# APPENDIX A

## Standard Operating Procedures

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| **Title:** | **FIELD ACTIVITY LOGBOOKS** |
| **Category:** | DOC 2.1 |
| **Revised:** | April 1998 |

STANDARD OPERATING PROCEDURE

# FIELD ACTIVITY LOGBOOKS

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| **TITLE:** | **FIELD ACTIVITY LOGBOOKS** | | |
| **CATEGORY:** | DOC 2.1 | **REVISED:** | April 1998 |

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| TITLE: | FIELD ACTIVITY LOGBOOKS | | |
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# 1. Summary

This Standard Operating Procedure (SOP) establishes requirements for the entry of information into logbooks to ensure that E & E field activities are properly documented. The project manager (PM) and the field team leader (FTL) are responsible for ensuring that logbook entries provide sufficient information for the completion of an accurate and detailed description of field operations and meets the requirements of the contract or technical direction document (TDD).

This SOP describes logbook entry requirements for all types of projects, specifies the format that should be used, and provides examples. Some flexibility exists when implementing the SOP because different types of projects require different data collection efforts. This SOP does not address site safety logbook requirements or geotechnical logbook entries.

# 2. Purpose

Complete and accurate logbook entries are important for several reasons: to ensure that data collection associated with field activities is sufficient to support the successful completion of the project; to provide sufficient information so that someone not associated with the project can independently reconstruct the field activities at a later date; to maintain quality control (QC) throughout the project; to document changes to or deviations from the work plan; to fulfill administrative needs of the project; and to support potential legal proceedings associated with a specific project.

## 2.1 Adequate Field Information/Quality Control

QC procedures for data collection begin with the complete and systematic documentation of all persons, duties, observations, activities, and decisions that take place during field activities. It is especially important to fully document any deviations from the contract, project scope, work plans, sampling plans, site safety plans, quality assurance (QA) procedures, personnel, and responsibilities, as well as the reasons for the deviations.

Prior to entering the field, the project manager must indicate to the field team what pertinent information must be collected during field activity in order to meet the desired objectives of the data collection effort. The PM is responsible for reviewing the adequacy of the project logbooks both during and following completion of field activities, and is also responsible for meeting with the field team members to discuss any findings and to direct activities to correct any deficiencies, as appropriate. The PM also has the responsibility of ensuring that the logbooks become part of the project or TDD file.

## 2.2 Work Plan Changes/Deviation

The logbook is the document that describes implementation of the work plan and other appropriate contract documents and provides the basis for the project reports. It must include

detailed descriptions of any and all deviation from the work plan and the circumstances that necessitate such changes. These changes will be reviewed for compliance with data quality objectives and include:

- Changes in procedures agreed to in the project planning stages;
- Any conditions that prevent the completion of the field effort, or that result in additional fieldwork must be noted (i.e., weather delays, government actions, physical obstructions, personnel/ equipment problems, etc.). Persons from whom permission was obtained to make such changes must be clearly documented.
- Any modifications requested by the client or client's representative that are contradictory to the contract or outside of the existing scope of work must be documented in detail because the cost of the project could be affected by such modifications.

## 2.3 Evidentiary Documentation

Field activity documentation can become evidence in civil and/or criminal judicial proceedings, as well as in administrative hearings. Field logbooks serve this purpose. Accordingly, such documentation is subject to judicial or administrative review. More importantly, it is subject to the review of an opposing counsel who will attempt to discredit its evidentiary value.

The National Enforcement Investigation Center (NEIC) and the United States Environmental Protection Agency (EPA) have prepared documents outlining their documentation needs for legal proceedings. These guidelines indicate the importance of accurate and clear documentation of information obtained during the inspections, investigations, and evaluations of uncontrolled hazardous waste sites. Consequently, attention to detail must be applied by E & E personnel to all field documentation efforts for all E & E projects. Project personnel must document where, when, how, and from whom any vital project information was obtained. This information is necessary to establish a proper foundation for admissible evidence.

# 3. Guidelines

Logbooks should contain a summary of any meeting or discussion held with a client or with any federal, state, or other regulatory agency that was on site during the field activities. The logbook should also describe any other personnel that appear on site, such as representatives of a potential responsible party (PRP).

The logbook can be used to support cost recovery activities. Data concerning site conditions must be recorded before the response activity or the passage of time eliminates or alters those conditions. Logbooks are also used to identify, locate, label, and track samples and their final disposition. In addition, data recorded in the logbook will assist in the interpretation of the analytical results.

Logbooks are subject to internal and external audits. Therefore, the recorded information should be consistent with and capable of substantiating other site documentation such as time cards, expense reports, chain-of-custody forms, shipping papers, and invoices from suppliers and

subcontractors, etc. Logbooks also act as an important means of reconstructing events should other field documents such as data collection forms become lost or destroyed. Therefore, all mission-essential information should be duplicated in the logbook.

## 3.1 General Instructions

The following general guidelines must be used for all logbooks:

- At a minimum, one separate field activity logbook must be maintained for each project or TDD.
- All logbooks must be bound and contain consecutively numbered pages.
- No pages may be removed for any reason, even if they are partially mutilated or illegible.
- All field activities must be recorded in the site logbook (e.g., meetings, sampling, surveys, etc.).
- All information must be **printed legibly** in the logbook using waterproof ink, preferably black. If weather conditions do not permit this (i.e., if it is too cold or too wet to write with ink), another medium, such as pencil, may be used. The reason that waterproof ink was not used should be specifically noted in the logbook.
- The language used in the logbook should be objective, factual, and free of personal feelings or terminology that might prove inappropriate.
- Entries should be made in chronological order. Contemporaneous entries are always preferred because recollections fade or change over time. Observations that cannot be recorded during field activities should be recorded as soon after as possible. If logbook entries are not made during field activities, the time of the activity/ observation and the time that it is recorded should be noted.
- The first entry for each day will be made on a new, previously blank page.
- Each page should be dated and each entry should include the time that the activity occurred based on the 24-hour clock (e.g., 0900 for 9 a.m., 2100 for 9 p.m.).
- At the completion of the field activity, the logbook must be returned to the permanent project or TDD file.

## 3.2 Format

The information presented below is not meant to be all-inclusive. Each project manager is responsible for determining the specific information requirements associated with a field activity logbook. If someone other than the Project Manager is keeping the logbook, the Project Manager is responsible to convey to that individual, prior to the start of fieldwork, specific instructions on what type of information is required to be entered into the logbook. Information requirements will vary according to the nature and scope of the project. (Refer to Appendix A for an example of a completed logbook.)

### Title Page

The logbook title page should contain the following items:

- Site name,
- Location,
- TDD No. or Job No.,
- PAN (an EPA site/task identification number), if applicable,
- SSID No. (Site ID number-assigned under CERCLA), if applicable,
- Start/Finish date, and
- Book ___ of ___.

### First Page

The following items should appear on the first page of the logbook prior to daily field activity entries:

- TDD No. or Job No.,
- Date,
- Summary of proposed work (Reference work plan and contract documents, as appropriate),
- Weather conditions,
- Team members and duties, and
- Time work began and time of arrival (24-hour clock).

