SOP-01

Environmental Sample Handling

Yerington Mine Site
Standard Operating Procedure

Revision 1
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ENVIRONMENTAL SAMPLE HANDLING

TABLE OF CONTENTS

1.0 OBJECTIVE

The objective of this procedure is to establish a uniform method for the handling of environmental samples. This includes the procurement of the appropriate sample containers and preservatives, chain of custody procedures and the use of appropriate sample shipment methods.

2.0 SCOPE AND APPLICABILITY

This procedure will be used during the collection of all types of environmental media that include, but are not limited to, groundwater, surface water and soil. Handling of air samples is not addressed in the current version of this procedure.

3.0 RESPONSIBILITIES

The *Project Manager (PM),* or designee, will have the responsibility to oversee and ensure that the handling of samples is in accordance with this SOP and any site-specific or project specific planning documents.

The *field sampling personnel* will be responsible for the understanding and implementation of this SOP during all field activities, as well as, obtaining the appropriate field logbooks, forms, and records necessary to complete the field activities. Field personnel will ensure all field activities are documented completely at the end of each field day. Field personnel are responsible for assuring that the original documentation (or copies of the field log book, if needed for another project at the same site), are filed at the end of the field project, or during a long project (greater than a month) every couple of weeks.

4.0 DEFINITIONS

EnCore® Sampler – Sampler designed for collecting Volatile Organic Carbon (VOC) samples.
PPE – Personal Protective Equipment

5.0 REQUIRED MATERIALS

The materials required for this SOP include the following:

- Bound field log books
- Black waterproof and/or indelible ink pens
- Field forms
- Chain of Custody forms
- Sample Labels

6.0 METHOD

The following method outlines general considerations for sample handling in the field and maintaining sample custody after collection.

Environmental samples are collected in the field in order to evaluate whether conditions in soil gas, soil, surface water, or groundwater are hazardous. These samples therefore, should be handled with the utmost care to maintain integrity so that analytical data represents as closely as possible, field conditions. In addition, sample chain of custody is extremely important for establishing that sample integrity was maintained between field crew and laboratory.

Details regarding collection of samples are provided in other SOPs (e.g., soil sampling SOP). General considerations for handling during sampling are:

- Always wear proper PPE when handling samples.
- Sample receptacles or containers should be wrapped in a way that is protective of both surrounding containers and the container the sample is in.
- Always check and document procedures well in field logbooks or sampling forms. There is never "too much information".

Samples must be stabilized for transport from the field to the laboratory through the use of the proper sample containers and preservation techniques. This is due to the potential changes in chemical quality that may occur after samples are collected. Sample containers and preservation are discussed in the Sample Preservation SOP.

Great care must be exercised in the sampling and handling of volatile compounds (e.g. VOCs or volatile gases) in order to minimize the introduction of sampling bias. This bias is caused largely through the loss of volatile constituents. Special handling procedures are described in respective sampling SOPs for the handling of aqueous and non-aqueous samples that should be followed in order to minimize the loss of volatile constituents.

Non-aqueous samples for VOC analysis should be placed in the appropriate container as quickly as possible following their collection. Consideration should be given to trimming soil samples that have been in contact with the air and the sampling device in order to minimize the loss of VOCs and inadvertent sample contamination, respectively. Some agencies require the use of USEPA Method 5035 (or similar) that utilizes containerization in a special sampler (EnCore® or equivalent), or field methanol preservation using specially prepared containers. Lastly, the sample container should be cooled immediately after it is filled.

6.1 Sample Labels

Sample labels are required on all sample containers for the primary purpose of sample identification. Specific field data need not be recorded on the labels. The sample labels should contain the following information:

- Sample or location identification number (i.e., well number, boring number/depth, or arbitrary sample number)
- Analysis to be performed
- Preservative (even if only keeping sample chilled)
- Project name and number
- Date and time of sample collection
- Details of samplers (initials, etc.)

It is recommended that the sample label be preprinted in the office on adhesive labels prior to initiation of the sampling program. Tape should NOT be used to cover any label or seal the ends of soil sleeves. Recent studies indicate that most commercially available tapes contain VOCs and that there is the potential for contamination from the tapes.

6.2 Chain-of-Custody

The goal of implementing chain-of-custody procedures is to ensure that the sample is traceable from the time that it is collected until it, or its derived data, are used. Samples would be considered to be "in custody" under the following conditions:

- It is in personal possession.
- It is in personal view after being in personal possession.
- It was in personal possession when it was properly secured.
- It is in a designated secure area.

6.2.1 Chain-of-Custody Forms

A chain-of-custody form may be initiated at the time that the sample containers are filled or, at a minimum, when the sample containers leave the site at which they are prepared, usually that of the analytical laboratory supplying the containers. Additionally, chain-of-custody forms may be specially prepared with some initial information for the project and specific analytical methods listed prior to field work to decrease the amount of information that has to be recorded in the field. However, in this event, actual sample collection information should be recorded only in the field after the sample has been collected.

It is important that the field personnel completely fill out the applicable sections of the form. Chain of custody forms should be numerically sequenced with a number clearly indicated on the form. The chain-of-custody forms should be placed in shipping containers, protected from moisture using plastic bags (e.g., Ziploc®), and should accompany the containers during shipment to the laboratory. Chain-of-custody forms included in any shipping container should only reflect those samples that are in that container. The field personnel collecting the samples will be responsible for the custody of the samples until transport to the laboratory. Sample transfer requires the individuals relinquishing and receiving the samples to sign, date and note the time of transfer on the

chain-of-custody forms. The chain-of-custody is considered to be complete after it has been received and signed in by the analytical laboratory. A copy of the chain-of-custody record should be maintained by the field personnel along with the other field records.

