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CP4-ES-0040 **FRev. 1**	**TITLE**: Composite Sampling	Page 1 of 10

DOCUMENT CATEGORY: ☐ Administrative ☒ Technical

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

FUNCTIONAL AREA: Environmental Services **SUBJECT MATTER AREA:** Sampling	**SUBJECT MATTER EXPERT**: Jeff Bennett, Sampling Operations Supervisor
NUCLEAR SAFETY REVIEW DOCUMENTATION: FRNP-18-0019-D	**APPROVED BY/DATE** (Signature on file): Pam Baird, Characterization Manager, 1/09/18
REQUIRED REVIEW DATE (or expiration date for temporary change): 1/09/2021	**EFFECTIVE DATE**: 1/11/18

REVISION/CHANGE LOG

Revision/Change Letter	Description of Changes	Pages Affected	Date of Revision/Change
FR1	Initial FRNP release	All	10/20/17
FR1	General revision	All	1/09/18

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure describes methods for the sampling of non-fissile composite samples.

1.2 Scope

This procedure shall be used by the Deactivation & Remediation (D&R) contractor personnel, and subcontractor personnel for sampling of non-fissile material at the U.S. Department of Energy (DOE)-owned Paducah site.

2.0 REFERENCES

2.1 Use References

- CP2-HS-2000, *Worker Safety, and Health Program*
- CP2-SM-1000, *Activity Level Work Planning and Control Program*
- CP4-ES-2700, *Logbooks and Data Forms*
- CP4-ES-2704, *Trip, Equipment and Field Blank Preparation*
- CP3-WM-1037, *Generation and Temporary Storage of Waste Materials.*
- CP3-WM-9503, *Off-Site Shipments by Air Transport*
- CP4-ES-2702, *Decontamination of Sampling Equipment and Devices*
- CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals*

2.2 Source References

- CP3-ES-5003, *Quality Assured Data*
- CP4-ES-2203, *Surface Water Sampling*
- CP4-ES-2300, *Collection of Soil Samples*
- CP4-ES-2302, *Collection of Sediment Samples Associated with Surface Water*
- CP2-WM-0001, *FRNP Waste Management Plan*
- CP3-RP-1109, *Radioactive Contamination Control and Monitoring*
- EPA/540/P-87/001, December 1987. *A Compendium of Superfund Field Operations Methods*, U.S. Environmental Protection Agency, OSWER Directive 9355.0-14
- U.S. Environmental Protection Agency, Region 4, Environmental Compliance Branch, 1996 Document, *Standard Operating Procedures and Quality Assurance Manual*

3.0 COMMITMENTS

None

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Precautions

4.1.1 The sampling team performing the task of composite sampling shall comply with the requirements of CP2-HS-2000, *Worker Safety and Health Program*, and any job hazard analyses (JHAs) that address safety and health.

4.1.2 The sampling team also shall comply with additional requirements as described in the JHA; task-specific work package (WP), if applicable; and the radiological work permit (RWP) if required.

4.1.3 **If** there is a potential risk of a dangerous chemical reaction, **then** composite samples should **NOT** be collected.

4.1.4 Ensure that approved eyewash is available and operational near the work location.

4.1.5 Keep a two-way radio and/or cell phone at the sampling site during any sampling event for communication purposes. Use only intrinsically safe radios, cell phones, etc., when working in facilities or areas that may contain a potentially explosive atmosphere.

4.1.6 Ensure that a minimum of two people are always present and within visual range of each other at all times during any sampling activity.

4.1.7 Extreme weather conditions may limit or preclude the conduct of certain types of fieldwork. Avoid outdoor sampling during dusty or wet conditions to prevent changing the composition of the material being sampled or contamination of the surrounding area.

4.2 Limitations

4.2.1 Composite samples normally are **NOT** an acceptable means of collecting samples to be analyzed for volatile organic compound (VOCs), semi volatile organic compound (SVOC), and dissolved gases.

4.2.2 Composite samples shall **NOT** be collected when the measure of contamination variation as a function of the location is important.

4.2.3 Composite samples are average values that are useful in estimating overall site properties. They are **NOT** representative of the variability of contaminant levels at specific locations.

4.2.4 Comply with all posted requirements pertaining to any given sampling location, if applicable.

5.0 PREREQUISITES

NOTE:

Issue any required permits (for example, excavation or penetration permit due to underground lines or utilities, etc.).

5.1 Perform planning and coordination of work activities in accordance with CP2-SM-1000, *Activity Level Work Planning and Control Program*, and incorporate principles, which are designed to maintain a safe and effective work and physical environment; and that control exposure to chemical, radiological and physical stress consistent with established PGDP D&R Contractor and DOE standards, procedures, and orders.