### Successive Pages

In addition to specific activity entries and observations, the following items should appear on every logbook page:

- Date,
- TDD or Job No., and
- Signature (bottom of each page). If more than one person makes entries into the logbook, each person should sign next to his or her entry.

### Last Page

In addition to specific activity entries and observations and the items that should appear on each successive page, the last page of the logbook should contain a brief paragraph that summarizes the work that was completed in the field. This summary can become especially important later on if more or less work was accomplished during the duration of the field activity.

## 3.3 Corrections

If corrections are necessary, they must be made by drawing a single line through the original entry in such a manner that it can still be read. *Do not erase or render an incorrect notation illegible*. The corrected entry should be written beside the incorrect entry, and the correction must be initialed and dated. Most corrected errors will require a footnote explaining the correction.

# 4. Documentation

Although the requirements and content of the field logbook will vary according to the site and the tasks to be performed, the following information should be included in every logbook:

## 4.1 Prior to Fieldwork

### Summary of Proposed Work

The first paragraph of **each** daily entry should summarize the work to be performed on that day. For example:

> "Collect soil and groundwater samples from previously installed wells and ship samples to Analytical Services Center (ASC). Discuss removal with site owner."

The first paragraph becomes especially important later when discussing work plan deviations or explaining why more or less work was accomplished for that day.

### Personnel

Each person to be involved in activities for the day, his/her respective role (sampler, health and safety, etc.), and the agency he/she represents should be noted in the logbook.

### On-Site Weather Conditions

Weather conditions may have an impact on the work to be performed or the amount of time required to perform the proposed work; therefore, all weather on-site weather conditions should be noted, including temperatures, wind speed and direction, precipitation, etc., and updated as necessary. Similarly, any events that are impacted by weather conditions should be noted in the logbook.

### Site Safety Meeting

Although minutes should be recorded for all site safety meetings under separate cover, the logbook should briefly summarize the site safety meeting and any specific site conditions and resultant site safety concerns.

## 4.2 Site Sketch

A site sketch should be prepared on the first day of field activities to indicate prominent site and environmental features. The sketch should be made either to scale or by noting the approximate distances between site feature. Area-specific sketches should be prepared as work is undertaken in such areas, and updated sketches should be drawn as work progresses.

### Site Features

Examples of features to be noted on the site sketch include the following:

- Structures such as buildings or building debris;
- Drainage ditches or pathways, swales, and intermittent streams (include direction of overland runoff flow and direction of stream flow);
- Access roads, site boundaries, and utility locations;
- Decontamination and staging areas;
- Adjacent property data: the type of property that borders the site, information pertaining to ownership, and available addressees; and
- North arrow.

### Changes in Site Conditions

Any deviation from previous site sketches or drawings presented in the work plan, and any changes that have occurred since the last site visit must be noted. Differences to be noted include the following:

- Demolished buildings;
- Changes to access routes;
- Damage to wells or equipment, or changes to the amount of such equipment believed to be on site,
- Changes resulting from vandalism;
- Destruction of reference points;
- Changes resulting from environmental events or natural disasters; and
- Locations of excavations, waste piles, investigation-derived waste (IDW), drum staging areas, etc.

In short, *any* site condition that varies from the conditions described in the work plan should be noted.

## 4.3 Monitoring Equipment and Activities

Any monitoring equipment used during field activities should be documented in the log-book. Information to be noted includes:

- The type of equipment with model and serial numbers. (HNu, OVA, etc.);
- The frequency at which monitoring is performed;
- Calibration results and the frequency at which the equipment is cali-brated or tested;
- Background readings;
- Any elevated or unusual readings; and
- Any equipment malfunctions.

It is particularly important to note elevated or unusual equipment readings because they could have an impact on personal protection levels or the activities to be performed on site. If a

change in the proposed work or protection levels occurs, it should be clearly noted in the logbook.

## 4.4 Sample Collection Activities

Because it represents the first step in an accurate chain-of-custody procedure, field sampling documentation must be complete. The following items should be documented in the logbook:

### Sample Collection Procedures

The following items pertaining to sample collection procedures should be included in the logbook:

- Any pre-sampling activities (i.e., well purging and the number of volumes purged before sample collection);
- Results of the pre-sampling activities (i.e., pH/conductivity/ temperature readings for well water, results of hazard categorization testing, etc.);
- Any environmental conditions that make sample collection difficult or impossible (i.e., dry or flooded drainage paths, inclement weather conditions, etc.); and
- Any deviation from the work plan (i.e., additional samples and the reason for their collection, alternate sample locations, etc.).

### Sample Information

The following information regarding sample data should be recorded in the logbook:

- Sample number and station location including relationship to permanent reference point(s);
- Name(s) of sampler(s);
- Sample description and any field screening results;
- Sample matrix and number of aliquots if a composite sample;
- Preservatives used, recipient laboratory, and requested analyses;
- QA/QC samples; and
- Shipping paper (airbill) numbers, chain-of-custody form numbers, and jar lot numbers.

### Investigation-Derived Waste/Sample Shipment

Details pertaining to sampling equipment, decontamination, and IDW should be clearly delineated in the work plan. However, the following information should be included in the log-book:

- The type of IDW generated an the number of containers generated (each drum should be numbered and its contents noted);
- All information relevant to the characterization of the IDW;
- Any directions received from the client/workplan/contract relative to the management of the IDW;
- The disposition of IDW (left on site or removed from site);
- The number of sample containers shipped to the ASC or laboratory and the courier used (i.e., Federal Express, Airborne Express, etc.);
- Airbill or shipment tracking numbers; and
- The type of paperwork that accompanied the waste/sample shipment (e.g., manifests, etc.).

## 4.5 Photodocumentation

Photographs should be taken during all relevant field activities to confirm the presence or absence of contaminants encountered during fieldwork. Specific items to be documented in-clude:

- Sample locations and collection activities;
- Site areas that have been disturbed or impacted, and any evidence of such impacts (i.e., stressed vegetation, seepage, discolored water, or debris);
- Hazardous materials requiring disposal, including materials that may not appear in the work plan;
- Any evidence that attests to the presence or absence of contamination; and
- Any features that do not appear in the work plan or differ from those described in the work plan.

Documentation of any photographs taken during the course of the project must be provided in the logbook with a detailed description of what is shown in the photograph and the reason for taking it. This documentation should include:

- Make, model, and serial numbers of the camera and lens,
- Film type and number of exposures,
- Roll and frame number of the photograph;
- Direction or view angle of the photograph, and
- Name of the photographer.

## 4.6 Data Collection Forms

Certain phases of fieldwork may require the use of project-specific data collection forms, such as task data sheets or hazard categorization data sheets. Due to the specific nature of these forms, the information that should be included in the logbook cannot be fully discussed in this SOP. However, the following data should be included in the logbook:

- Results of any field tests or hazard categorization tests (i.e., ignitability, corrosivity, reactivity, etc.);
- The source from which any field sample was collected and its condition (i.e., drum, tank, lagoon, etc.).
- Other conclusions as a result of the data collected on data collection forms.

