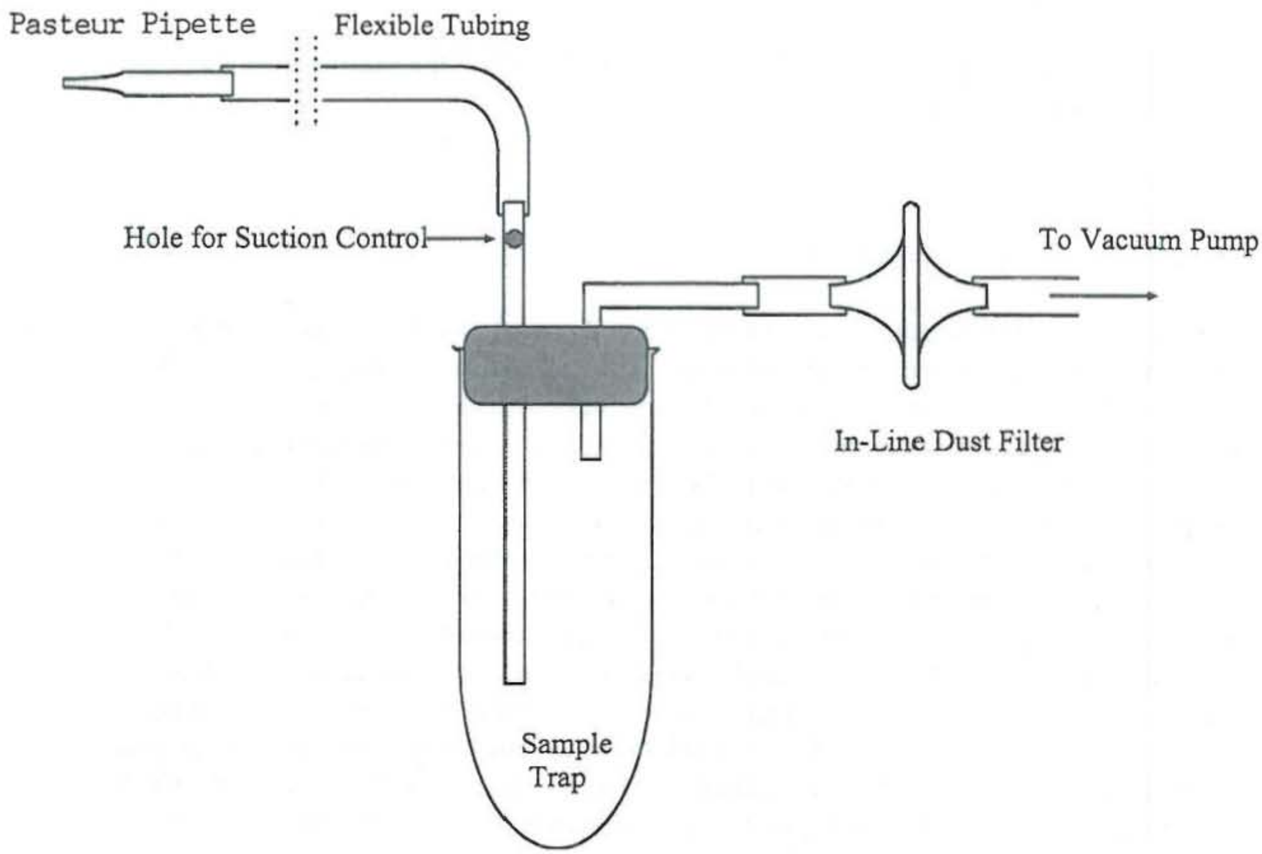
9.3.4.2 Option two: drill with the 1 inch bit and either make the hole larger or use a smaller bit to take the next ½- inch sample.

