FIELD QC SAMPLES (WATER, SOIL)

1.0 PURPOSE

This standard operating procedure (SOP) describes the number and types of field Quality Control (QC) samples that will be collected during site field work.

2.0 SCOPE

This procedure applies to all site sample collection activities conducted.

This procedure shall serve as professional guidance for Ogden personnel. It is not intended to obviate the need for professional judgment that may arise in unforeseen circumstances. Deviations from this procedure in the planning or execution of activities must be approved by the Project Manager.

3.0 DEFINITIONS

3.1 TRIP BLANK

Trip blanks are samples that originate from ASTM Type II analyte-free water taken from the laboratory to the sampling site and returned to the laboratory with samples to be analyzed for volatile organic compounds.

3.2 EQUIPMENT RINSATE SAMPLES

An equipment rinsate (i.e., "decontamination rinsate," or "equipment blank") sample consists of analyte-free water that has been poured over or through the sample collection equipment after its final decontamination rinse. Analytical results of equipment rinsate samples are used to access equipment cleanliness and the effectiveness of the decontamination process.

3.3 FIELD BLANKS

Field blanks are samples of the source water used as the final decontamination rinse water of sampling equipment, and should be from the same source water as used to generate the equipment rinsate sample.

3.4 FIELD DUPLICATE

A field duplicate is a second sample taken from the same source at the same time and analyzed under identical conditions to assist in evaluating sample variance. There are two types of field duplicates: replicates and collocates. Replicates are identical samples that have typically been homogenized, while collocates are samples collected next to each other (e.g., laterally or vertically, in separate containers, and not homogenized).

3.5 REFERENCE SAMPLES

Reference samples are samples taken from media similar to site media, but that are collected outside the zone of contamination, usually offsite.

3.6 QUALITY CONTROL (QC) LEVELS

USEPA QC Level IV is appropriate to use for laboratory analysis for sites where cleanup decisions will be based on risk assessment; sites on or eligible for the National Priorities List (NPL) will also have laboratory analyses conducted at Level IV QC. Other QC levels may be appropriate for certain types of samples or analyses; criteria for selection of the appropriate QC level for individual projects and field work activities are discussed in Ogden SOP, *Data Validation Planning and Coordination.*

4.0 RESPONSIBILITIES

The Field Manager, the Project Manager, and Technical Director/QA are responsible for ensuring that field QC samples are collected and analyzed according to this procedure. The Laboratory Manager is responsible for ensuring that field QC samples are analyzed according to the specifications of the project Statement of Work and the analytical methods used.

5.0 PROCEDURES

Field QC checks may include submission of trip blank, equipment rinsate, field blank, duplicate, and reference samples to the laboratory. Suggested frequency and types of QC check samples are discussed in the following guidance documents: *RCRA Technical Enforcement Guidance Document*, Section 4.6.1 (EPA 1986); the use and frequency of these field QC samples should be incorporated as appropriate. Types of field QC samples

are discussed in general below. The frequency at which field QC samples should be collected for each QC level is provided in Table 1.

The use of performance evaluation (PE) samples is discussed in Ogden SOP, *Performance Evaluation Procedures.*

5.1 TRIP BLANKS

Trip blanks are prepared by the laboratory using organic-free water. They are sent by the laboratory to the field.

Trip blanks shall be placed in sample coolers by the laboratory prior to transport to the site so that they accompany the samples throughout the sample collection/handling/transport process. Once prepared, trip blanks should not be opened until they reach the laboratory. One set of two 40 milliliter vials will form a trip blank and will accompany each cooler containing samples to be analyzed for volatile organics (VOCs) by methods such as CLP VOCs, 8010/601, 8020/602, 8240/624, and modified 8015 (only if purge and trap analysis is performed, e.g., for gasoline, not for extraction and analysis for diesel fuel). Trip blanks will be analyzed for VOCs only (EPA 1987). Results of trip blank analyses are used to assess whether samples have been contaminated by VOCs during sample handling and transport to the laboratory.

Table 1

FIELD QC SAMPLES PER SAMPLING EVENT

Type of Sample	Level III		Level IV		Level V	
	Metal	Organic	Metal	Organic	Metal	Organic
Trip blank (for volatiles only)	NA[1]	1/cooler	NA[1]	1/cooler	NA[1]	1/cooler
Equipment rinsate[2]	1/day	1/day	1/day	1/day	1/day	1/day
Field blank	1/decontamination water source/event/for all QC levels and all analytes					
Field duplicates[3]	10%	10%	10%	10%	5%	5%
Background samples at least 1/sample media/sample event[4]						

Notes:

[1]NA means not applicable.

[2]Samples are collected daily; however, only samples from every other day are analyzed. Other samples are held and analyzed only if evidence of contamination exists.

[3]The duplicate must be taken from the same sample that will become the laboratory matrix/spike duplicate for organics or for the sample used as a duplicate in inorganic analysis.

[4]Sample event is defined from the time sampling personnel arrive at the site until they leave the site for more than a period of one week; the use of controlled-lot source water makes one sample per lot rather than per event an option.