In many cases, rubber stamps that contain routine data collection forms can be manufactured ahead of time. These forms can be stamped into the logbook on an as-needed basis.

## Appendix A

## Sample Logbook

RI 6130

WEDNESDAY JANUARY 26, 1994

PROPOSED WORK FOR DAY: COLLECT GROUNDWATER SAMPLES FROM WELLS AND PIEZOMETERS AT SITE 1 AND SITE 3. SHIP SAMPLES TO THE ASC. CONTAINERIZE PURGE WATER. MEET WITH FRED CANSLER AND DISCUSS REMOVAL OF CANOPIES AT SITES 1 AND 3 AND FILLING OF EXCAVATIONS.

WEATHER ON SITE: CLOUDY AND WARM WITH A HIGH TEMPERATURE OF 50° F. RAIN SHOWERS WITH WINDS FROM THE SW AT 5-15 MPH.

E&E PERSONNEL ON SITE: G. JONES, J. MAYS, S. MC COLL

LOG

1330 ARRIVED ON SITE. THE GROUNDWATER SAMPLING CREW WAS PREPARING TO PURGE THE WELLS AND PIEZOMETERS IN THE FIELD ACROSS THE ROAD FROM SITE 1. PURGING OF WELLS BEING COMPLETED WITH HAND BAILERS SINCE PUMP IS INOPERATIVE.

1340 ARRIVED AT SITE 3. MW3-1 AND MW3-3 UNLOCKED AND OPEN; SECURED BOTH WELLS.

38 [signature] 1/26/94

RI 6130 1/26/94

1350 FRED CANSLER ARRIVED ON SITE. DISCUSSED REMOVAL OF CANOPIES AND CLOSURE OF EXCAVATIONS AT SITES 1 AND 3. FRED CANSLER STATED THAT HE HAS A SOURCE FOR THE ROCK AND FOR THE TOPSOIL FOR THE EXCAVATIONS.

1405 ARRIVED AT THE SITE WHERE FRED CANSLER PROPOSES TO REMOVE THE FILL FOR THE EXCAVATIONS. A HILL ON THE WEST SIDE OF THE WOODEN NICKLE IS IN THE PROCESS OF BEING REMOVED. THE ROCK CONSISTS OF WEATHERED SHALE SIMILAR TO THE ROCK REMOVED FROM THE EXCAVATIONS. FRED CANSLER PROPOSES TO USE THE ROCK TO FILL THE EXCAVATIONS TO WITHIN ONE FOOT OF GRADE.

1415 ARRIVED AT THE SITE WHERE FRED CANSLER PROPOSES TO REMOVE TOP SOIL FOR THE EXCAVATIONS. TOP SOIL REMOVED FROM THE YELLOW FREIGHT LOT IS IN PILES ON THE NORTH SIDE OF THE LOT.

1430 RETURNED TO SITE 3. FRED CANSLER WILL ARRANGE TO REMOVE THE CANOPY OVER THE EXCAVATION AT SITE 3 ON THURSDAY MORNING AND WILL ARRANGE TO BRING THE ROCK IN ON THURSDAY AFTERNOON. TWO TRUCKS WILL BE USED TO HAUL THE FILL. THE SUPPORTS HOLDING THE CANOPY

39 [signature] 1/26/94

1/26/94 RI6130

1430 (cont) WILL BE CUT AND THE CANOPY DRAGGED AWAY FROM THE EXCAVATION.

1445 CONTACTED JOY INMAN FROM ENVIRONICS. TANKERS WILL BE ON SITE ON THURSDAY TO PUMP OUT THE EXCAVATION AT SITE 3 AND ON FRIDAY TO REMOVE WATER AT SITE 1. A FRAC TANK WILL BE DELIVERED TO SITE 1 ON THURSDAY.

1515 SAMPLING CREW COMPLETED PACKING SAMPLES COLLECTED AT SITE 1. ALL WELLS AND PIEZOMETERS AT SITE 1 HAVE BEEN SAMPLED

1530 SAMPLING CREW COMPLETED PACKING SAMPLES AND SECURING DRUMS OF PURGE WATER.

1535 SAMPLING CREW DEPARTED SITE TO DELIVER SAMPLES TO FEDERAL EXPRESS.

1600 CONTACTED TIM GRADY FROM E+E. DISCUSSED CONVERSATION WITH FRED CANSLER AND STATUS OF WELL/PIEZOMETER SAMPLING.

1615 SECURED FOR DAY.

WORK COMPLETED: COLLECTED GROUNDWATER SAMPLES FROM SITE 1 WELLS AND PIEZOMETERS. DISCUSSED REMOVAL OF CANOPIES AND FILLING OF EXCAVATIONS WITH FRED CANSLER. SHIPPED SAMPLES TO ASC

[signature] 1/26/94



RI6130

THURSDAY JANUARY 27, 1994

PROPOSED WORK FOR DAY: COMPLETE COLLECTION OF GROUNDWATER SAMPLES AT SITE 3 AND SHIP THE SAMPLES TO THE ASC. REMOVE THE CANOPIES COVERING THE EXCAVATIONS AT SITES 1 AND 3. PUMP THE WATER OUT OF THE EXCAVATIONS AT SITES 1 AND 3 AND SHIP THE WATER OFF SITE TO OSCO. BACKFILL THE EXCAVATION AT SITE 3. REMOVE THE DRUMS FROM THE ROLL OFF BOX AND TRANSFER THE DRUMS TO THE WAREHOUSE.

WEATHER ON SITE: CLOUDY AND COOL WITH A HIGH TEMPERATURE OF 45°F. WINDS VARIABLE 10-20 MPH.

E+E PERSONNEL ON SITE: C. JONES, J. MAYS, S. MCCONE

LOG

0700 SCOTT MCCONE ARRIVED AT SITE 3.

0710 ENVIRONICS PERSONNEL ARRIVED AT SITE 3.

0715 HELD SITE SAFETY MEETING. DISCUSSED PHYSICAL AND CHEMICAL HAZARDS ASSOCIATED WITH SITE AND PROPOSED WORK FOR THE DAY.

0725 E+E SAMPLING TEAM ARRIVED ON SITE

 [signature] 1/27/94

1/27/94 RI6130

0730 E+E Sampling Crew Commenced Collecting Samples and Purging MW 3-1 and MW 3-2.

0800 Fred Cansler Arrived on Site with Personnel to Remove the Canopy over the Excavation at Site 3. The Supports were Cut and the Canopy was Dragged Away from the Excavation with two Tractors.

0845 The Canopy Removal at Site 3 Completed and the Crew Departed for Site 1.

0850 Commenced Pumping Water from the Excavation into Bryson Trailer #6185.

0915 The E+E Sampling Team Completed Collecting the Groundwater Samples from MW 3-1, MW 3-2, MW 3-3, and MW 3-4. Commenced Packing Samples.

0935 Completed Filling Bryson Trailer #6185 with 5,000 Gallons of Water and Prepared Manifest #00941 for Load. Commenced Loading Bryson Trailer #429.

1000 E+E Sampling Team Departed the Site to Deliver Samples to Federal Express.

1030 Arrived at Site 1. The Cansler Crew is in the Process of Removing the Canopy over the Excavation. Canopy is not moving as a unit.