9.3.5 A stainless steel scoopula will make it easier to collect the sample from the bottom of the hole.

9.4 Vacuum Trap Design and Clean-out

The trap presented in Figure 1 is a convenient and thorough way for collecting and removing concrete powder from drilled holes. The trap system is designed to allow for control of the suction from the vacuum pump and easy trap clean-out between samples. Note, by placing a hole in the inlet tube (see Figure 1), a finger on the hand holding the trap can be used to control the suction at the sampling tip. Thus, when this hole is left completely open, there will be no suction, and the sampler can have complete control over where and what to sample. To change-out between samples the following steps should be taken: 1) the Pasteur pipette and piece of polyethylene tubing at the sample inlet should be replaced with new materials, 2) the portion of the rubber stopper and glass tubing that was in the trap should be wiped down with a clean damp paper towel (wetted with deionized water) and then dried with a fresh paper towel, 3) a clean pipe cleaner should be drawn through the glass inlet tube to remove any concrete dust present, and 4) the glass tube or flask used to collect the sample should swapped out with a clean decontaminated sample trap. Having several clean tubes or flasks on hand will facilitate change-out between samples.

Figure 1



Note: the holes should be vacuumed thoroughly to minimize any cross-contamination between sample depths and the bits should be decontaminated between samples. (See Section 11.0)

10.0 Sample Handling, Preservation, and Storage

10.1 Samples must be collected in glass containers for PCB analyses. In general, a 2-ounce sample container with a Teflon-lined cap (wide-mouth jars are preferred) will hold sufficient mass for most analyses. A 2-ounce jar can hold roughly 90 grams of sample.

10.2 Samples are to be shipped refrigerated and maintained at $\leq 6°C$ until the time of extraction and analysis.

10.3 The suggested holding time for PCB samples is 14 days to extraction.

11.0 Decontamination

11.1 Assemble two decontamination buckets. The first bucket contains a detergent and potable water solution, and the second bucket is for rinsate. Place all used drill bits, hose for the vacuum cleaner, and utensils in the detergent and water bucket. Scrub each piece thoroughly using the scrub brush. Note, the powder does cling to the metal surfaces, so care should be taken during this step, especially with the twists and curves of the drill bits. Next, rinse each piece with water and hexane. Place the rinsed pieces on clean paper towels and individually dry and inspect each piece. Note: all pieces should be dry prior to reuse.

11.2 Lightly contaminated drill bits and utensils may be wiped with a hexane soaked cloth and hexane rinsed for decontamination.

12.0 Data and Record Management

12.1 All data and information collection should follow a Field Data Management SOP or Quality Assurance Project Plan (QAPP).

12.2 Follow the chain of custody procedures to release the samples to the laboratory. A copy is kept with the sampling records.

12.3 The field data is stored for at least 3 years.

13.0 Quality Control and Quality Assurance

13.1 Representative samples are required. The sampler will evaluate the site specific conditions to assure the sample will be representative.

13.2 All sampling equipment must be decontaminated prior to use and between each discrete sample.

13.3 All field Quality Control (QC) sample requirements in a Sample and Analysis Plan (SAP) or QAPP must be followed. The SAP or QAPP may involve field blanks, equipment blanks, field duplicates and/or the collection of extra samples for the laboratory's quality control program.

13.4 Field duplicates should be collected at a minimum frequency of 1 per 20 samples or 1 per non-related porous matrix, whichever is greater.

14.0 Waste Management and Pollution Prevention

14.1 During field sampling events there may be PCB and/or hazardous waste produced from the sample collection. The waste must be handled and disposed of in accordance with federal, state, and local regulations. The dust filter, and tubing if a vacuum pump is used, is disposed after each site investigation. This waste will be treated as PCB waste if the samples are positive for PCBs. It may be possible to manage or dispose of the waste produced at the site where the work was performed. If the site does not meet regulatory requirements for these types of activities, the waste must be transported to a facility permitted to manage and/or dispose of the waste.

