

VERIF. DATE: _____

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DOCUMENT CATEGORY: Technical		LEVEL OF USE: ☒ Reference Level ☐ Continuous Use
Check all that apply: TSR/NCS ☐ WCO ☐ Shared Site ☐		
FUNCTIONAL AREA: Characterization (Sampling/Lab) SUBJECT MATTER AREA: Characterization		SUBJECT MATTER EXPERT: Chris Skinner, Field Sampling Manager
NUCLEAR SAFETY REVIEW DOCUMENTATION: FRNP-25-0534-S		RESPONSIBLE MANAGER/OWNER: Mike Dunn, Laboratory/Characterization Manager
REQUIRED REVIEW DATE (or expiration date for temporary change): 11/6/2030		EFFECTIVE DATE: 11/13/2025

REVISION/CHANGE LOG

Revision/Change Letter	Description of Changes	Pages Affected	Date of Revision/Change	Approved By (signature on file)
FR0	Initial FRNP release.	All	10/20/2017	Documentation on file
FR1	Added Step 5.4. Updated references	All	12/21/2017	
FR1A	Periodic Review has been completed with no changes identified in procedure technical content. Nonintent change to correct SMA, FA, SME, Approver, and dates has been incorporated per CP3-NS-2001. Date for review cycle has been reset.	All	8/16/2021	
FR1B	Periodic Review has been completed with no changes identified in procedure technical content. Nonintent change to correct SMA, FA, SME, Approver, and dates has been incorporated per CP3-NS-2001. Date for review cycle has been reset.	All	10/25/2022	
FR1C	Added information for PFAS blank preparation. Updated formatting. Corrected superseded procedure number.	3 - 8	01/11/2023	
FR2	Revision to include steps for preparation of air monitoring field blanks to close CAPA #005731 in Issues Management.	All	11/6/2025	Caleb Kline

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure describes guidelines for preparation and use of Quality Control (QC) samples including equipment rinsate blanks, field blanks, trip blanks, field duplicates, and field replicates collected during environmental sampling activities.

Environmental QC samples are used to determine the presence and concentration of contaminants resulting from field activities and to measure or control variables in sample handling.

Environmental QC samples assist in ensuring that the accuracy of analytical results is stated with a high level of confidence.

The frequency field QC samples are collected and their appropriate preservation requirements are defined by the task-specific Work Package (WP) or Sampling Analysis Event Plan (SAEP).

1.2 Scope

This procedure applies to Deactivation & Remediation Contractor personnel, and subcontractor personnel that perform collection of environmental QC samples at the U.S. Department of Energy - owned Paducah site.

2.0 REFERENCES

2.1 Use References

- CP3-ES-2700, *Sample and Miscellaneous Data Forms*
- CP3-ES-2709, *Chain-of-Custody Forms, Sample Labels, and Custody Seals*
- CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*

2.2 Source References

- CP3-ES-0043, *Temperature Control for Sample Storage*
- JHA-11055, *Sample Bottle Preparation and Preservation*
- U.S. Environmental Protection Agency, November 2001, *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. Region 4, Environmental Compliance Branch, Athens, GA.

3.0 COMMITMENTS

None

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Precautions

- 4.1.1** Only new and certified pre-cleaned sample containers are used for each sampling event, with the use of plastic sample bottles preferred when feasible.
- 4.1.2** Carrying more than two sample bottle boxes at one time should be avoided to prevent impaired line of sight.

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- 4.1.3** Chemicals are handled with caution and while using the appropriate personal protective equipment, chemical resistant gloves, and eye protection (safety face shield, safety glasses or goggles) as applicable.
- 4.1.4** A functional eyewash and safety shower shall be readily available within the immediate area of the chemical hazard.
- 4.1.5** If sample solution is splashed onto employee skin, **then** the area shall be immediately flushed with water.
- 4.1.6** The use of MCR Ninja Force N9677, Tillman TrueFit 1477, or equivalent cut resistant gloves is required when handling broken glass, while using Category I knives, or working with sharp edged objects.

4.2 Limitations

None

5.0 PREREQUISITES

- 5.1** Review the SAEP and/or WP for the sampling methods, equipment to be used, and number of QC samples to be collected.
- 5.2** Inspect sample bottles prior to handling.
- 5.3** Label sample containers with known information before collection of the sample according to CP3-ES-2709, *Chain-of-Custody Forms, Sample Labels, and Custody Seals*.

6.0 INSTRUCTIONS

6.1 Preparation of Equipment Rinsate Blanks

Sampler

NOTE:

Equipment rinsate blanks are required only when non-disposable or non-dedicated sampling equipment is being used.

- 6.1.1** Collect the number and type of QC samples as specified in the task-specific WP and/or SAEP.
- 6.1.2** Prepare QC blank samples of peristaltic pump tubing by pumping analyte-free or organic-free water directly from the analyte-free water bottle, through the decontaminated tubing, and into the appropriate sample bottles.
- 6.1.3** Prepare QC blank samples of submersible pumps by pouring analyte-free or organic-free water into a clean container and pump water from the container through the decontaminated hose and into the appropriate sample bottles.

NOTE:

It may be necessary to add water to the pipe during pumping.

- 6.1.4** Prepare QC blank samples of bladder pumps by pumping analyte-free or organic-free water from a 3 meter length of at least 10 centimeter diameter clean pipe sealed at one end, or other

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container specified in the SAEP and/or WP through the pump and into the sample bottles.

- 6.1.5** Prepare QC blank samples of miscellaneous sampling equipment and devices by pouring analyte-free or organic-free water over or through the decontaminated sample collection equipment or device and into the sample bottles.