5.2 Obtain chain-of-custody forms, field sample logs, sample labels, and custody seals as necessary from Sample Management Office (SMO).

5.3 Prepare quality control samples according to CP4-ES-2704, *Trip, Equipment and Field Blank Preparation*, if applicable.

5.4 Prior to the start of field activities, notify the following parties:

- Facility Manager
- Industrial Safety Specialist
- Radiological Control (RADCON)

5.5 Limit preparation and collection of samples to those individuals who have the necessary training and are knowledgeable of field procedures applicable to the collection of samples.

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

6.0 INSTRUCTIONS

6.1 General Requirements

<u>Sampler</u>

NOTE:

The use of the Global Positioning Satellite (GPS) system may be utilized to survey and stake sampling locations and to determine appropriate sampling requirements.

6.1.1 Place clean plastic sheeting on a flat and level surface near the sampling area, if possible.

6.1.2 Unless new, verify that all reusable sampling equipment has been decontaminated prior to use.

6.1.3 **If** prior decontamination of sampling equipment cannot be verified, **then** decontaminate the equipment according to CP4-ES-2702, *Decontamination of Sampling Equipment and Devices*, prior to use.

6.1.4 Place decontaminated equipment to be used on the plastic **and** place the sample cooler(s) on separate plastic sheeting, if necessary.

6.1.5 Cover all equipment and supplies with clean plastic sheeting when **NOT** in use.

6.1.6 **If** sampling locations **CANNOT** be sampled due to a physical obstruction, **then** contact the FLM to notify the SMO that a change in sample location is needed.

6.1.7 **When** the sample management office (SMO) approves the changes, document the change in the field logbook or sample data form according to CP4-ES-2700, *Logbooks and Data Forms*.

6.2 Composite Sampling

NOTE:
Sample portions or aliquots collected for volatile analyses and/or any other analyses degraded by aeration should be collected first.

Sampler

6.2.1 Complete composite sampling based upon one of the following methods selected:

- Surface Soil, Sludge, and Sediment Compositing
- Subsurface Soil Compositing
- Surface Water Compositing
- Surface Water Timed Compositing

6.3 Surface Soil, Sludge, and Sediment Compositing

Sampler

6.3.1 **If** applicable, **then** consult the site-specific Sampling Analysis Plan or Sampling and Analysis Event Plan (SAP/SAEP) for composite sample frequency, location, and techniques. Follow guidance herein if technique is **NOT** described in the plan.

6.3.2 Document the sampling events by recording the information in the logbook according to procedure CP4-ES-2700 or appropriate Project Environmental Measurement System (PEMS) generated sample data form.

6.3.3 Clear away any vegetation or debris from the sampling location surface.

6.3.4 Carefully remove the top ½ to ¾ inch of exposed soil, sediment, or sludge before sample collection **unless** the SAP/SAEP indicates otherwise.

6.3.5 Collect equal volumes from each of the specified sampling locations. The volume of each sample must be at least the amount required for a single sample.

6.3.6 Thoroughly homogenize using a stainless steel spatula or other appropriate equipment.

6.3.7 Place appropriate labels on the sample containers **as** directed in the site-specific SAP/SAEP.

6.3.8 Transfer subsamples of the composited sample into the appropriate sample containers **and** seal the container.

6.3.9 Wipe the containers clean according to CP4-ES-2702.

6.3.10 Ensure sample bottle closure lids are properly secured **and** place the samples in a cooler with blue ice or bagged ice, if required prior to transport to storage locations.

6.3.11 Complete chain-of-custody (COC) forms as described in CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals.*

6.4 Subsurface Soil Compositing

Sampler

6.4.1 **If** applicable, **then** consult the site-specific SAP/SAEP for composite sample frequency, location, and techniques. Follow guidance herein if technique is **NOT** described in the plan.

6.4.2 Document the sampling events by recording the information in the logbook according to procedure CP4-ES-2700, or on the appropriate PEMS generated sample data form.

6.4.3 Clear away any vegetation or debris from the sampling location surface.

6.4.4 Place plastic sheeting over the boring location so soil cuttings have minimal contact with the ground surface prior to containerization.

6.4.5 Place the soil samples in an appropriate container, making sure that equal amounts of sample from each depth or location are used.

6.4.6 Thoroughly homogenize using a stainless steel spatula or other appropriate equipment.

6.4.7 Place appropriate labels on the sample containers **as** directed in the site-specific SAP/SAEP.

6.4.8 Transfer subsamples of the composited sample into the appropriate sample containers **and** seal the container.

6.4.9 Wipe the containers clean according to CP4-ES-2702.

6.4.10 Ensure sample bottle closure lids are properly secured **and** place the samples in a cooler with blue ice or bagged ice, if required prior to transport to storage locations.

