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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/control variables in sample handling.

Environmental QC samples assist in ensuring that the accuracy of analytical results are 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).

1.2 Scope

This procedure applies to Fluor Federal Services employees and subcontractors that perform collection of environmental QC samples at the Paducah U.S. Department of Energy Site.

2.0 REFERENCES

2.1 Use References

- CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*
- CP4-ES-2700, *Logbooks and Data Forms*
- CP4-ES-2708, *Chain of Custody (COC) Forms, Field Sample Logs, Sample Labels and Custody Seals*
- Job Hazard Analysis (JHA) 11055, *Sample Bottle Preparation and Preservation.*

2.2 Source References

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

None

4.2 Limitations

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

5.0 PREREQUISITES

5.1 Review the WP for the sampling methods, equipment to be used, and number of QC samples to be collected.

5.2 Review JHA-11055, *Sample Bottle Preparation and Preservation.*

5.3 Label sample containers with known information before collection of the sample according to CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, 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.

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 container specified in the 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

NOTES:

Field blanks are collected in dusty environments and/or from areas where volatile organic contaminates are present in the atmosphere and originating from a source other than the media being sampled.

For groundwater monitoring, organic-free means American Society for Testing and Materials (ASTM) 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.

6.3 Preparation of Field Duplicate Samples

NOTES:

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.

6.4 Preparation of Field Replicate Samples

NOTES:

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

NOTES:

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 CP4-ES-2700, *Logbooks and Data Forms.*

8.3 As necessary, request survey of sample containers from radiological areas.

8.4 Seal sample containers **and** affix custody seals according to CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, 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 COC forms according to CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody.*

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.*

Appendix A – Acronyms/Definitions

ACRONYMS

ASTM – American Society for Testing and Materials

COC – Chain of Custody

JHA – Job Hazard Analysis

QC – Quality Control

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. 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. 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.