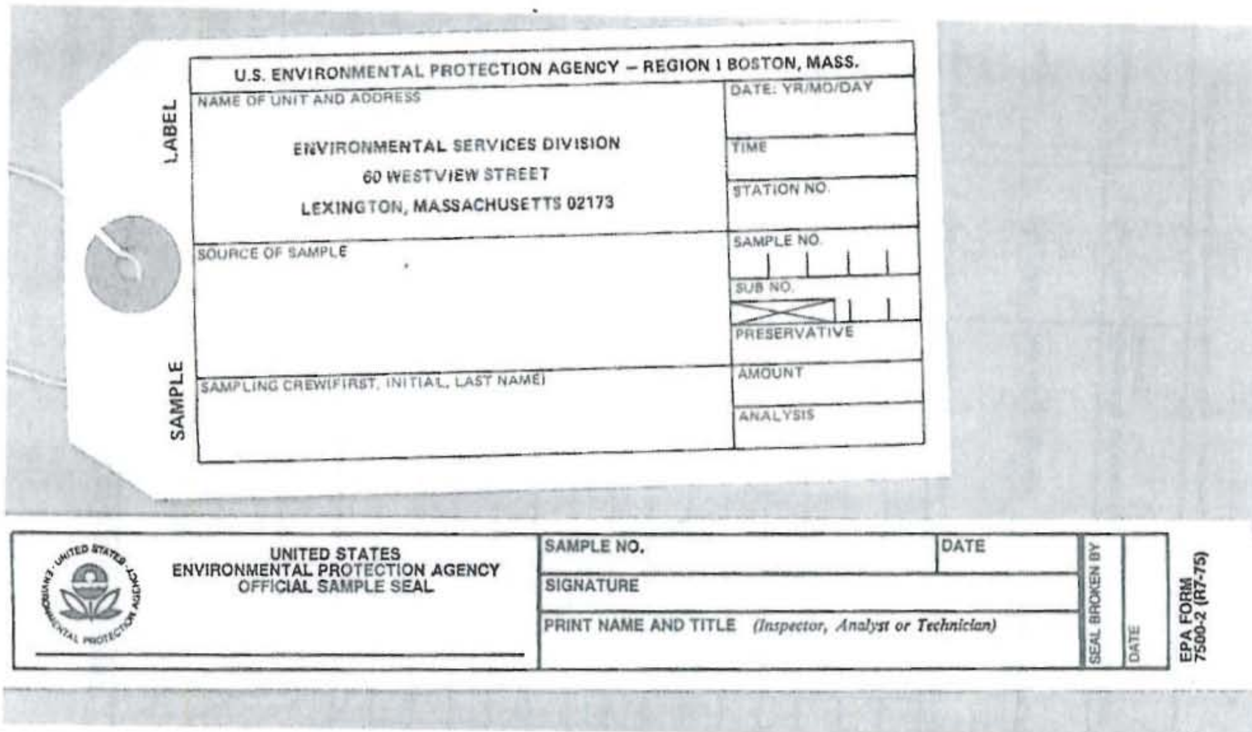
15.0 References

1. Guidance for the Preparation of Standard Operating Procedures for Quality-Related Operations, QA/G-6, EPA/600/R-96/027, November 1995.

2. 40 CFR Part 761 – Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, and Use Prohibitions

3. Sample Container and Holding Time: RCRA SW 846, Chapter 4, Table 4.1, Revision 4, February, 2007.

Example of Sample Label and Custody Seal



LABEL

SAMPLE

U.S. ENVIRONMENTAL PROTECTION AGENCY – REGION I BOSTON, MASS.

NAME OF UNIT AND ADDRESS

ENVIRONMENTAL SERVICES DIVISION
60 WESTVIEW STREET
LEXINGTON, MASSACHUSETTS 02173

DATE: YR/MO/DAY

TIME

STATION NO.

SOURCE OF SAMPLE

SAMPLE NO.

SUB NO.

PRESERVATIVE

SAMPLING CREW(FIRST, INITIAL, LAST NAME)

AMOUNT

ANALYSIS

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
OFFICIAL SAMPLE SEAL

SAMPLE NO.

DATE

SIGNATURE

PRINT NAME AND TITLE *(Inspector, Analyst or Technician)*

SEAL BROKEN BY

DATE

EPA FORM
7500-2 (R7-75)

Example of Chain of Custody Form

ENVIRONMENTAL PROTECTION AGENCY

REGION 1

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME					NO. OF CONTAINERS							REMARKS
SAMPLERS: *(Signature)*													
STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION								

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

1-16940

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Appendix 2: EPA Standard Operating Procedures for Field Equipment Cleaning and Decontamination

Region 4 **U.S. Environmental Protection Agency** **Laboratory Services and Applied Science Division** **Athens, Georgia**	
Operating Procedure	
Title: Field Equipment Cleaning and Decontamination	ID: LSASDPROC-205-R4
Issuing Authority: LSASD Field Branch Chief	
Effective Date: June 22, 2020	Review Due Date: June 22, 2023

Purpose

This procedure is to be used by Region 4 Laboratory Services and Applied Science Division staff . This document describes general and specific procedures, methods and considerations to be used and observed when cleaning and decontaminating sampling equipment during the course of field investigations. This procedure is to be used by all Region 4 Laboratory Services and Applied Science Division (LSASD) staff.

