

KRW CONSULTING, INC.

GENERAL SOIL

SAMPLING PROTOCOL

INTRODUCTION

The purpose of this document is to provide KRW personnel with instructions for the collection of soil samples in compliance with appropriate federal and state regulations and guidelines for soil sampling protocols. The following sections provide information on the equipment requirements, sample collection, and handling procedures. Information regarding important precautions is also provided to help insure the integrity of the sample collection and handling.

This is a "working" document, in that changes will be necessary from time to time to accommodate regulatory changes and site specific conditions.

Sampling personnel are encouraged to call Greg Knell or Bill Brown at KRW, (303) 239-9011, with any questions which may arise during sampling or use of this manual or changes which may need to be made in the manual.

EQUIPMENT REQUIREMENTS

Soil samples are typically collected using the following types of equipment:

- drilling rig/drive sampling
- Geoprobe® rig
- excavator
- sampling spoons/shovels
- stainless steel trowels

Field instruments used to measure organic gas and vapors during soil sampling include:

- photoionization detector (PID)
- flame ionization detector (FID)

Instruments used to measure approximate field pH and conductivity include:

- pH/conductivity meter (WTW pH/Cond 3400i with auto temp adjustments)

Field instruments should be calibrated according to the manufactures' specifications, prior to sampling event.

EXPENDABLE SAMPLING SUPPLIES

Expendable sampling supplies which will be required each time soil samples are collected include:

- distilled or deionized water (DI water)

- LiquiNox® (or similar) soap
- brushes
- paper towels
- 5-gallon plastic buckets
- sample bottle kits
- ice
- ball-point pen
- indelible marker
- resealable plastic bags
- disposable rubber gloves
- disposable teflon sampling spoons
- mason jars

The majority of these items can be purchased at the local grocery stores.

Sample bottle kits are provided by the laboratory and should be ordered by phone at least five working days prior to each planned sampling date. The sample bottle kits will include necessary bottles, labels, and chain of custody forms.

A ball-point pen and indelible marker will be required to record sampling data and mark the sample labels.

RECORD KEEPING

A field book will be used soil sampling events to record the following minimum information:

- sampling conditions (i.e. climate)
- soil sample identification/sampling location/depth of sample
- any notable conditions of the site, soil samples
- deviations from recommended sampling protocol (due to equipment failures, or special site conditions)
- dates and results of calibration of field instruments

Additional record keeping will include preparation of a chain of custody record for the samples which is consistent with both the field sampling record and sample labels on each of the sample bottles.

SAMPLING METHODS

Soil sampling will include the following tasks:

- collection of soil samples in zip lock-type plastic bags
- head space readings in the plastic bag with PID and/or FID
- field pH and conductivity readings on 1:1 soil/DI water mixture in mason jars
- collection of the sample
- packaging and shipment of the sample
- documentation of sampling activities and conditions

The sampling equipment must be decontaminated prior to the initial collection of soil samples of soil and prior to collection of each subsequent soil samples. A solution of Liquinox® (or similar) soap and DI

water is used for the decontamination activity. Samples should be collected with disposable teflon sampling spoons.

Label the laboratory sample bottles with the following information:

- time and date of sampling
- sample identification/location/depth of sample
- sampler's name
- company name

Fill out the appropriate entries on the chain of custody form provided by the laboratory, including:

- sampler's name
- sample identification/location/depth
- time/date of sample collection (same as sample label)
- number of sample bottles
- method of shipment

Note: A separate line entry is required on the Chain of Custody form for soil sample (refer to Figure 1, Example Chain of Custody Form). A parameters list identifying requested analyses is attached to these instructions. Include the parameters list with the Chain of Custody for submittal to the laboratory.

Immediately following the sampling of soil, place the sample on ice in the cooler provided. Upon completion of sampling, pack the samples to prevent breakage during shipping. The chain of custody form should be signed whenever the samples change hands.

Ship the samples as soon as possible to the laboratory.

PRECAUTIONS

1. Disposable rubber gloves must be used during all sampling activities. A new set of gloves must be used for each soil sample collected. Disposable gloves used for sampling activities should be constructed of inert rubber or plastic materials.
2. Always store and transport the sampling equipment and supplies in an environment which is free of chemical odors, dust etc. Do not store this equipment in areas which are exposed to solvents, gasoline, diesel fuel, oil, paints, vehicle exhaust, or similar chemicals.
3. If possible, schedule sampling so that samples can be delivered to the laboratory the same day.
4. Keep good records of all sampling activities