42 [signature] 1/27/94

RI6130 1/27/94

1045 Returned to Site 3. All water in the Excavation has been removed except for the ice. Bryson Trailer #429 Loaded with 5,200 Gallons of Water. Prepared Manifest #00942 for Load. Both Tankers Departed the Site.

1100 Enviroties Personnel opened the Drums of Drilling Fluids, Development Water and Purge Water and found the Drums Full of Ice. Enviroties will Contact Gary Shockley and Recommend that the Drums of Liquids be Transported to OSCO for Treatment since they can not be Bulked.

1200 Cansler Crew Commenced Loading Trucks with Stone from the Site West of the Wooden Nickel.

1230 Arrived at the Site where the Stone was being Loaded. The Fill Material is all Undisturbed Weathered Bedrock.

1245 Arrived at Site 3. Two Loads of Rock Fill have been Dumped in the Excavation; an Estimated Four More Loads of Stone will be Needed to Fill the Excavation.

1300 Arrived at Site 1. Bryson Trailer #617

43 [signature] 1/27/94

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|---|---|
| **Title:** | **GEOTECHNICAL LOGBOOK/ TRIP REPORT PREPARATION** |
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STANDARD OPERATING PROCEDURE

# GEOTECHNICAL LOGBOOK/ TRIP REPORT PREPARATION

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| **CATEGORY:** | DOC 2.4 | **REVISED:** | April 1998 |

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# 1. Introduction

This Standard Operating Procedure (SOP) outlines the procedures followed by Ecology and Environment, Inc. (E & E), for the entry of information into the geotechnical logbook, thereby ensuring that field activities are properly documented.

It is the responsibility of the site geologist to ensure that the proper information is collected in the field in order to fulfill the obligations of the contract.

# 2. Purpose

The purpose of this document is to establish the minimum content requirements of the geotechnical logbook entries for drilling projects. The document provides guidance to ensure that the documentation for drilling projects is correct, complete, and adequate for use in any potential legal proceeding. It is important to remember that field activity documentation can become evidence in civil and criminal law- enforcement proceedings, as well as in administrative hearings. Accordingly, such documentation is subject to judicial or administrative review; even more importantly, it is subject to the review of an opposing attorney attempting to discredit its value as evidence. Complete and accurate entries in the geotechnical logbook are important for two reasons: to maintain quality control, and to support any legal proceedings associated with the project.

# 3. Geotechnical Logbook Procedures

## 3.1 General Information

Information concerning the project can be found in the geotechnical logbook. The majority of the information should be obtained prior to arriving on site. Figure 1 is an example of a completed general information sheet.

CLIENT: Chemical Corporation of America

JOB NUMBER: ZZ-1020

SITE NAME: ABC Landfill

DRILLER: Paul Barth E+E Drilling and Testing Company

LOCATION: CITY/TOWN: Midway

STATE: Tennessee

PROJECT MANAGER: Buff Walter

FIELD TEAM LEADERS: Marilyn Frappa /

SITE SAFETY OFFICER(S): Greg Jones /

TEAM MEMBERS: Paul Barth (EEDT)
Kevin Williamson (EEDT)

JOB START/FINISH DATE: 1/4/94 / 1/18/94

BOOK 1 OF 3

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|---|---|---|
| Buff Walter | E+E | 703/522-6065 |
| | | |
| | | |

For inquires regarding the distribution, scope, and/or organization of the Geotechnical Logbook please contact:

**Figure 1 General Information**

## 3.2 Daily Logs

### 3.2.1 General Guidelines

The following includes general guidelines for preparing the geotechnical logbook:

- A separate logbook must be maintained for each project.
- No pages can be removed for any reason, even if they are partially mutilated or illegible.
- All field activities (e.g., meetings, sampling, surveying) must be recorded in the geotechnical logbook.
- All information is **printed** legibly into the logbook in waterproof ink, preferably black. If weather conditions do not permit this (i.e., if it is too cold or too wet to write with ink), another medium such as a pencil may be used, but it should be specifically noted in the logbook why waterproof ink was not used.
- The language used in the geotechnical logbook should be objective, factual, and free of personal feelings or terminology that might prove inappropriate.
- Chronological entries are preferred. If entries cannot be made at the time observed, record them as soon as possible, noting both the time of the entry and the time of the observation.
- Each successive day's first entry is made on a new, blank page.
- Each page should be dated, and all entries should have a time notation based on the 24-hour clock (e.g., 0900 for 9:00 a.m., 2100 for 9:00 p.m.).
- At the completion of the drilling activity, the geotechnical logbook must be placed in the permanent project file.

### 3.2.2 Format

The information listed below is not meant to be all-inclusive. Each project manager is responsible for determining the information requirements for each geotechnical logbook; such information requirements will vary depending on the nature and scope of the project.

First Page: On the first page of every daily entry, the date and project number should be entered on the top line. The proposed work for the day, weather on site, and personnel

on site follow below the date. Log entries include the time that personnel arrive on site, the time personnel depart the site, the time that site safety meetings are held (with signatures of the personnel attending the briefing), the levels of personal protection used by the team, specific activities undertaken (e.g., drilling operations, air monitoring, sample collection), and equipment calibration data. At the bottom of the page, the signature of the person keeping the log and the date should be entered.

Successive Pages: The date and project number should appear at the top of each successive page, and the person keeping the log should sign and date the page.

Last Page: On the last page of the daily log, the work completed that day and future plans and recommendations should be entered.

Samples: Each sample must be properly accounted for in the geotechnical logbook. Information entered in the log should include the location where the sample was collected; the time that the sample was collected; the type of sample (e.g., subsurface composite soil sample or groundwater sample); on-site measurement data (e.g., pH, temperature, conductivity); a preliminary description of the sample; preservatives used (if any); air monitoring instrument readings; and the Federal Express (or other carrier's) air bill number.

### 3.2.3 Photographs

If photographs are taken of soil samples, drill cuttings, or core samples, the following information should be entered in the geotechnical logbook:

- Time, location, direction, and weather conditions.
- Complete description or identification of the subject in the photograph and reason for taking the picture.
- Sequential number of photograph and film number.
- Camera type and serial number (e.g., Olympus 35-mm #1164916), and lens size and serial number (if appropriate).
- Name of photographer.

Upon return to the office, the above information will be used to prepare photograph logs.

### 3.2.4 Signature

Each page of the geotechnical logbook must be initialed by the person recording the information. When two individuals make entries on the same page, they must initial their own en-

tries. The individual making the last entry on the page must sign and date the bottom of the page.

### 3.2.5 Corrections

If corrections are necessary, they may be made by drawing a single line through the entry and writing the corrected entry next to it. The correction must be initialed and dated. Do not render the incorrect notation illegible; make the correction in such a manner that the original entry can still be read.

## 3.3 Drilling Information

Information concerning the installation of the borehole is entered in the drilling log. The geotechnical logbook is divided in such a manner that the information for four boreholes can be entered in one logbook. In addition to information about the location, start and finish dates, drill rig, and driller, a sketch indicating the location where the borehole or well was installed should be drawn.