Common carriers (i.e., Federal Express) are not expected to sign the chain-of-custody form. However, the bill of lading or airbill becomes part of the chain-of-custody record in the event that a common carrier is used to transport the samples. Airbill or bill of lading numbers should be recorded on the chain-of-custody forms.

6.2.2 Chain-of-Custody Seals

Custody seals shall be affixed to the outside of each shipping container or cooler. Two seals are required and should be placed at two points along the front of the cooler at the point where the lid meets the body of the cooler. The seals do not necessarily need to be custody tape, but any type of tape that can be used that cannot be easily removed without showing signs of damage. The custody seals or tape shall include the date and initials of the packager.

Chain-of-custody seals or evidence tape may be used, but are not required, on the sample containers in order to demonstrate that the sample containers have not been opened or otherwise tampered with. Chain-of-custody seals or evidence tape, if used, should be affixed to each sample container as soon after sample collection as is possible.

6.3 Sample Shipment

Shipment of samples to an analytical laboratory is usually required upon completion of sample collection. Proper packaging is necessary in order to protect the sample containers, to maintain the samples at a temperature of 6°C or less, and to comply with all applicable transportation regulations.

In general, samples are shipped using packaging that is supplied by the analytical laboratory. The packaging normally includes a shippable insulated box such as an ice cooler and contains protective internal packaging materials such as foam sleeves or bubble wrap. Some laboratories use proprietary sample packaging with integral internal packaging. In either case, provisions need to be made for maintaining the temperature of the samples either with the use of ice packs or ice. Care should be taken to ensure that the sample bottles are adequately protected from breakage during shipments. Samples should be secured tightly with bubble wrap or other suitable packing media and covered with plastic bags. Ice should be added to the shipping container only after the samples have been secured with packing media. Ice should never be used to provide separation between sample bottles. Once packed, the cooler should be secured shut by wrapping fiber reinforced (strapping) tape completely around the cooler.

Custody seals shall be placed on the outside of the cooler, and clear tape should be wrapped around the cooler to cover each seal without obliterating signatures or other significant data. The shipping label shall be secured to the outside of the shipping container and, if it is attached to the top of a cooler by adhesive, clear tape shall be used to secure it to the packaging. A valid return address must appear on the shipping label in the event the shipper is unable to deliver to the designated address.

Samples will be delivered to the analytical laboratory so that there is sufficient time for analysis of the constituent with the shortest holding time. For holding times, please see SOP-02, Sample Preservation. Samples preserved at 6°C using ice packs or ice shall be shipped via overnight delivery. If samples are sent on Friday, Saturday delivery will be requested and arrangements must be made with the laboratory to receive the shipment. Chemically preserved samples may be delivered to the laboratory using ground transportation.

Regulations must be observed regarding the shipment of Dangerous Goods. Sample containers and certain field equipment may be defined as Dangerous Goods such that special requirements must be followed for their shipment. Air shipment of Dangerous Goods is regulated by the International Air Transport Association (IATA) as described in "Dangerous Goods Regulations". Shipment by ground is regulated by the U.S. Department of Transportation (DOT). Furthermore, individual shippers (e.g., Federal Express) may have additional requirements for Dangerous Goods shipment. The shipment of Dangerous Goods must be consistent with the instruction and authorization of the analytical laboratory shipping and receiving coordinator and the Health and Safety director.

Environmental samples, including groundwater samples, are currently exempt from Hazardous Goods regulations. 40 CFR 261.40(d) states, "A sample of solid waste or a sample of water, soil, or air which is collected for the sole purpose of testing to determine its characteristics or composition is not subject to this Part or Parts 262 through 267 or Part 124 of this chapter or to the notification requirements of Section 3010 of RCRA." Therefore, no special regulations are required to be followed for the shipment of environmental samples from the field. However, sample containers should be properly packed such that inadvertent spillage does not occur during shipment (e.g., any discharge spouts should be taped closed). Samples of NAPL do not fall under this exemption.

Specific regulations do exist, however, for the shipment of many reagents that are commonly used as preservatives and decontamination agents. Consequently, the shipment to the field site of "empty" sample containers containing small quantities of preservatives must be conducted in accordance with the regulations. The most significant limitations for the shipment of preservatives (IATA, 1992) involve those for nitric acid in which only small quantities (<0.5L) of low concentration (<20%) nitric acid can be shipped in any given shipment.

7.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance for sample handling centers upon following procedures outlined above and double checks as samples are collected. Checks should be performed either by 1) the field personnel, or, preferably, 2) by a project chemist or other personnel that constantly check field chain of custody forms versus laboratory receipt acknowledgment forms, discuss condition of samples as received by laboratory personnel, and communicate constantly with the laboratory project manager to prevent quality assurance issues from starting or becoming significant problems should they occur.

8.0 REFERENCES

United States Environmental Protection Agency, 1984, Soil Sampling Quality Assurance Users Guide, EPA/600/4-84/043.

United States Environmental Protection Agency, 1986, RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, OSWER-9950.1.

United States Environmental Protection Agency, 1987, A Compendium of Superfund Field Operations Methods, EPA/600/P-87/001.

United States Environmental Protection Agency, 1992, RCRA Ground-Water Monitoring: Draft Technical Guidance, EPA/600/R-92/001.

9.0 ATTACHMENTS

None