Scope/Application

The procedures contained in this document are to be followed when field cleaning sampling equipment, for both re-use in the field, as well as used equipment being returned to the Field Equipment Center (FEC). On the occasion that LSASD field investigators determine that any of the procedures described in this section are either inappropriate, inadequate or impractical and that other procedures must be used to clean or decontaminate sampling equipment at a particular site, the variant procedure will be documented in the field logbook, along with a description of the circumstances requiring its use. Mention of trade names or commercial products in this operating procedure does not constitute endorsement or recommendation for use.

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1 General Information

1.1 Documentation/Verification

This procedure was prepared by persons deemed technically competent by LSASD management, based on their knowledge, skills and abilities and have been tested in practice and reviewed in print by a subject matter expert. The official copy of this procedure resides on the LSASD Local Area Network (LAN). The Document Control Coordinator (DCC) is responsible for ensuring the most recent version of the procedure is placed on LAN and for maintaining records of review conducted prior to its issuance.

1.2 Definitions

- Decontamination: The process of cleaning dirty sampling equipment to the degree to which it can be re-used, with appropriate QA/QC, in the field.

- Deionized water: Tap water that has been treated by passing through a standard deionizing resin column. At a minimum, the finished water should contain no detectable heavy metals or other inorganic compounds (i.e., at or above analytical detection limits) as defined by a standard inductively coupled Argon Plasma Spectrophotometer (ICP) (or equivalent) scan. Deionized water obtained by other methods is acceptable, as long as it meets the above analytical criteria. Organic-free water may be substituted for deionized water.

- Detergent shall be a standard brand of phosphate-free laboratory detergent such as Liquinox® or Luminox®. Liquinox® is a traditional anionic laboratory detergent and is used for general cleaning and where there is concern for the stability of the cleaned items in harsher cleaners. Luminox® is a specialized detergent with the capability of removing oils and organic contamination. It is used in lieu of a solvent rinse step in cleaning of equipment for trace contaminant sampling. Where not specified in these procedures, either detergent is acceptable.

- Drilling Equipment: All power equipment used to collect surface and sub-surface soil samples or install wells. For purposes of this procedure, direct push is also included in this definition.

- Field Cleaning: The process of cleaning dirty sampling equipment such that it can be returned to the FEC in a condition that will minimize the risk of transfer of contaminants from a site.

- Organic-free water: Tap water that has been treated with activated carbon and deionizing units. At a minimum, the finished water must meet the analytical criteria of deionized water and it should contain no detectable pesticides, herbicides, or extractable organic compounds, and no volatile organic compounds above minimum detectable levels as determined by the Region 4 laboratory for a given set of analyses. Organic-free water obtained by other methods is acceptable, as long as it meets the above analytical criteria.

- Tap water: Water from any potable water supply. Deionized water or organic-free water may be substituted for tap water.

1.3 General Precautions

1.3.1 Safety

Proper safety precautions must be observed when field cleaning or decontaminating dirty sampling equipment. Refer to the LSASD Safety, Health and Environmental Management Program (SHEMP) Procedures and Policy Manual and any pertinent site-specific Health and Safety Plans (HASPs) for guidelines on safety precautions. These guidelines, however, should only be used to complement the judgment of an experienced professional. Address chemicals that pose specific toxicity or safety concerns and follow any other relevant requirements, as appropriate. At a minimum, the following precautions should be taken in the field during these cleaning operations:

- When conducting field cleaning or decontamination using laboratory detergent, safety glasses with splash shields or goggles, and latex gloves will be worn.

- No eating, smoking, drinking, chewing, or any hand to mouth contact should be permitted during cleaning operations.

1.3.2 Procedural Precaution

Prior to mobilization to a site, the expected types of contamination should be evaluated to determine if the field cleaning and decontamination activities will generate rinses and other waste waters that might be considered RCRA hazardous waste or may require special handling.