6.2 Preparation of Field Blanks

NOTE:

For groundwater monitoring, organic-free means American Society for Testing and Materials Type-II water or a documented equivalent.

- 6.2.1** Transport analyte-free or organic-free water to the field in a sealed container.
- 6.2.2** Open the container of analyte-free or organic-free water in the field near the sampling location **and** pour the field blank into the appropriate sample bottles.
- 6.2.3** **If** collecting air monitor filter paper field blank, **then** while at desired sample collection point, place a new, undamaged filter in the appropriate labeled sample container.

NOTE:

A preserved Per- and Polyfluoroalkyl Substances (PFAS) field blank for each sample location will be provided by the Sample Management Organization along with empty bottles for the field blanks.

- 6.2.4** **If** collecting PFAS field blank, **then** perform the following:
- A.** While at the first sample collection point, open the preserved field blank water bottle and an empty unpreserved sample bottle.
 - B.** Pour the preserved reagent blank water from the preserved bottle into the unpreserved blank container.
 - C.** Affix the label to the field reagent blank bottle and pack in the same cooler as the associated sampling for shipment to the offsite laboratory.

6.3 Preparation of Field Duplicate Samples

NOTE:

Field duplicate samples are collected at the same time, using the same procedures, the same type of equipment, and in the same types of containers as the original samples.

Duplicate samples are also preserved in the same manner and submitted for the same analyses as the required samples.

- 6.3.1** Collect duplicate sample material using the same procedural requirements as the original sample.
- 6.3.2** Place samples in separate, but identical sample containers for analysis.

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6.4 Preparation of Field Replicate Samples

NOTE:

Replicate samples may also be referred to as Split samples.

- 6.4.1** Collect sufficient sample volume in order to meet the volume needed to fill two sets of bottles for all analyses being conducted.

NOTE:

Samples for volatile organic compounds (VOCs) are **NOT** mixed prior to subsampling.

- 6.4.2** Mix the collected sample material to ensure the sample is homogeneous.
- 6.4.3** Place sample material in separate, but identical sample containers for analysis.
- 6.4.4** Designate the original sample and the replicate sample on the sample labels and sample data forms or logbooks.

6.5 Preparation of Trip Blank Samples

NOTE:

Trip Blanks are used when collecting environmental samples for VOCs.

Trip Blanks may be required when collecting environmental samples for Tritium analysis.

Unless specified otherwise in the site-specific sampling plan, aqueous Trip Blanks are used for either liquid or solid environmental samples.

- 6.5.1** Prepare 2 or 3 Trip Blank vials of organic-free water with the appropriate preservative.
- 6.5.2** Place a set of Trip Blank vials in each cooler used to contain VOC samples.
- 6.5.3** Ensure the Trip Blank vials remain unopened and are kept with the investigative samples they represent from the field to the laboratory.

7.0 ACCEPTANCE CRITERIA

None

8.0 POST PERFORMANCE WORK ACTIVITIES

- 8.1** Record any remaining information on the sample label.
- 8.2** Record all QC sample collection activities according to CP3-ES-2700, *Sample and Miscellaneous Data Forms*.
- 8.3** As necessary, request survey of sample containers from radiological areas.

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- 8.4 Seal sample containers **and** affix custody seals according to CP3-ES-2709, *Chain-of-Custody Forms, Sample Labels, and Custody Seals*.
- 8.5 Store sample containers in a cooler with ice or blue ice to maintain the preservation temperature as required.
- 8.6 Manage waste generated during sampling activities according to CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*.
- 8.7 Complete Chain-of-Custody (COC) forms according to CP3-ES-2709.
- 8.8 Release samples and related COC documentation for shipment to an off-site laboratory **or** deliver to the on-site laboratory.

9.0 RECORDS

9.1 Records Generated

The following records may be generated by this procedure:

- Field Logbook Entries
- Data Form Entries

9.2 Records Disposition

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

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Appendix A – Acronyms/Definitions

ACRONYMS

COC – Chain of Custody

JHA – Job Hazard Analysis

PFAS – Per- and Polyfluoroalkyl Substances

QC – Quality Control

SAEP – Sampling Analysis Event Plan

VOC – Volatile Organic Compounds

WP – Work Package

DEFINITIONS

Equipment Rinsate Blank – Equipment rinsate blanks are prepared in the field using analyte-free or organic-free water as required by the task-specific WP and/or SAEP. These samples are used to determine if contaminants have been introduced by contact of the sample medium with contaminated sampling equipment. This serves as a QC check on the cleanliness of the sampling device and, therefore, the equipment decontamination process.

Field Blank - Field blanks are prepared at the sample site using analyte-free or organic-free water, or other acceptable material as required by the task-specific WP and/or SAEP. Field blanks are used to evaluate the potential for contamination of a sample by ambient site contaminants from a source not associated with the media being sampled (e.g., air-borne fugitive dust or organic vapors).

Field Duplicate – Field duplicate samples are collected at the same time, using the same procedures, the same type of equipment, and in the same types of sample containers as the original samples. Duplicate samples are also be preserved in the same manner and submitted for the same analyses as the required samples. Data from duplicate sample may be used to assess sampling variability.

Field Replicate - Replicate samples are collected by initially collecting twice as much volume as is normally collected. The material is distributed, after mixing, if appropriate, into two sets of sample containers. Both sets of containers will be submitted for analyses with one set designated as an original sample, the other designated as a "replicate sample." Data from replicate samples may be used to assess sample handling variability and or analytical variability.

Trip Blank - Trip Blanks are used to determine if samples for VOC analysis are contaminated during storage and/or transportation to the laboratory. Each set of 2 or 3 vials is one Trip Blank sample.