6.4.11 Complete COC forms as described in CP4-ES-2708.

6.5 Surface Water Compositing

Sampler

6.5.1 **If** applicable, **then** consult the site-specific SAP/SAEP for composite sample frequency, location, **and** techniques. Follow guidance herein if technique is not described in the plan.

6.5.2 Document the sampling events by recording the information in the logbook according to procedure CP4-ES-2700, or on the appropriate PEMS generated sample data form.

6.5.3 Collect equal volumes from each sample location. The volume of each sample must be at least the amount required for a single sample.

6.5.4 Place appropriate labels on the sample containers **as** directed in the site-specific SAP/SAEP.

6.5.5 Transfer subsamples of the composited sample into the appropriate sample containers **and** seal the container.

6.5.6 Wipe the containers clean according to CP4-ES-2702.

6.5.7 Ensure sample bottle closure lids are properly secured **and** place the samples in a cooler with blue ice or bagged ice, if required prior to transport to storage locations.

6.5.8 Complete COC forms as described in CP4-ES-2708.

6.6 Surface Water Timed Compositing

Sampler

6.6.1 Consult the site-specific SAP/SAEP for composite sample frequency, location, and techniques, if applicable. Follow guidance herein if technique is NOT described in the plan.

6.6.2 Document the sampling events by recording the information in the logbook according to procedure CP4-ES-2700, or on the appropriate PEMS generated sample data form.

6.6.3 Use automated Environmental Monitoring Sampler (EMS) to determine mass-per-unit time concentrations **and** to identify sporadically discharged contaminants from outfalls or streams. The system can be used for basins, ponds, pools, lakes, or streams.

NOTE:
A refrigerated jar or EMS is required **if** samples should be at 4°C.

6.6.4 To minimize disturbance of sediment, place the automated EMS with the sample collection jar near the specified sample point.

6.6.5 Set mechanisms on the EMS to collect a selected volume at the desired time frequency (for example, 250 mL of the total discharge at the same time each hour).

6.6.6 Place appropriate labels on the sample containers **as** directed in the site-specific SAP/SAEP.

6.6.7 Transfer subsamples of the composited sample into the appropriate sample containers **and** seal the container.

6.6.8 Wipe the containers clean according to CP4-ES-2702.

6.6.9 Ensure sample bottle closure lids are properly secured **and** place the samples in a cooler with blue ice or bagged ice, if required prior to transport to storage locations.

6.6.10 Complete COC forms as described in CP4-ES-2708.

7.0 ACCEPTANCE CRITERIA

None

8.0 POST PERFORMANCE WORK ACTIVITIES

Sampler

8.1.1 **If** required, **then** submit sample containers for radiation surveys to be performed by a RADCON

8.1.2 Coordinate with RADCON, **and** release the sample(s) and related COC documentation to the Transportation Specialist, for further handling in accordance with CP3-WM-9503, *Off-Site Shipments by Air Transport*.

8.1.3 Prepare samples for shipment off-site according to CP3-WM-9503.

8.1.4 Decontaminate any non-disposable water sampling equipment, tools, or supplies in accordance with CP4-ES-2702.

8.1.5 Collect any waste generated by the decontamination process.

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

8.1.7 Submit a copy of the COC forms and logbook pages/data forms to the Sample Management Office for entry into the PEMS.

Sample Management Group

8.1.8 Enter field parameters into the PEMS database to identify sample date, time, and other information related to sample collection.

9.0 RECORDS

9.1 Records Generated

The following records may be generated by this procedure:

- COC forms
- Logbooks
- Miscellaneous Sample Data Form

Forms are to be completed in accordance with CP3-OP-0024, *Forms Control*.

9.2 Records Disposition

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

Appendix A – Acronyms/Definitions

ACRONYMS

COC - Chain of Custody

DOE - U.S. Department of Energy

EMS - Environmental Monitoring Sampler

GPS - Global Positioning Satellite

JHA - Job Hazard Analysis

PEMS - Project Environmental Measurements System

RADCON – Radiological Control

RWP - Radiological Work Permit

SAEP – Sampling and Analysis Event Plan

SAP - Sampling and Analysis Plan

SMO - Sample Management Office

SVOC - Semi Volatile Organic Compound

VOC - Volatile Organic Compound

WP - Work Package

DEFINITIONS

Composite Samples - Samples that consist of two or more subsamples taken from a specific media and locations at a specific point in time. The subsamples are collected and mixed and a single average sample is taken from the mixture.

PEMS Generated Forms - Forms can include COCs, labels, and sample data forms.