Sample information should also be included in this section. The number of blows it took to drive the split-barrel sampler 2 feet below the bottom of the hollow-stem augers in 6-inch intervals should be recorded. The amount of soil recovered in the split-barrel sampler, organic vapor readings noted in the sample, and soil components must also be recorded in this section. An example of a completed drilling log can be found in Figure 2.

## 3.4 Lithologic Description

A description of the materials used in the construction of the monitoring well and the type of well (e.g., screened or open-hole well) must also be recorded. Figure 3 is an example of a completed well installation diagram. In addition to the well installation diagram, a narrative description of the lithology of the soil and bedrock encountered is also recorded in this section.

## 3.5 Well Development Record

The proper development of monitoring wells will prevent the buildup of fines on the screened interval and will provide groundwater samples that are representative of the groundwater conditions. To determine the volume of water to be removed from the well, the inside diameter of the monitoring well or diameter of the borehole is determined and the appropriate line is found on the table in Figure 4.

DRILLING LOG FOR MW1-1

Project Name ABC Landfill RI

Site Location Midway, TN

Date Started/Finished 1/6/94 – 1/6/94

Drilling Company E&E Drilling & Testing

Driller's Name Paul Barth

Geologist's Name Marylyn Frappa

Geologist's Signature Marylyn Frappa

Rig Type (s) DIEDRICH D50

Drilling Method (s) 4.25" HSA

Bit Size (s) _____ Auger Size (s) 8" O.D.

Auger/Split Spoon Refusal 24 ft

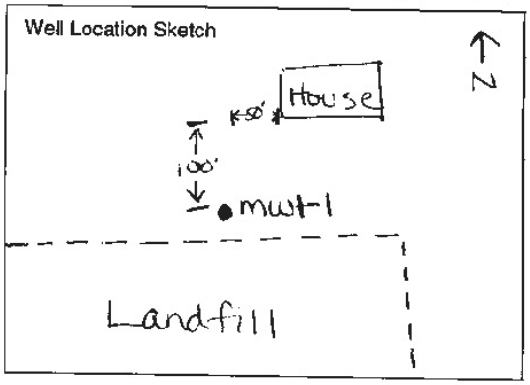
Total Depth of Borehole is 24 ft

Total Depth of Corehole is N/A

Water Level (TOIC)

| Date | Time | Level (Feet) |
|---|---|---|
| 1/6/94 | 1640 | 16.25 |
| 1/8/94 | 0920 | 13.75 |
| 1/14/94 | 0830 | 13.86 |
| 1/14/94 | 1020 | 14.26 |

Well Location Sketch




| Depth (Feet) | Sample Number | Blows on Sampler | | Soil Components CL SL S GR | Rock Profile Recovery | (PPM) Head Space | Run Number | Core Recovery | RQD | Fracture Sketch | OVA (ppm) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0'-5' Asphalt | | | | | | | | | | | | |
| 1 | | 10 | 9 | | | | | | | | | |
| 2 | 1 | 16 | 19 | SL/S | 16" | Ø ppm | 1 | N/A | | NONE | Ø PPM | |
| 3 | | 7 | 8 | | | | | | | | | |
| 4 | 2 | 10 | 9 | SL/S | 6" | Ø PPM | 2 | N/A | | NONE | Ø PPM | |
| 5 | | 6 | 8 | | | | | | | | | |
| 6 | 3 | 5 | 9 | SL/S | 10" | Ø PPM | 3 | N/A | | NONE | Ø PPM | |
| 7 | | 4 | 11 | | | | | | | | | |
| 8 | 4 | 23 | 10 | SL/S | 6" | Ø PPM | 4 | N/A | | NONE | Ø PPM | |
| 9 | | 7 | 8 | | | | | | | | | |
| 10 | 5 | 10 | 9 | SL/S | 4" | Ø PPM | 5 | N/A | | NONE | Ø PPM | |
| 11 | | 6 | 9 | | | | | | | | | |
| 12 | 6 | 26 | 32 | S/GR | 5" | 28 PPM | 6 | N/A | | NONE | 1 PPM | |
| 13 | | 12 | 24 | | | | | | | | | |
| 14 | 7 | 34 | 48 | S/GR | 6" | Ø PPM | 7 | N/A | | NONE | Ø PPM | |

**Figure 2 Drilling Information**

**SCREENED WELL**

Stick-up 2 ft

Inner Casing Material PVC

Inner Casing Inside Diameter 2 Inches

Top of Grout 0 ft

Borehole Diameter 8 Inches ft

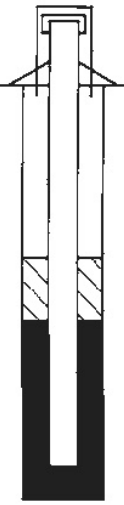
Top of Seal at 10 ft

Bottom of Seal at 12 ft

Top of Screen at 14 ft

Pack Type/Size:
- [x] Sand 00N
- [ ] Gravel
- [ ] Natural

Bottom of Screen at 24 ft



Lock Number IG031

Quanity of Material Used:
Betonite Pellets 2 Buckets
Cement 4 Bags
Cement/ Bentonite
Grout
Top of Sand Pack 12'
Screen Slot Size 0.010
Screen Type Continuous
- [x] PVC 2"
- [ ] Stainless Steel

Bottom of Hole at 24 ft

Bottom of Sandpack at 24'

**OPEN-HOLE WELL**

Stick-up ft

Inner Casing Material

Inner Casing Inside Diameter Inches

Top of Grout ft

Bottom of Outer Casing ft

Borehole Diameter ft

Bedrock ft

Bottom of Rock Socket/ Grout/Casing ft

Corehole Diameter

Bottom of Corehole ft

NOTE: See page 109 and 110 for well construction diagrams

| Depth-ft. | NARRATIVE LITHOLOGIC DESCRIPTION | Moisture Content: Dry | Moist | Wet |
|---|---|---|---|---|
| 1 | 8" Asphalt then Fill - Black + Dry (Cuttings) | ● | ○ | ○ |
| 2 | ↓ | ● | ○ | ○ |
| 3 | Fill Materials, Mainly Black Cinders, Some white Ash Last 3" | ● | ○ | ○ |
| 4 | ↓ | ● | ○ | ○ |
| 5 | Brown Sandy-Silt Matrix about 50% Small Large Gravels, Subangular | ● | ● | ○ |
| 6 | ↓ | ● | ● | ○ |
| 7 | Same as above | ○ | ● | ○ |
| 8 | ↓ | ○ | ● | ○ |
| 9 | Same as above | ○ | ● | ○ |
| 10 | ↓ | ○ | ● | ○ |
| 11 | Same as above with large Gravel 1"-2", Moist, 1PPM | ○ | ● | ○ |
| 12 | ↓ | ○ | ● | ○ |
| 13 | 3" Rock + Ground Rock, Grey Sands w/ | ○ | ● | ○ |
| 14 | ↓ | ○ | ○ | ● |
| | | ○ | ○ | ● |

**Figure 3 Well Construction/Lithologic Description**

## WELL DEVELOPMENT RECORD

SITE ABC Landfill DATE 1/14/94

LOCATION Midway, TN WELL NO. MW1-1

### MEASUREMENT OF WATER LEVEL AND WELL VOLUME

- Prior to sampling, the static water level and total depth of the well will be measured with a calibrated weighted line. Care will be taken to decontaminate equipment between each use to avoid cross contamination of wells.
- The number of linear feet of static water (difference between static water level and total depth of well) will be calculated.
- The static volume will be calculated using the formula:

$$V = Tr^2 (0.163)$$

Where:
V = Static volume of well in gallons;
T = Depth of water in the well, measured in feet;
r = Inside radius of well casing in inches;
and 0.163 = A constant conversion factor which compensates for $r^2h$ factor for the conversion of the casing radius from inches to feet, the conversion of cubic feet to gallons, and (pi).
1 well volume (v) = _____ gallons.