2 Introduction to Field Equipment Cleaning and Decontamination

2.1 General

The procedures outlined in this document are intended for use by field investigators for cleaning and decontaminating sampling and other equipment in the field. These procedures should be followed in order that equipment is returned to the FEC in a condition that will minimize the risk of transfer of contaminants from a site.

Sampling and field equipment cleaned in accordance with these procedures must meet the minimum requirements for the Data Quality Objectives (DQOs) of the study or investigation. If deviations from these procedures need to be made during the course of the field investigation, they will be documented in the field logbook along with a description of the circumstances requiring the use of the variant procedure.

Cleaning procedures for use at the Field Equipment Center (FEC) are found in LSASD Operating Procedure for Equipment Cleaning and Decontamination at the FEC (LSASDPROC-206).

2.2 Handling Practices 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 solutions:

- Detergent must be kept in clean plastic, metal, or glass containers until used. It should be poured directly from the container during use.

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

- Deionized water must be stored in clean, glass or plastic containers that can be closed for transport. It can be applied from plastic squeeze bottles.

- Organic-free water must be stored in clean glass or Teflon® containers prior to use. It may be applied using Teflon® squeeze bottles, or with the portable system.

2.3 Disposal of Cleaning Solutions

Procedures for the safe handling and disposition of investigation derived waste (IDW); including used wash water and rinse water are in LSASD Operating Procedure for Management of Investigation Derived Waste (LSASDPROC-202).

2.4 Sample Collection Equipment Contaminated with Concentrated Materials

Equipment used to collect samples of concentrated materials from investigation sites must be field cleaned before returning from the study. At a minimum, this should consist of washing with detergent and rinsing with tap water. When the above procedure cannot be followed, the following options are acceptable:

- Leave with facility for proper disposal;

- If possible, containerize, seal, and secure the equipment and leave on-site for later disposal;

- Containerize, bag, or seal the equipment so that no odor is detected and return to the Field Equipment Center.

It is the project leader's responsibility to evaluate the nature of the sampled material and determine the most appropriate cleaning procedures for the equipment used to sample that material.

2.5 Sample Collection Equipment Contaminated with Environmental Media

Equipment used to collect samples of environmental media from investigation sites should be field cleaned before returning from the study. Based on the condition of the sampling equipment, one or more of the following options must be used for field cleaning:

- Wipe the equipment clean;

- Water-rinse the equipment;

- Wash the equipment in detergent and water followed by a tap water rinse.

- For grossly contaminated equipment, the procedures set forth in Section 2.4 must be followed.

Under extenuating circumstances such as facility limitations, regulatory limitations, or during residential sampling investigations where field cleaning operations are not feasible, equipment can be containerized, bagged or sealed so that no odor is detected and returned to the FEC without being field cleaned. If possible, FEC personnel should be notified that equipment will be returned without being field cleaned. It is the project leader's responsibility to evaluate the nature of the sampled material and determine the most appropriate cleaning procedures for the equipment used to sample that material.

2.6 Handling of Decontaminated Equipment

After decontamination, equipment should be handled only by personnel wearing clean gloves to prevent re-contamination. 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.

3 Field Equipment Decontamination Procedures

3.1 General

Sufficient equipment should be transported to the field so that an entire study can be conducted without the need for decontamination. When equipment must be decontaminated in the field, the following procedures are to be utilized.

Note: Equipment utilized for PFAS sampling will not cleaned in the field.

3.2 Specifications for Decontamination Pads

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 known or 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 either easily replaced (disposable) or repairable.

At the completion of site activities, the decontamination pad should be deactivated. The pit or sump should be backfilled with the appropriate material designated by the site project leader, but only after all waste/rinse water has been pumped into containers for disposal. See LSASD Operating Procedure for Management of Investigation Derived Waste (LSASDPROC-202) for proper handling and disposal of these materials. If the decontamination pad has leaked excessively, soil sampling may be required.

