WORKING COPY

VERIF. DATE: _____

INTIALS: _____

CP4-ES-2302 FRev. 1C	**TITLE**: Collection of Sediment Samples Associated with Surface Water	Page 1 of 9

DOCUMENT CATEGORY: ☐ Administrative ☒ Technical

LEVEL OF USE: ☐ Information Level ☒ Reference Level ☐ Continuous Use

FUNCTIONAL AREA: Characterization (Sampling/Lab) **SUBJECT MATTER AREA:** Characterization	**SUBJECT MATTER EXPERT**: Chris Skinner, Characterization Field Lead
NUCLEAR SAFETY REVIEW DOCUMENTATION: FRNP-23-0348-S, Rev 0	**APPROVED BY/DATE** (Signature on file): Kelly Layne, Laboratory/Characterization Manager 5/30/2023
REQUIRED REVIEW DATE (or expiration date for temporary change): 10/25/2025	**EFFECTIVE DATE**: 6/22/2023

REVISION/CHANGE LOG

Revision/Change Letter	Description of Changes	Pages Affected	Date of Revision/Change
FR0	Initial FRNP release	All	10/20/2017
FR1	General Revision	All	1/17/2018
FR1A	Non-intent change to correct functional area, SME and approver. Updated required review date.	All	8/18/2021
FR1B	Periodic Review has been completed with no changes identified in procedure technical content. Nonintent change to correct FA, SMA, SME, Approver, and dates has been incorporated per CP3-NS-2001. Date for review cycle has been reset	All	10/25/2022
FR1C	Intent Change to update references and address comments	3-9	5/30/2023

TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure describes the standard methods required to collect environmental sediment samples associated with surface water for physical and/or chemical analyses.

1.2 Scope

This procedure applies to Deactivation & Remediation (D&R) contractor personnel, and subcontractor personnel that perform sediment sampling associated with surface water at the Paducah U.S. Department of Energy (DOE)-owned Paducah site.

2.0 REFERENCES

2.1 Use References

- CP2-ES-0006, *Environmental Monitoring Plan Paducah Gaseous Diffusion Plant, Paducah, Kentucky*
- CP3-EN-0227, *Trenching, Excavation and Penetration Permit*
- CP3-RD-0010, *Records Management Process*
- CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*
- CP4-ES-2700, *Logbooks and Data Forms* Chg C
- CP4-ES-2704, *Trip, Equipment and Field Blank Preparation*
- CP4-ES-2702, *Decontamination of Sampling Equipment and Devices*
- CP4-ES-0043, *Temperature Control for Sample Storage*
- CP3-ES-2708, *Chain-of-Custody forms, Field Sample Logs, Sample Labels, and Custody*
- CP3-WM-9503, *Off-Site Shipments by Air Transport*
- CP3-HS-2017, *Safe Work Practices Around Water*

2.2 Source References

- Job Hazard Analysis (JHA) 10438, *Environmental Monitoring Inspections and Sampling of KPDES Outfalls and Streams*

3.0 COMMITMENTS

None

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Precautions

4.1.1 The sampling personnel performing the task of surface water sampling shall comply with the requirements of CP2-HS-2000, *Worker Safety and Health Program for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.

4.1.2 The sampling personnel shall comply with requirements in the Job Hazard Analysis (JHA) and applicable Industrial Hygiene Work Permit(s) (IHWP) and the Radiation Worker Permit (RWP).

4.1.3 Approved safety glasses shall be worn when sampling activities are being performed.

4.1.4 A two-way radio and/or cell phone shall be kept at the sampling site during any sampling event for communication purposes. Chg C

4.1.5 The buddy system must always be used when sampling Outfalls and Streams.

4.1.6 Water depth must be checked before entering.

4.1.7 **DO NOT** enter water that presents a drowning hazard unless approved methods have been discussed with Safety and Health and controls are implemented from CP3-HS-2017, *Safe Work Practices Around Water*.

4.1.8 An Excavation/Penetration Permit is required for all sample locations where penetration is required to a depth greater than six inches below ground surface.

4.2 Limitations

4.2.1 Be aware of changing weather and stream conditions. Chg C

4.2.2 Collect sediment samples for Volatile Organic Compounds (VOC) analysis first to minimize loss of volatiles due to disturbance and off-gassing.

5.0 PREREQUISITES

5.1 Review CP2-ES-0006, *Environmental Monitoring Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (EMP) for the frequency and locations to be sampled and reference any photos, maps, or figures that indicate or show proposed sediment sampling locations, methods to be used, sample types (for example, discrete or composite), and number of samples to be collected. Chg C

5.2 **If** required, **then** notify Radiological Control (RADCON) personnel before initiating sediment sampling to determine required surveys and monitoring. Chg C

5.3 Review JHA-10438, *Environmental Inspections and Sampling of KPDES Outfalls and Streams* before performing sediment sampling activities.

5.4 Obtain an Excavation/Penetration Permit according to CP3-EN-0227, *Trenching, Excavation and Penetration Permit* for all sample locations where penetration is required to a depth greater than six inches below ground surface.

5.5 Label sample containers with known information according to CP3-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals.* Chg C

6.0 INSTRUCTIONS

6.1 General Sampling Requirements

Sampler

6.1.1 Ensure all sampling observations and operations are documented according to CP4-ES-2700, *Logbooks and Data Forms*

6.1.2 Ensure all sampling equipment is decontaminated according to CP4-ES-2702, *Decontamination of Sampling Equipment and Devices*.

6.1.3 Manage sampling waste according to CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*.

NOTE:

Rinsate blanks are **NOT** required when using new disposable sampling equipment.