Source: Naval Energy and Environmental Support Activity (NEESA), 1988. Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program. NEESA 20.2-047B. June.

5.2 EQUIPMENT RINSATE SAMPLES

Equipment rinsate samples are collected by pumping the source water over and/or through the decontaminated sampling equipment. This runoff water is collected into the sample containers directly, or with the use of a funnel if necessary. The source water may be poured by use of an electric or hand submersible pump by tipping the jug of water upside down, or by use of a stopcock and gravity.

One equipment rinsate sample shall be collected per day per sampling technique utilized that day (EPA 1986). The samples will be analyzed for the same parameters for which samples collected utilizing a particular sampling method were analyzed. If analytes pertinent to the project are found in the rinsates, the remaining rinsate samples will be analyzed unless holding times have been exceeded. If no analytes are found in any rinsate

samples, the frequency of analysis may be decreased from every other day to weekly. Results of rinsate samples are used to determine whether equipment decontamination was effective.

When disposable or dedicated sampling equipment is utilized, only one equipment rinsate sample will be collected per equipment lot or project phase. Disposable and/or dedicated sampling equipment may include stainless steel bowls or trowels that will be used for collection of only one soil sample, disposable bailers for ground-water sampling, dedicated submersible pumps for ground-water sampling, or other such equipment. These disposable and/or dedicated sampling equipment are typically pre-cleaned and individually wrapped by the manufacturer prior to delivery to the site. In this case, the equipment rinsate sample is used to provide verification that contaminants are not being introduced to the samples via sampling equipment.

5.3 FIELD BLANKS

Field blanks are collected simply by pouring the source water into sample containers.

Field blanks, consisting of samples of the source water used as the final decontamination rinse water, will be analyzed to assess whether the wash or rinse water contained contaminants that may have been carried over into the site samples.

The final decontamination rinse water source, the field blank source water, and equipment rinsate source water should all be from the same purified water source. Tap water used for steam cleaning augers or used in the initial decontamination buckets need not be collected and analyzed as a field blank, because augers typically do not touch the actual samples and because the final decontamination rinse water should be from a purified source.

Field blanks are collected at a frequency of one per sampling event per each source of water for all levels of QC. A sampling event is considered to be from the time sampling personnel arrive at a site until they leave for more than a week. Field blanks will be analyzed for the same analyses as the samples collected during the period that the water sources are being used for decontamination. If the same lot of the water source is used, a field blank needs to be collected only once per lot.

5.4 FIELD DUPLICATES

Field duplicates consist of either collocated or replicate samples. Collocated samples will be collected from adjacent locations or liners or water samples collected from the same well at the same time; these provide information on the entire sample measurement system, including sampling, analysis, and non-homogeneities of the media sampled. Alternatively, replicates may be collected. Replicates are collected at the same time (e.g., homogenized or split samples), and provide information for various points in the analytical process. Sampling error can be approximated by the inclusion of collocated and replicated versions of the same sample.

Field duplicates for ground water and surface water samples will generally consist of replicates. Field duplicates for soil samples will consist primarily of collocates. Soil field duplicates that are to be analyzed for volatile constituents will consist only of collocates; no soil samples that are to be analyzed for volatiles will be replicated (i.e., homogenized or otherwise processed or split) in the field. A separate sample will be collected to provide duplicates for non-volatile analyses. The sample may be homogenized and split in the field to form an original and duplicate (replicate) sample, or an additional volume into a separate sample container may be collected to form a duplicate (collocate) sample. Alternatively, replicates may be formed by homogenization in the laboratory. Duplicates will be analyzed for the same analytical parameters as their associated original sample.

5.5 REFERENCE SAMPLES

Reference sampling is conducted to distinguish site-related contamination from naturally occurring or other non-site related levels of chemicals, i.e., to assess background levels. There are two types of background levels of chemicals:

- Naturally occurring levels, which are concentrations of chemicals present in the environment that have not been influenced by humans (e.g., iron, aluminum)
- Anthropogenic levels, which are concentrations of chemicals that are present in the environment due to human-made, non-site sources (e.g., industry, automobiles)

Reference samples will be collected for each medium sampled at a site. Site-specific conditions will dictate the number of reference samples necessary to characterize background concentrations of contaminants of concern. However, at least one reference sample from each medium will be collected during each sampling event at a site. The samples will be analyzed for all the analytes for which site samples of that medium are analyzed for. Background analysis, especially for metals, should be performed to assess the typical naturally occurring levels.

6.0 RECORDS

Records of the collection of field QC samples should be kept in the sample logbook by the methods discussed in Ogden SOP *Record Keeping, Sample Labeling, and Chain-of-Custody*.

7.0 HEALTH AND SAFETY

The site-specific Health and Safety Plan shall be followed when collecting or working with potentially hazardous environmental samples.

8.0 REFERENCES

EPA. 1987. Data Quality Objectives for Remedial Response Activities: Development Process

NEESA. 1988. Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program, NEESA 20.2-047B, June.

EPA. 1992. RCRA Technical Enforcement Guidance Document.

SOP, *Equipment Decontamination*

9.0 ATTACHMENTS

None.

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