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CP4-ES-5004 FRev. 1A	**TITLE:** Sample Tracking, Lab Coordination, and Sample Handling	Page 1 of 11

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REVISION/CHANGE LOG

Revision/Change Letter	Description of Changes	Pages Affected	Date of Revision/Change
FR0	Bluesheet	ALL	10/20/17
FR1	Non-intent to incorporate bluesheet.	ALL	12/5/17
FR1A	Added source reference, added step 6.1.8 regarding controls required in SOW to fulfill NCSR-FRNP-17-001 to section 6.0 and added acronym to Appendix A.	4,6,7,11	6/21/18

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure describes the process for coordinating analytical services, sample collection and analysis, tracking sample shipment and analysis, maintaining a repository of sample data records, and use of Project Environmental Measurements System (PEMS).

1.2 Scope

This procedure applies to all sampling and analysis activities performed by the Paducah Gaseous Diffusion Plant Deactivation and Remediation (PGDP D&R) personnel and subcontractors at the United States Department of Energy (DOE)-owned Paducah site.

2.0 REFERENCES

2.1 Use References

- CP3-ES-5003, *Quality Assured Data*
- CP3-WM-1037, *Generation and Temporary Storage of Waste Material*
- CP3-WM-3015, *Waste Packaging*
- CP3-WM-9503, *Off-Site Shipments by Air Transport*
- CP4-ER-0012, *Groundwater Acceptance at the C-612 Northwest Plume Groundwater System*
- CP4-ES-2700, *Logbooks and Data Forms*
- CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals*
- NCSE 058, *Nuclear Criticality Safety Evaluation for the Drain System in the C-710 Facility at the Paducah Gaseous Diffusion Plant*

2.2 Source References

- BJC/PAD-141, *Paducah Gaseous Diffusion Plant, Department of Energy National Emission Standards for Hazardous Air Pollutants (NESHAP) Management Plan*
- CP2-ES-0006, *Environmental Monitoring Plan Fiscal Year 2016, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*
- CP2-ES-0103, *Environmental Radiation Protection Program*
- CP3-SM-0017, *Measuring and Test Equipment Program*
- CP3-ES-1034, *Nuclear Criticality Safety Requirements for Sample Labeling, Handling and Assay Smears*
- CP3-WM-1036, *Nuclear Criticality Safety Implementation Requirements for Handling and Storage of Fissile Waste*
- CP4-ES-0043, *Temperature Control for Sample Storage*
- CP4-ES-2704, *Trip, Equipment and Field Blank Preparation*

- Federal Register, 40 Code of Federal Regulations Part 136.3

- NCSR-FRNP-17-001, *Addressing Common Mode Failures of Independent Samples Sent Offsite for Analysis* | Chg A

3.0 COMMITMENTS

None

4.0 RESPONSIBILITIES

4.1 Project Manager

Coordinates sample collection, sample analysis, data assessment, and decision-making. Project manager has ultimate responsibility but designated representative may include the following:

- Technical lead
- Risk assessor
- Waste management coordinator
- Compliance coordinator
- Individual that needs data to support decision- making

4.2 Quality Assurance (QA) Reviewer

Reviews data to ensure that data quality requirements are met.

4.3 Sampler

4.3.1 Ensures collection and delivery of samples to appropriate laboratory.

4.3.2 Ensures that field records (field logbook and/or sample data forms, and chain-of-custody [COC] records) are complete.

4.3.3 Communicates final disposition of "hold samples" or returned samples to the Sample Management Office.

4.4 Sample Management Office (SMO)

4.4.1 Ensures long-term electronic storage of data.

4.4.2 Performs loading of Electronic Data Deliverables (EDDs).

4.4.3 Performs electronic verification of data.

4.4.4 Ensures compliance with applicable Data Management Implementation Plan.

4.4.5 Maintains tracking system for samples.

4.5 Scientist

4.5.1 Serves as the primary contact for all matters relating to the analytical laboratories.

4.5.2 Creates statements of work (SOW).

4.5.3 Contracts laboratory services.

4.5.4 Performs contractual screenings.

5.0 GENERAL INFORMATION

None.

6.0 INSTRUCTIONS

6.1 Sample Collection, Sample Shipment, and Sample Receipts

Project Manager

6.1.1 Provide the SMO with analytical requests using an appropriate template (Quality Assurance Project Plan, Sample Analysis Plan, Sample Request Form, or email containing pertinent information related to sampling analyses and requirements).

6.1.2 Instruct personnel that questions relating to sample results and sample material should be vetted through the SMO.

6.1.3 Ensure that CP3-ES-5003, *Quality Assured Data*, is followed throughout the sample collection process to ensure data quality.