6.1.4 Prepare the required Quality Control (QC) samples, according to CP4-ES-2704, *Trip, Equipment and Field Blank Preparation*. Chg C

6.1.5 Prepare field logbooks, data forms, and other records according to CP4-ES-2700.

6.1.6 Ensure sampling tools and equipment are protected from sources of contamination by wrapping in aluminum foil, sealing in plastic or other storage containers, or placing on plastic sheeting in staging area.

6.1.7 Ensure disposable sampling equipment is new and unused.

6.1.8 Ensure only new and certified pre-cleaned sample containers are used for each sampling event.

6.2 Collection of Sediment Samples

Sampler

NOTE:

Before sampling, sample locations are surveyed by RADCON and/or Safety personnel as necessary.

6.2.1 Locate proposed sample points as described in the current EMP using photos, maps, and/or figures.

6.2.2 Use a disposable or decontaminated stainless-steel scoop or spoon for each sample.

NOTES:

Samples are collected by wading in the water, if the surface water body is shallow.

A stainless steel scoop or spoon attached to an extension pole is used either from the banks of the water body or from a boat if the surface water body is too deep to wade.

Samples are collected from quiet areas in the surface water body where sediment tends to deposit.

Chg C

6.2.3 Collect sediment samples by wading in the surface water body while facing upstream into the current.

6.2.4 Collect sample from quiet pools where sediment has accumulated in the surface water body in an upstream direction.

6.2.5 Carefully decant excess water from the scoop or spoon to minimize the loss of the sediment fines.

6.2.6 Collect sediment from the sample area until an adequate sample volume has been obtained.

6.2.7 Process each sample according to Section **6.3**.

6.2.8 **If** the location is to be civil surveyed, **then** label **and** stake the location using a survey pin flag or survey stake **and** record the information.

6.2.9 Repeat Steps **6.2.3** through **6.2.8** as necessary until all sediment samples have been collected at the sample site.

6.3 Sediment Sample Processing

Sampler

NOTES:

The type of sediment sample collected may be a discrete sample or a composite sample. Each of these sample types is processed in a manner to ensure the sample is representative of the source media.

Samples to be analyzed for VOCs are placed directly in the sample container without mixing.

6.3.1 **If** requested, **then** observe and document the sediment description on the sample data form.

Chg C

6.3.2 **Except** for VOC analysis, collect the sediment in a stainless steel or glass bowl.

6.3.3 **When** collecting VOC samples, minimize the headspace by completely filling the sample containers with sediment.

6.3.4 Collect sediment aliquots in the same manner and of generally equal proportion.

NOTE:

When round bowls are used for sample mixing, adequate mixing is achieved by stirring the material in a circular fashion, reversing direction, and occasionally turning the material over.

6.3.5 Ensure aliquots are well mixed to ensure the sample is representative of the source material:

6.3.6 Transfer sediment samples into sample containers using appropriate equipment (stainless steel or Teflon® spoon, spatula, or disposable scoop) and securely tighten lid.

6.3.7 Record any remaining information on the sample label.

6.3.8 Seal sample containers **and** affix custody seals according to CP3-ES-2708. Chg C

6.3.9 Store sample containers in a cooler with ice or blue ice to maintain the preservation temperature as required.

6.3.10 Record all field observations and sampling methods according to CP4-ES-2700.

6.4 Post-Sampling Activities

Sampling Lead and Sampler

6.4.1 Complete the Chain of Custody (COCs) and sample labels according to CP3-ES-2708.

6.4.2 Ensure sample information is documented according to CP4-ES-2700.

Chg C

6.4.3 Inspect reusable sampling equipment to ensure gross quantities of sample material have been removed.

6.4.4 **If** gross quantities of sample material can **NOT** be removed from the reusable sampling equipment, **then** handle the reusable sampling equipment as non-fissile waste according to CP3-WM-1037.

6.4.5 Decontaminate sampling equipment according to CP4-ES-2702 **and** record the event on CP4-ES-2702 F01.

6.4.6 Dispose of all waste generated from sampling activities in accordance with CP3-WM-1037.

7.0 ACCEPTANCE CRITERIA

None

8.0 POST PERFORMANCE WORK ACTIVITIES

8.1 Maintain custody of the samples according to CP3-ES-2708 until samples are transferred to the laboratory for analysis as soon as possible.

8.2 Ensure that the temperature of the sample(s) is maintained according to CP3-ES-0043, *Temperature Control for Sample Storage.* Chg C

8.3 **If** samples contain radiological material**, then** coordinate with RADCON, **and** release the sample(s) and related COC documentation for further handling according to CP3-WM-9503, *Off-Site Shipments by Air Transport.*

8.4 Prepare samples for shipment off-site and ship according to CP3-WM-9503.

8.5 Submit a copy of the COCs and logbook pages/sample data forms to the Sample Management Office (SMO) for entry into PEMS.

9.0 RECORDS

9.1 Records Generated

The following records may be generated by this procedure:

- Field Log Entries
- Data Form Entries

9.2 Records Disposition

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

Appendix A – Acronyms/Definitions

ACRONYMS

COC – Chain of Custody

D&R – Deactivation and Remediation

DOE – U.S. Department of Energy

EMP – Environmental Monitoring Plan

JHA – Job Hazard Analysis

RADCON – Radiological Control

SMO – Sample Management Office

VOC – Volatile Organic Compounds

QC – Quality Control

Chg C

DEFINITIONS

COMPOSITE SAMPLE – A sample that consists of a number of discrete sediment samples collected from a body of material and mixed before analysis. The objective of sediment sample compositing is to represent the average condition of the sampled sediment.

Chg C

DISCRETE SAMPLE - A sample collected from one specific horizontal and vertical interval (usually 6 inches) that is not mixed with sediment aliquots from other locations.

Chg C