**Volume of Water in Casing or Hole**

| Diameter of Casing or Hole (n) | Gallons per Foot of Depth | Cubic Feet per Foot of Depth | Liter per Meter of Depth | Cubic Meters per Meter of Depth |
|---|---|---|---|---|
| 1 | 0.041 | 0.0055 | 0.509 | $0.509 \times 10^{-3}$ |
| 11/2 | 0.092 | 0.0123 | 1.142 | $1.142 \times 10^{-3}$ |
| 2 | 0.163 | 0.0218 | 2.024 | $2.024 \times 10^{-3}$ |
| 21/2 | 0.255 | 0.0341 | 3.167 | $3.167 \times 10^{-3}$ |
| 3 | 0.367 | 0.0491 | 4.558 | $4.558 \times 10^{-3}$ |
| 31/2 | 0.500 | 0.0668 | 6.209 | $6.209 \times 10^{-3}$ |
| 4 | 0.653 | 0.0873 | 8.110 | $8.110 \times 10^{-3}$ |
| 41/2 | 0.826 | 0.1104 | 10.260 | $10.260 \times 10^{-3}$ |
| 5 | 1.020 | 0.1364 | 12.670 | $12.670 \times 10^{-3}$ |
| 51/2 | 1.234 | 0.1650 | 15.330 | $15.330 \times 10^{-3}$ |
| 6 | 1.469 | 0.1963 | 18.240 | $18.240 \times 10^{-3}$ |
| 7 | 2.000 | 0.2673 | 24.840 | $24.840 \times 10^{-3}$ |
| 8 | 2.611 | 0.3491 | 32.430 | $32.430 \times 10^{-3}$ |
| 9 | 3.305 | 0.4418 | 41.040 | $41.040 \times 10^{-3}$ |
| 10 | 4.080 | 0.5454 | 50.670 | $50.670 \times 10^{-3}$ |
| 11 | 4.937 | 0.6600 | 61.310 | $61.310 \times 10^{-3}$ |
| 12 | 5.875 | 0.7854 | 72.960 | $72.960 \times 10^{-3}$ |
| 14 | 8.000 | 1.0690 | 99.350 | $99.350 \times 10^{-3}$ |
| 16 | 10.440 | 1.3960 | 129.650 | $129.650 \times 10^{-3}$ |
| 18 | 13.220 | 1.7670 | 164.180 | $164.180 \times 10^{-3}$ |
| 20 | 16.320 | 2.1820 | 202.680 | $202.680 \times 10^{-3}$ |
| 22 | 19.750 | 2.6400 | 245.280 | $245.280 \times 10^{-3}$ |
| 24 | 23.500 | 3.1420 | 291.850 | $291.850 \times 10^{-3}$ |
| 26 | 27.590 | 3.6870 | 342.520 | $342.520 \times 10^{-3}$ |
| 28 | 32.000 | 4.2760 | 397.410 | $397.410 \times 10^{-3}$ |
| 30 | 36.720 | 4.9090 | 456.020 | $456.020 \times 10^{-3}$ |
| 32 | 41.780 | 5.5850 | 518.870 | $518.870 \times 10^{-3}$ |
| 34 | 47.180 | 6.3050 | 585.680 | $585.680 \times 10^{-3}$ |
| 36 | 52.880 | 7.0690 | 656.720 | $656.720 \times 10^{-3}$ |

1 Gallon = 3.785 liters
1 Meter = 3.281 feet
1 Gallon water weighs 8.33 lbs. = 37.785 kilograms
1 Liter water weighs 1 kilogram = 2.205 pounds
1 Gallon per foot of depth = 12.419 liters per foot of depth
1 Gallon per meter of depth = $12.419 \times 10^{-3}$ cubic meters per meter of depth

### INITIAL DEVELOPMENT WATER

WATER LEVEL (TOIC) 13.86'
WELL DEPTH (TD) 24
COLOR Brown Silty
ODOR Musty
CLARITY Opaque

### FINAL DEVELOPMENT WATER

WATER LEVEL (TOIC) 14.26'
WELL DEPTH (TD) 24'
COLOR Clear
ODOR None
CLARITY Clear

DESCRIPTION OF DEVELOPMENT TECHNIQUE Stainless Steel Hand Bailer. Measured volume removed with bucket.

**Figure 4 Well Development Record**

### 3.6 Well Development—Parameter Measures

Physical measurements are made on samples of the groundwater during well development. At routine intervals, a sample of the development water is tested for temperature, conductivity, corrosivity (pH), and turbidity. The results of each test are recorded as shown in Figure 5. When two consecutive tests have the same readings, development of the well is considered complete.

### 3.7 Investigation-Derived Waste Inventory

In most instances, the drill cuttings, drilling fluids, development and purge water, and personal protective equipment must be containerized and handled as a hazardous waste as described by the Resource Conservation and Recovery Act (RCRA) until analytical results are available to reclassify the wastes. All hazardous wastes must be properly marked and labeled and must be disposed of in a specific period of time. The contents of each container, the source of the waste, the date that the waste was generated, the approximate volume of waste in the container, and the location where the container is being stored must be noted in the geotechnical logbook. Figure 6 is an example of a completed investigation-derived waste inventory sheet.

## 4. Trip Report

The geologist or team leader is responsible for filing a trip report upon returning to the office. The trip report must include information regarding the persons making the trip; the date of the trip; location of the trip; and, most importantly, the purpose of the trip. The trip report provides the means to convey information gathered and observed to the project manager. Trip reports should be written and submitted within two working days of return from a trip. Figure 7 shows the format for a trip report.

## 5. References

United States Environmental Protection Agency, 1986, RCRA Groundwater Monitoring Technical Enforcement Guidance Document, OSWER Directive 9950-1, September 1986.

_____, 1986, Region IV Engineering Support Branch, Standard Operating Procedures and Quality Assurance Manual, April 1986.

