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August 18, 2008

Brandon Perkins, Task Monitor
United States Environmental Protection Agency
1200 Sixth Avenue, Mail Stop ECL-112
Seattle, Washington 98101

Re: Contract Number: EP-S7-06-02
Technical Direction Document Number: 06-07-0004
Final North Morrow Groundwater Site: Milk Sampling and Quality Assurance Plan

Dear Mr. Perkins:

Enclosed please find the final Sampling and Quality Assurance Plan for the milk phase of the North Morrow Groundwater Expanded Site Inspection which is located in Morrow and Umatilla Counties, Oregon. There were no changes to the appendices of this document. It is noted; however, that vermiculite may not be used in the packaging of sample coolers. The Sample Packaging Standard Operating Procedure is currently under review at our headquarters and will be revised in the near future. If you have any questions regarding this submittal, please call me at (206) 624-9537.

Sincerely,
ECOLOGY AND ENVIRONMENT, INC.

Renee L. Nordeen

Renee Nordeen
START-3 Project Leader

cc: Mark Woodke, Project Manager, E & E, Seattle, Washington

Final North Morrow Groundwater Site : Milk Sampling Sampling and Quality Assurance Plan Morrow and Umatilla Counties, Oregon

TDD Number: 06-07-0004

August 2008

Prepared for:
United States Environmental Protection Agency
1200 Sixth Avenue, Mail Stop ECL-112
Seattle, Washington 98101

Prepared by:
ECOLOGY AND ENVIRONMENT, INC.
720 Third Avenue, Suite 1700
Seattle, Washington 98104

SAMPLING AND QUALITY ASSURANCE PLAN FOR:

North Morrow Groundwater Site: Milk Sampling
Morrow and Umatilla Counties, Oregon

Contract Number: EP-S7-06-02
Technical Direction Document Number: 06-07-0004

Prepared By:
Mark Woodke, Project Manager
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720 Third Avenue, Suite 1700
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Submitted To:
Brandon Perkins, Task Monitor
United States Environmental Protection Agency
1200 Sixth Avenue, Mail Stop ECL-112
Seattle, Washington 98101

Date: August 18, 2008

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List of Abbreviations and Acronyms

Acronym	Definition
DQIs	Data Quality Indicators
DQOs	Data Quality Objectives
E & E	Ecology & Environment Inc.
EPA	United States Environmental Protection Agency
ESI	Expanded Site Inspection
FDA	United States Food and Drug Administration
FOWP	Field Operations Work Plan
FUDS	Formerly Used Defense Site
GIS	Geographic Information System
GPS	Global Positioning System
GWMA	Groundwater Management Area
LCS	Laboratory Control Sample
LUB	Lower Umatilla Basin
MEL	Manchester Environmental Laboratory
Mg/kg-day	Milligram per kilogram-day
NAD	North American Datum
NMG	North Morrow Groundwater
NMPS	North Morrow Perchlorate Study
NPL	National Priorities List
ODEQ	Oregon Department of Environmental Quality
PA	Preliminary Assessment
PE	Performance Evaluation
PO	Project Officer
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QMP	Quality Management Plan
RfD	Reference Dose
RPD	Relative Percent Difference
RSCC	Regional Sample Control Coordinator
SDMS	Site Data Management System
SHINE	Superfund Health Investigation and Education
SI	Site Inspection
SIS	Sample Information System
SOP	Standard Operating Procedure
SOW	Statement of Work
SPAF	Sample Plan Alteration Form
SQAP	Sampling and Quality Assurance Plan

List of Abbreviations and Acronyms (cont.)

Acronym	Definition
START	Superfund Technical Assessment and Response Team
TDD	Technical Direction Document
TM	Task Monitor
WSI	Weston Solutions, Incorporated

1 Project Management

1.1 Project/Task Organization

This subsection outlines the individuals directly involved with the milk phase of the North Morrow Groundwater (NMG) Expanded Site Inspection (ESI) and their specific responsibilities. Communication lines are shown in the Project Organization Chart (Figure 1-1).

1.1.1 United States Environmental Protection Agency, Region 10, Task Monitor

The United States Environmental Protection Agency (EPA) Task Monitor (TM) is the overall coordinator of the project and decision maker. The TM reviews and approves the site-specific sampling and quality assurance plan (SQAP) and subsequent revisions in terms of project scope, objectives, and schedules. The TM ensures site-specific SQAP implementation and is the primary point of contact for project problem resolution and has approving authority for the project.