3.3 "Classical Parameter" Sampling Equipment

"Classical Parameters" are analyses such as oxygen demand, nutrients, certain inorganic compounds, sulfide, flow measurements, etc. For routine operations involving classical parameter analyses, water quality sampling equipment such as Kemmerers, buckets, dissolved oxygen dunkers, dredges, etc., may be cleaned with the sample water or tap water between sampling locations as appropriate.

Flow measuring equipment such as weirs, staff gages, velocity meters, and other stream gauging equipment may be cleaned with tap water between measuring locations, if necessary.

Note: The procedures described in Section 3.3 are not to be used for cleaning field equipment to be used for the collection of samples undergoing trace organic or inorganic constituent analyses.

3.4 Sampling Equipment used for the Collection of Trace Organic and Inorganic Compounds

For samples undergoing trace organic or inorganic constituent analyses, the following procedures are to be used for all sampling equipment or components of equipment that come in contact with the sample:

3.4.1 Standard LSASD Method

- An optional Liquinox® detergent wash step may be useful to remove gross dirt and soil.
- Clean with tap water and Luminox® detergent using a brush, if necessary, to remove particulate matter and surface films.
- Rinse thoroughly with tap water.
- Rinse thoroughly with organic-free water and place on a clean foil-wrapped surface to **a**ir-dry.
- Wrap the dry equipment with aluminum foil or bag in clean plastic. If the equipment is to be stored overnight before it is wrapped in foil, it should be covered and secured with clean, unused plastic sheeting.

3.4.2 Alternative Solvent Rinse Method

The historical solvent rinse method of cleaning equipment for trace contaminant sampling remains an acceptable method.

- Clean with tap water and Liquinox® detergent using a brush, if necessary, to remove particulate matter and surface films. Equipment may be steam cleaned (Liquinox® detergent and high-pressure hot water) as an alternative to brushing. Sampling equipment that is steam cleaned should be placed on racks or saw horses at least two feet above the floor of the decontamination pad. PVC or plastic items should not be steam cleaned.

- Rinse thoroughly with tap water.

- Rinse thoroughly with deionized water.
- Rinse with an appropriate solvent (generally isopropanol).
- Rinse with organic-free water and place on a clean foil-wrapped surface to **a**ir-dry.
- Wrap the dry equipment with aluminum foil or plastic. If the equipment is to be stored overnight before it is wrapped, it should be covered and secured with clean, unused plastic sheeting.

3.5 Well Sounders or Tapes

The following procedures are recommended for decontaminating well sounders (water level indicators) and tapes. Unless conditions warrant, it is only necessary to decontaminate the wetted portion of the sounder or tape.

- Wash with Liquinox® detergent and tap water.
- Rinse with tap water.
- Rinse with deionized water.

3.6 Redi-Flo2® Pump

CAUTION – Do not wet the controller. Always disconnect power from the pump when handling the pump body.

The Redi-Flo2® pump and any associated connected hardware (e.g., check valve) should be decontaminated between each monitoring well. The following procedures are required, depending on whether the pump is used solely for purging or used for purging and sampling.

3.6.1 Purge Only (Pump and Wetted Portion of Tubing or Hose)

- Disconnect power and wash exterior of pump and wetted portion of the power lead and tubing or hose with Liquinox® detergent and water solution.
- Rinse with tap water.
- Final rinse with deionized water.
- Place pump and reel in a clean plastic bag and keep tubing or hose contained in clean plastic or galvanized tub between uses.

3.6.2 Purge And Sample

Grundfos Redi-Flo2® pumps are extensively decontaminated and tested at the FEC to prevent contamination from being transmitted between sites. The relevant sections of LSASDPROC-206, *Field Equipment Cleaning and Decontamination at the FEC,* should be implemented in the field where a high risk of cross-contamination exists, such as where NAPL or high-concentration contaminants occur. In most cases, the abbreviated cleaning procedure described below will suffice, provided that sampling proceeds from least to most contaminated areas.

- Disconnect and discard the previously used sample tubing from the pump. Remove the check valve and tubing adapters and clean separately (See Section 3.6.3 for check valve). Wash the pump exterior with detergent and water.