**WELL DEVELOPMENT - PARAMETER MEASUREMENTS**

| TIME | TOTAL VOL. WITHDRAWN | | pH | COND. (umhos/cm) | TEMP. ( c) | TURB. (NTU) | COMMENTS |
|---|---|---|---|---|---|---|---|
| | GALS. | BORE VOL. | | | | | |
| 0830 | 0 | 26 | 9.23 | 4.86 | 20°C | – | |
| 0838 | 2 | 26 | 8.52 | 4.69 | 20.2° | – | |
| 0845 | 4 | 26 | 8.49 | 4.67 | 20.3° | – | |
| 0852 | 6 | 26 | 8.37 | 4.65 | 20.4° | – | |
| 0900 | 8 | 26 | 8.14 | 4.63 | 20.5° | – | |
| 0908 | 10 | 26 | 8.05 | 4.63 | 20.5° | – | |
| 0913 | 12 | 26 | 7.96 | 4.58 | 20.4° | – | |
| 0926 | 14 | 26 | 7.92 | 4.50 | 20.4° | – | |
| 0933 | 16 | 26 | 7.91 | 4.49 | 20.6° | – | |
| 0945 | 18 | 26 | 7.90 | 4.48 | 20.7° | – | |
| 0953 | 20 | 26 | 7.89 | 4.42 | 20.8° | – | |
| 1005 | 22 | 26 | 7.88 | 4.40 | 21.0° | – | |
| 1014 | 24 | 26 | 7.88 | 4.39 | 21.1° | – | |
| 1020 | 26 | 26 | 7.88 | 4.39 | 21.1° | – | |

DEVELOPED BY: Kevin Williamson DATE 1/14/94

**Figure 5 Well Development-Parameter Measurements**

**INVESTIGATION-DERIVED WASTE INVENTORY SHEET**

Site: ABC Landfill, Midway TN (22-1020) No. of Drums 6

Inventory Date: January 15, 1994

| Waste Source | Drum/Container ID Number | Date Generated | Contents (Solid, Liquids, etc.) | Approximate Volume | Drum Location/ Comments |
|---|---|---|---|---|---|
| MW1-1 | 22001 | 1/6/94 | Drill Cuttings | Full | Site 1 Staging Area |
| MW1-1 | 22002 | 1/6/94 | Drill Fluids | Full | Site 1 Staging Area |
| MW1-2 | 22003 | 1/7/94 | Drill Cuttings | Full | Site 1 Staging Area |
| MW1-2 | 22004 | 1/7/94 | Drill Fluids | Full | Site 1 Staging Area |
| MW1-1 | 22005 | 1/14/94 | Dev. / Purge Water | 1/2 Full | Site 1 Staging Area |
| MW1-2 | 22006 | 1/14/94 | Dev./Purge Water | 1/2 Full | Site 1 Staging Area |

**Figure 6 Investigation-Derived Waste Inventory**

**TRIP REPORT**

**Project No. _____**

FROM: Persons Making Trip

TO: Project Manager and/or Staff Members

DATE: Date of Trip

LOCATION: Region, Municipality, or Agency with Address Visited

PURPOSE: Reason for Trip

TRIP DISCUSSION: _____

_____

_____

_____

_____

_____

_____

List of Accompanying Contact Reports (if appropriate)
Person Contacted and Date

**Figure 7 Trip Report Format**

| | |
|---|---|
| **Title:** | **SAMPLE PACKAGING** |
| **Category:** | ENV 3.16 |
| **Revised:** | May 2001 |

STANDARD OPERATING PROCEDURE

# SAMPLE PACKAGING

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**ecology and environment, inc.**
368 Pleasant View Drive / Lancaster, New York 14086 / (716) 684-8060

| | | | |
|---|---|---|---|
| **TITLE:** | **SAMPLE PACKAGING** | | |
| **CATEGORY:** | ENV 3.16 | **REVISED:** | May 2001 |

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# 1. Introduction

Liquid and solid environmental samples are routinely collected by E & E during field surveys, site investigations, and other site visits for laboratory analysis. Unless the samples have anesthetic, noxious, or other properties that could inhibit the ability of a flight crew member to perform his or her duty or are known to meet the established U.S. Department of Transportation criteria for hazardous material (i.e., explosive, corrosive, flammable, poisonous), they are not regulated as hazardous materials.

This Standard Operating Procedure (SOP) describes the packaging procedures to be used by E & E's staff to ensure the safe arrival of the samples at the laboratory for analyses. These procedures have been developed to reduce the risk of damage to the samples (i.e., breakage of the sample containers), promote the maintenance of sample temperature within the cooler, and prevent spillage of the sampled material should a container be broken.

In the event the sample material meets the established criteria of a DOT hazardous material, the reader is referred to E & E's Hazardous Materials/Dangerous Goods Shipping Guidance Manual (see H&S 5.5).

# 2. Scope

This SOP describes procedures for the packaging of environmental samples in:

- Coolers;
- Steel, aluminum and plastic drums; and
- 4GV fiberboard boxes.

The Hazardous Materials/Dangerous Goods Shipping Guidance Manual will complete the information needed for shipping samples by providing guidance on:

- Hazard determination for samples which meet the USDOT definition of a hazardous material;
- Shipping profiles for "standard" shipments;
- Shipping procedures for "non-standard" shipments;
- Marking of packages containing hazardous materials;
- Labeling of packages containing hazardous materials; and
- Preparation of shipping papers for hazardous materials shipment.

# 3. Sample Packaging Procedures

## 3.1 General

It is E & E's intent to package samples so securely that there is no chance of leakage during shipment. This is to prevent the loss of samples and the expenditure of funds for emergency responses to spills and the efforts necessary to re-obtain the sample.

Over the years, E & E has developed several "standard" package configurations for the shipping of environmental samples. These standard package configurations are described below.

Liquid samples are particularly vulnerable. Because transporters (carriers) do not know the difference between a package leaking distilled water and a package leaking a hazardous chemical, they will react to a spill in an emergency fashion, potentially causing enormous expense to E & E for the cleanup of the sample material. Therefore, liquids are to be packed in multiple layers of plastic bags and absorbent/cushioning material to preclude any possibility of leaks from a package. This section defines the standard packaging configurations for environmental samples.

## 3.2 Liquid Environmental Sample Packaging Procedures

Liquid environmental samples should be collected and preserved as outlined in the Standard Operating Procedures (SOP) for Surface Water Sampling (ENV 3.12), and Groundwater Well Sampling (ENV 3.7). ***Preserved water samples are not considered to meet the HM/DG definitions of Class 8 (Corrosive) and are therefore considered to be nonhazardous samples.*** Liquid environmental samples may be shipped using an 80-quart cooler or an outer package consisting of either a steel or aluminum drum. Because the steel and aluminum drums provide little insulating capability, they should not be used for samples that require icing.

### Packaging Liquid Environmental Samples Using the 80-Quart Cooler

- Label and seal all water sample bottles according to appropriate sampling SOPs;
- Secure the bottle caps using fiberglass tape; and
- Place each amber, poly, and volatile organic analysis (VOA) bottle in a sealable plastic bag. Mark the temperature blank VOA bag for identification.

If a foam block insert is used:

- Line the cooler with two plastic bags;
- Place a foam insert (with holes cut to receive the sample bottles) inside the plastic bag;
- Place the bottles in the holes in the foam block;

- Fill void spaces with bagged ice to the top of the cooler;
- Fold over the plastic bags lining the cooler and secure shut with tape;
- Place Chain-of-Custody (C-O-C) form in a sealable bag and tape it to the inside of the cooler lid; and
- Secure the cooler with strapping tape and custody seal. Cover the custody seals with clear tape.