Scientist

6.1.4 Establish Paducah PEMS for use during sample collection, if applicable.

6.1.5 Log the project into the Paducah Analytical Project Tracking System.

6.1.6 Prepare the laboratory SOW based on analytical request received from Project Manager.

NCSE 058

6.1.7 **If** preparing an SOW for the C-712 Neutralization Pit, **then** ensure the following is included in the SOW:

A. **If** samples contain water and sediment **then**;

1. Allow water and sediment to settle for 24 hrs.

2. After sediment has settled; decant free-flowing water.

3. Transfer sediment and any remaining liquid to a graduated cylinder.

4. Allow sediment to settle for approximately 30 minutes.

5. Record the volume of the sediment.

6. Adjust to desired volume in graduated cylinder.

7. Transfer contents of graduated cylinder to new sample container.

8. Analyze sediment material.

9. Report results in grams Uranium per Liter (gU/L) for the total volume of sediment in step **6.1.7.5.**

B. **If** samples do not contain sediment **then**

1. Analyze sample.

2. Report results in grams Uranium per Liter (gU/L) for the total sample.

C. **If** any sample has concentration > **5 gU/L**, **then** notify SMO immediately.

NCSR-FRNP-17-001

6.1.8 **If** preparing an SOW for Nuclear Criticality Safety (NCS) assay smears **or** NCS bulk assay samples, then ensure the following controls are included in the SOW in order to ensure independence of samples is maintained:

> NOTE:
>
> Independent Samples: Samples which are capable of providing the value of a parameter with no single point failure which would invalidate the results.
>
> Independent Analysts: Two different individual analysts that, while performing analyses, do not rely upon observed actions of / or assist the other individual analyst performing sample preparation, analysis, calculation, data entry or review of the independent sample **or** one analyst that completes sample preparation, analysis, calculation, data entry, and review of first "A" sample before starting second "B" sample on different day.

A. Sample receipt

1. Ensure both samples have been assigned one unique customer sample number.

2. Ensure one sample has an "A" designator and the independent sample has a "B" designator.

3. **If** samples are **not** labeled properly, **then** do **not** analyze.

   - Request a new sample.

Chg A

B. Preparation of Samples

1. **If** complete sample is not used for analysis (e.g., bulk) **then** ensure a representative aliquot is used by homogenizing sample material before aliquot is taken for analysis.

2. Ensure the samples with an "A" designator will be prepared by an analyst who is independent from the analyst who prepares the samples with a "B" designator.

3. **If** a single analyst prepares both sets of samples, **then** the samples with an "A" designator will be prepared on a different day from the samples with a "B" designator.

C. Analyzing Samples

1. Ensure A **and** B samples are analyzed on different instruments by different analysts **or**:

   a) If both "A" **and** "B" samples are analyzed on a single instrument **then** ensure analysis is performed on different days or by different analysts.

   b) If both "A" **and** "B" samples are analyzed by a single analyst **then** ensure the samples are analyzed on different days **and** results from the first analysis is entered into a laboratory information management system database **before** performing the second analysis. Chg A

D. Instrument Controls

1. Ensure calibration standards are **not** from same parentage as continuing calibration verification (CCV) standards.

2. Ensure appropriate quality control (QC) samples (e.g., blanks, duplicates, spikes) are analyzed with each batch.

3. Using a control standard (e.g., CCV) ensure laboratory instrument response is within 3 sigma of the calibrated instrument response **before** and **following** each measurement session.

4. Ensure "A" and "B" samples are **not** analyzed in the same measurement session.

5. Do **not** consider the results of an analysis valid **until** the final check of instrument has been satisfactorily completed with a standard.

E. Data Approval

1. Ensure review/approval of data entry into the laboratory information management system database is performed by an independent person **not** responsible for analyzing the sample. Chg A

F. Data Reporting

NOTE: Verbal relay of the analytical results is prohibited.

1. **If** sample results are manually entered into the laboratory information management system database **then** ensure results are correctly entered by an independent person.

2. **If** the same analyst is to perform both analyses **then** the result from the first sample shall be entered into the appropriate laboratory information management system database before the second analysis is performed.

6.1.9 Determine the analytical laboratory to be used.

6.1.10 Provide SOW to laboratory for review and approval.

6.1.11 Provide additional information requested by the laboratory, if applicable.

6.1.12 Request the sample container and preservative requirements from laboratory.

6.1.13 Request sample containers with appropriate preservatives to be shipped from laboratory.

6.1.14 Specify the quality control (QC) samples (such as trip blank, field blanks, equipment rinsates, or field duplicates) that are identified by using CP3-ES-5003, *Quality Assured Data.*

Sampler

6.1.15 Develop sampling schedule and train staff on proper procedures for sample identification, custody, and labeling.

NOTE:

Deactivated chains for "hold samples" are to document the disposal path for the sample.

6.1.16 Ensure that COC forms for samples, including "hold samples", are properly completed (or deactivated) according to CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals.*

6.1.17 Ensure that logbooks and/or sample data forms are properly completed according to CP4-ES-2700, *Logbooks and Data Forms.*

NOTE:

Proper radioactive screening tests and U.S. Department of Transportation approvals may be required prior to shipping samples off-site.