- Prepare and fill three containers with decontamination solutions, consisting of Container #1, a tap water/detergent washing solution. Luminox® is commonly used. An additional pre-wash container of Liquinox® may be used; Container #2, a tap water rinsing solution; and Container #3, a deionized or organic-free water final rinsing solution. Choice of detergent and final rinsing solution for all steps in this procedure is dependent upon project objectives (analytes and compounds of interest). The containers should be large enough to hold the pump and one to two liters of solution. An array of 2’ long 2” PVC pipes with bottom caps is a common arrangement. The solutions should be changed at least daily.

- Place the pump in Container #1. Turn the pump on and circulate the detergent and water solution through the pump and then turn the pump off.

- Place the pump in Container #2. Turn the pump on and circulate the tap water through the pump and then turn the pump off.

- Place the pump in Container #3. Turn the pump on and circulate deionized or organic-free water through the pump and then turn the pump off.

- Disconnect power and remove pump from Container #3. Rinse exterior and interior of pump with fresh deionized or organic-free water.

- Decontaminate the power lead by washing with detergent and water, followed by tap water and deionized water rinses. This step may be performed before washing the pump if desired.

- Reassemble check valve and tubing adapters to pump. ALWAYS use Teflon® tape to prevent galling of threads. Firm hand-tightening of fittings or light wrench torque is generally adequate.

- Place the pump and reel in a clean plastic bag.

3.6.3 Redi-Flo2® Ball Check Valve

- Remove the ball check valve from the pump head. Check for wear and/or corrosion, and replace as needed. During decontamination check for free-flow in forward direction and blocking of flow in reverse direction.

- Using a brush, scrub all components with detergent and tap water.

- Rinse with deionized water.

- Rethread the ball check valve to the Redi-Flo2® pump head.

3.7 Mega-Monsoon® and GeoSub® Electric Submersible Pump

As these pumps have lower velocities in the turbine section and are easier to disassemble in the field than Grundfos pumps, the outer pump housing should be removed to expose the impeller for cleaning prior to use and between each use when used as a sampling pump for trace contaminant sampling.

- Remove check valves and adapter fittings and clean separately.
- Remove the outer motor housing by holding the top of the pump head and unscrewing the outer housing from its O-ring sealed seat.
- Clean all pump components per the provisions of section 3.4. Use a small bottle brush for the pump head passages
- Wet the O-ring(s) on the pump head with organic-free water. Reassemble the outer pump housing to the pump head.
- Clean cable and reel per Section 3.4.
- Conduct final rinse of pump with organic-free water over pump and through pump turbine.

3.8 Bladder Pumps

Bladder pumps are presumed to be intended for use as low flow purge-and-sample pumps. The Geotech® bladder pump and Geoprobe Systems® mechanical bladder pump can be cleaned similarly.

- Discard any tubing returned with the pump.

- Completely disassemble the pump, being careful to note the initial position of and retain any springs and loose ball checks.

- Discard pump bladder.

- Clean all parts as per the standard cleaning procedure in Section 3.4.

- Install a new Teflon® bladder and reassemble pump.

3.9 Downhole Drilling Equipment

While LSASD does not currently operate drilling equipment, LSASD personnel do oversee and specify drilling operations. The following procedures are to be used for drilling activities involving the collection of soil samples for trace organic and inorganic constituent analyses and for the construction of monitoring wells to be used for the collection of groundwater samples for trace organic and inorganic constituent analyses.

3.9.1 Introduction

Cleaning and decontamination of all equipment should occur at a designated area (decontamination pad) on the site. The decontamination pad should meet the specifications of Section 3.2 of this procedure.

Tap water brought on the site for drilling and cleaning purposes should be contained in a pre-cleaned tank.

A steam cleaner and/or high pressure hot water washer capable of generating a pressure of at least 2500 PSI and producing hot water and/or steam, with a detergent compartment, should be obtained.

3.9.2 Preliminary Cleaning and Inspection

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 (detergent and high pressure hot water), or wire brushing. Sandblasting should be performed <u>prior to arrival</u> 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 (detergent 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.

- Equipment associated with the drilling and sampling activities should be inspected to insure that all oils, greases, hydraulic fluids, etc., have been removed, and all seals and gaskets are intact with no fluid leaks.

3.9.3 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 (detergent and high pressure hot water) between boreholes.

3.9.4 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 3.4 of this procedure.