If vermiculite is used:

- Place 1 inch of inert absorbent material (vermiculite) in the bottom of the cooler;
- Line the cooler with two plastic bags;
- Place each sample bottle inside the inner bag;
- Fill the void spaces around the bottles with vermiculite to about half the height of the large bottles;
- Fill the remainder of the void spaces with bagged ice to within 4 inches of the top of the cooler, making sure the VOAs are in direct contact with a bag of ice;
- Fold over the plastic bags lining the cooler and secure shut with tape;
- Fill the remaining space in the cooler with vermiculite to the top of the cooler;
- Place C-O-C form in a sealable bag and tape it to the inside of the cooler lid; and
- Secure the cooler with strapping tape and custody seal. Cover the custody seals with clear tape.

### Alternate Packaging Using 1A2/1B2 Drum

- Place 3 inches of inert absorbent material (vermiculite) in the bottom of the drum;
- Line the drum with two plastic bags;
- Place each sample bottle inside the inner bag;
- Fill the void spaces around the bottles with vermiculite to the height of the larger bottles;

- Fold over the plastic bags lining the drum and secure shut with tape;
- Fill the remaining space in the drum with vermiculite to the top of the drum;
- Place C-O-C form in a sealable bag and tape it to the inside of the drum lid; and
- Secure the drum with closing ring and apply custody seals. Cover the custody seals with clear tape.

## 3.3 Soil/Sediment Environmental Sample Packaging Procedures

Soil/sediment environmental samples should be collected as outlined in the SOP for Soil Sampling (ENV 3.13), and SOP for Sediment Sampling (ENV 3.8). Soil/sediment environmental samples may be shipped using an 80-quart cooler, a 4GV fiberboard combination package, or an outer package consisting of either a steel or aluminum drum. Because the steel and aluminum drums provide little insulating capability, they should not be used for samples that require icing.

### Packaging Soil/Sediment Environmental Samples

- Label and seal each sample container according to SOPs;
- Secure the bottle caps using fiberglass tape;
- Place each sample bottle inside a sealable plastic bag and place it in its original shipping box or in individual fiberboard boxes. Mark the temperature blank bag for identification; and
- Secure the original shipping box with strapping tape, place shipping box in a plastic bag, and secure the plastic bag with tape.

If an 80-quart cooler is used:

- Place bubble pack or similar material on the bottom and sides of an 80-quart cooler;
- Place the bagged shipping boxes in the cooler with a layer of bubble pack between each box;
- Fill the void spaces with “blue ice” or ice in baggies to the top of the cooler;
- Place C-O-C form in a sealable baggie and tape it to the inside of the cooler lid; and
- Secure the cooler with strapping tape and custody seal. Cover the seals with clear tape.

If a 1A2/1B2 drum is used:

- Place 3 inches of inert absorbent material (vermiculite) in the bottom of the drum;
- Line the drum with two plastic garbage bags;
- Place the boxes inside the inner bag;
- Fill the space around the samples with vermiculite;
- Fold over the plastic bags lining the drum and secure shut with tape;
- Fill the remaining space around the bags with vermiculite to the top of the drum;
- Place C-O-C form in a sealable bag and tape it to the inside of the drum lid; and
- Secure the drum with the closing ring and apply custody seals. Cover the custody seals with clear tape.

Note: If a small number of samples are being shipped, it may be more practical to package them using the vermiculite or foam block configurations used for shipping liquid samples.

# 4. Shipping Procedures

Environmental samples are to be shipped as nonhazardous cargo. Unless the samples have anesthetic, noxious, or other properties that could inhibit the ability of a flight crew member to perform his or her duty or are known to meet the established U.S. Department of Transportation criteria for a hazardous material (i.e., explosive, corrosive, flammable, poisonous), they are not regulated as hazardous materials. When preparing the containers (i.e., cooler, drum, or box) for shipment, E & E staff must remove all labels from the outside container. Labels indicating that the contents may be hazardous are misleading and are not appropriate. Markings indicating ownership of the container, destination, and chain of custody labels are acceptable and can be attached as required.

When completing the paperwork for shipment, the standard nonhazardous forms must be used. Do not use the hazardous materials/dangerous goods airbills, either in total or in part; these forms are coded and their use will invite unnecessary questions. This will only serve to confuse Airborne or Federal Express' terminal personnel and will cause much frustration and the delay of sample shipment.

Environmental sample packages can be shipped overnight by both Airborne and Federal Express. When choosing between the two, cost should be considered. It is normally much cheaper to ship Airborne. For work conducted and paid for by E & E, it is E & E's policy that you must first attempt to ship by Airborne before considering Federal Express. In addition, Airborne tends to have remote locations open later in the evenings than Federal Express, which may

be helpful when trying to complete a full day's sampling effort and still make the flights on time. Although both companies offer pickup of samples at the site, it is advisable to call ahead and ensure that this service is offered beforehand. In almost all cases, both companies will deliver to the laboratory of your choice on Saturdays. When planning for sampling activities, check with the companies in advance to verify pick-up and delivery schedules.

# APPENDIX B

# Field Forms

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HERRERA
ENVIRONMENTAL
CONSULTANTS

# SEDIMENT CORE RECORD

Sample Station Number _____

Sheet _____ of _____

Project name Oakland Bay Sediment Characterization

Project number 06-03386-007

Client Ecology

HEC Samplers _____

Date Sampled _____

Location _____

Photo number _____

| Wood chips (Y or N) | Soil Description / Comments | Time Sampled | Depth (feet) | Sample Interval | Sediment Core Log |
|---|---|---|---|---|---|
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| | | | 2 | | |
| | | | 3 | | |
| | | | 4 | | |

HERRERA ENVIRONMENTAL CONSULTANTS

**2200 Sixth Avenue, Suite 1100**
**Seattle, Washington 98121**
**(206) 441-9080**
**FAX (206) 441-9108**

# CHAIN OF CUSTODY RECORD



| PROJECT NAME: Oakland Bay | PROJECT NUMBER: 06-03386-007 | CLIENT: Ecology |
|---|---|---|
| REPORT TO: Gina Catarra, Herrera | | COPY TO: |
| SAMPLED BY: | | DELIVERY METHOD: |
| LABORATORY: | REQUESTED COMPLETION DATE: | TOTAL # OF CONTAINERS: |
| LAB USE: | | |

ANALYSES REQUESTED

| SAMPLE ID: | DATE: | TIME: | SAMPLE DESCRIPTION | # OF CONTAINERS: | | | | | | | | | | | | | | | | | |
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REMARKS:

| RELINQUISHED BY (NAME/CO.): | SIGNATURE: | DATE/TIME: | RECEIVED BY (NAME/CO.): | SIGNATURE: | DATE/TIME: |
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| RELINQUISHED BY (NAME/CO.): | SIGNATURE: | DATE/TIME: | RECEIVED BY (NAME/CO.): | SIGNATURE: | DATE/TIME: |