6.1.18 **If** applicable, **then** coordinate shipment or delivery of samples to the appropriate laboratory in accordance with CP3-WM-9503, *Off-site Shipments by Air Transport.*

6.1.19 Retain any samples that are collected and not submitted to a laboratory ("hold samples") using proper preservation and storage conditions until notified by the SMO for decision on additional analysis.

NOTE:

Samples are not considered or managed as waste by way of a RCRA exemption until determined to be no longer needed.

A disposal path for "hold samples" is required in advance to ensure that samples are managed quickly and compliantly.

6.1.20 Consult with Waste Engineer and/or regulatory compliance for proper waste disposal/storage of "hold samples" in advance to establish a proper disposal path.

6.1.21 **If** "hold samples" are no longer needed, **then** dispose of "hold samples" in accordance with regulatory compliance guidelines and/or existing procedures (CP4-ER-0012, *Groundwater Acceptance at the C-612 Northwest Plume Groundwater System*).

Scientist

6.1.22 Ensure the laboratory received the samples.

6.1.23 Log the date that the sample was received by the laboratory into Paducah PEMS.

6.1.24 Track the receipt of electronic data deliverables and laboratory data packages.

6.1.25 Perform contractual screening on all deliverables.

6.1.26 **If** validation is required, **then** prepare a validation SOW **and** send laboratory data packages to the data validator.

6.1.27 Provide the data assessment package to the data reviewer, in order to perform data assessment.

QA Reviewer

6.1.28 Perform a Quality Assurance review on data assessment packages as required.

Data Entry Specialist/Scientist

6.1.29 Ensure all comments or issues have been resolved.

6.1.30 Electronically load analytical data from Paducah PEMS database into Paducah Oak Ridge Environmental Information System (OREIS).

6.1.31 Ensure all applicable emails **and** required forms are included in the data assessment package.

6.1.32 Submit completed data assessment package and applicable laboratory data packages to Records Management.

Sample Management Office

6.1.33 Utilize a tracking system to denote if a sample is to be disposed by the laboratory **or** if the sample is to be returned to PGDP D&R.

6.1.34 Provide the Project Manager, the Samplers, and the Waste Generator Manager with a listing of

samples to be returned.

6.1.35 **If** the project is considered closed, **then** notify Waste Generator Manager.

> NOTE:
>
> Approval is to be obtained by Project Manager, Samplers, and Waste Generator Manager before samples can be returned.

6.1.36 Notify the laboratory that samples are ready for return.

Sampler

> NOTE:
>
> Upon return of samples, samples will be managed as waste by the Project Manager in accordance with CP3-WM-1037, *Generation and Temporary Storage of Waste Material* and CP3-WM-3015, *Waste Packaging*.
>
> Samples shipped to a laboratory are **NOT** candidates for RCRA waste consideration via an exemption.
>
> A disposal path for samples returning from the lab is required in advance to ensure that samples are managed quickly and compliantly.

6.1.37 Receive the sample shipment **and** notify Project Manager.

6.1.38 **If** project is closed, **then** notify Waste Generator Manager.

6.1.39 Notify SMO of the sample receipt **and** final disposition of the samples.

Sample Management Office

6.1.40 Document in the tracking system that samples have been received from the laboratory **and** applicable disposition information.

6.1.41 Confirm that all samples associated with the project have been denoted in the tracking system as follows:

- Disposed and/or consumed by the laboratory
- Disposed by PGDP D&R as a returned sample
- Disposed by PGDP D&R as a "hold sample"

7.0 RECORDS

7.1 Records Generated

The following records may be generated by this procedure:

- COC forms
- Logbooks and/or sample data forms
- Data assessment packages

- Laboratory data packages

7.2 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 – United States Department of Energy

EDD – electronic data deliverable

NCS– nuclear criticality safety

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OREIS – Paducah Oak Ridge Environmental Information System

PEMS – Project Environmental Measurements System

PGDP D&R– Paducah Gaseous Diffusion Plant Deactivation and Remediation

QA- quality assurance

QC- quality control

SMO – sample management office

SOW – statement of work

DEFINITIONS

Contractual Screening – A process of evaluating a set of data against the requirements specified in the SOW to ensure that all requested information is received. The contractual screening includes, but is **NOT** limited to, the COC, analytes requested, method used, electronic data deliverables, units, holding times, and reporting limits achieved.

Hold Samples – Samples that are collected for the purpose of potential analysis, generally dependent upon the results of a preceding screening sample. Hold Samples are collected and retained using proper preservation and are tracked in Paducah PEMS as any other active sample unless disposed.

Paducah Analytical Project Tracking System – A Paducah system developed to track sampling requests and projects by assigning either a system generated project number for some programs or allowing the user to assign a unique project number. The system is maintained by the SMO to track various information about the event such as the charge number, sampling time frame, status,etc.

Paducah PEMS – The data management system that supports the project's sampling and data management activities. The system generates COC forms, bottle labels, and field forms; tracks sampling progress, and stores project specific data.