- Wash with tap water and detergent, using a brush if necessary, to remove particulate matter and surface films. Steam cleaning (high pressure hot water with detergent) 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 saw horses 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.

- Rinse thoroughly with tap water.

- Remove from the decontamination pad and cover with clean, unused plastic if not used immediately. If stored overnight, the plastic should be secured to ensure that it stays in place.

3.9.5 Field Decontamination Procedure for Direct Push Technology (DPT) Equipment

- Certain specific procedures for the decontamination of DPT tools are described in the various sampling procedures, but the following general guidelines apply:

- Prior to return to the Field Equipment Center, all threaded tool joints should be broken apart and the equipment cleaned per the provisions of *Section 2.5, Sample Collection Equipment Contaminated with Environmental Media* of this procedure.

- Equipment that contacts the sample media and is cleaned in the field for reuse should be cleaned per the provisions of *Section 3.4, Sampling Equipment used for the Collection of Trace Organic and Inorganic Compounds* of this procedure. This would include piston sampler points and shoes, screen point sampler screens and sheaths, and the drive rods when used for groundwater sampling.

- Equipment that does not directly contact the sample media and is cleaned in the field for reuse can generally be cleaned per the provisions of Section *3.7.4, Field Decontamination Procedure for Drilling Equipment* of this procedure.

- Stainless steel SP15/16 well screens require special care as the narrow slots are difficult to clean under even controlled circumstances and galvanic corrosion can release chrome from the screen surface. As soon as possible after retrieval, the screen slots should be sprayed from the outside to break loose as much material as possible before it can dry in place. To prevent galvanic corrosion, the screens must be segregated from the sampler sheaths, drive rods, and other carbon steel during return transport from the field.

3.10 Rental Pumps

Completing a groundwater sampling project may require the use of rental pumps. Rental pumps are acceptable where they are of suitable stainless steel and Teflon® construction. These pumps should be cleaned prior to use using the procedures specified herein and a rinse-blank collected prior to use.

4 References

LSASD Operating Procedure for Management of Investigation Derived Waste, LSASDPROC-202, Most Recent Version

LSASD Operating Procedure for Equipment Cleaning and Decontamination at the FEC, LSASDPROC-206, Most Recent Version

US EPA. Safety, Health and Environmental Management Program Procedures and Policy Manual. Region 4 LSASD, Athens, GA, Most Recent Version

Revision History

The top row of this table shows the most recent changes to this controlled document. For previous revision history information, archived versions of this document are maintained by the LSASD Document Control Coordinator on the LSASD local area network (LAN).

History	Effective Date
LSASDPROC-205-R4, *Field Equipment Cleaning and Decontamination,* replaces SESDPROC-205-R3 **General:** Updated format, Division and Branch names and naming conventions post agency re-alignment. Section 3.1: Added note that PFAS sampling equipment will not be cleaned in the field. Clarified in Section 3.9 that LSASD does not performing drilling activities.	June 22, 2020
SESDPROC-205-R3, *Field Equipment Cleaning and Decontamination*, replaces SESDPROC-205-R2. **Cover Page:** The author was changed to Brian Striggow. LSASD's reorganization was reflected in the authorization section by making John Deatrick the Chief of the Field Services Branch. The FQM was changed from Bobby Lewis to Hunter Johnson. **Revision History:** Changes were made to reflect the current practice of only including the most recent changes in the revision history. **General:** Corrected any typographical, grammatical and/or editorial errors. **Section 1.4:** Differentiate between Liquinox® and Luminox® detergents. **Section 3.4:** Restore solvent rinse as alternative cleaning method. **Section 3.7:** Added section on cleaning of 12 Volt electric submersible pumps. **Section 3.8:** Added section on cleaning of bladder pumps. **Section 3.9:** Added language on cleaning and transport of SP15/16 screens **Section 3.10:** Added section on cleaning of rental pumps	December 18, 2015
SESDPROC-205-R2, *Field Equipment Cleaning and Decontamination*, replaces SESDPROC-205-R1.	December 20, 2011
SESDPROC-205-R1, *Field Equipment Cleaning and Decontamination*, replaces SESDPROC-205-R0.	November 1, 2007

SESDPROC-205-R0, *Field Equipment Cleaning and Decontamination*, Original Issue	February 05, 2007