1.1.2 EPA Region 10 Quality Assurance Officer

The EPA Quality Assurance (QA) officer reviews and approves the site-specific SQAP and revisions in terms of QA aspects and may conduct assessments of field activities.

1.1.3 EPA, Region 10, Regional Sample Control Coordinator

The EPA Regional Sample Control Coordinator (RSCC) coordinates sample analyses performed through the EPA Region 10 Manchester Environmental Laboratory (MEL) and provides sample identification numbers.

1.1.4 Ecology & Environment Inc. Superfund Technical Assessment and Response Team-3 Project Manager

The Ecology & Environment Inc. (E & E) Superfund Technical Assessment and Response Team (START)-3 PM provides overall coordination of field work and provides oversight during the preparation of the site-specific SQAP. The PM implements the final approved version of the site-specific SQAP and records any deviations and acts as the primary contact point with the EPA TM. The PM receives EPA Region 10 laboratory information from the RSCC, acts as primary START-3 point of contact for technical problems, and is responsible for the execution of decisions and courses of action deemed appropriate by the TM. In the absence of the START-3 PM, a START-3 site manager will assume the PM's responsibilities.

1.1.5 E & E START-3 Quality Assurance Officer

The Quality Assurance Officer (QAO) reviews and approves the site-specific SQAP, conducts in-house audits of field operations, and is responsible for auditing and reviewing the field activities and final deliverables and proposing corrective action, if necessary, for nonconformities.

1.1.6 E & E START-3 Program Manager and EPA Project Officer

The Project Officer (PO) is responsible for coordinating resources requested by the TM for this project and for the overall execution of the START-3 program.

1.2 Problem Definition/Background

Pursuant to EPA START-3 Contract Number EP-S7-06-02 and Technical Direction Document (TDD) Number 06-07-0004, E & E will perform an ESI at the NMG site which is located in Morrow and Umatilla Counties, Oregon. Previous work under the TDD included sampling and analysis of watermelons. This document outlines the technical and analytical approaches E & E will employ during the milk phase of the ESI. This document is a combined field operations work plan (FOWP) and site-specific quality assurance project plan (QAPP) for field sampling activities. The combined FOWP/QAPP; hereafter called the SQAP, includes a brief site summary, project objectives, sampling and analytical procedures, and QA requirements that will be used to obtain valid, representative field samples and measurements. The SQAP is intended to be combined with information presented in E & E's (2005a) quality management plan (QMP) for Region 10 START-3. A copy of the QMP is available in E & E's office located at 720 Third Avenue, Suite 1700, Seattle, Washington 98104.

1.2.1 Site Description and Location

The NMG site is situated in the Lower Umatilla Basin (LUB) Groundwater Management Area (GWMA). The LUB, located in northeastern Oregon, consists primarily of rural, agricultural communities (Figure 1-2). It has a semi-arid climate and is sparsely populated with the majority of people residing in the towns of Hermiston, Boardman, Echo, Irrigon, Umatilla, and Stanfield.

Site Name	North Morrow Groundwater
CERCLIS ID Number:	ORN001002612
Site Address:	Morrow and Umatilla Counties, Oregon
County:	Morrow and Umatilla
Congressional District:	2

1.2.2 Site Operations and Source Characteristics

In 1990, the Oregon Department of Environmental Quality (ODEQ) declared the LUB a GWMA due to widespread nitrate contamination. In many areas, the nitrate concentrations in groundwater exceeded the federal safe drinking water standards. ODEQ has been monitoring nitrate in the area since its declaration of a GWMA. During the fall of 2003, ODEQ and the EPA initiated testing for perchlorate in addition to routine nitrate testing. Low concentrations of perchlorate were detected in over half of the 133 water wells sampled in portions

of Morrow and Umatilla counties. The source of the perchlorate has not been determined.

Perchlorate can be a naturally occurring chemical in the environment or it can be manufactured for industrial use. Ammonium perchlorate and sodium perchlorate are examples of manufactured perchlorate salts. Perchlorate salts are used primarily as oxidizers in solid rocket fuel, missiles, and some explosive compositions. Other uses of perchlorate include highway safety flares, fireworks, matches, some dyes, lubricating oils, electroplating, some pesticides, and medical supplies.

Perchlorate can occur naturally in some mineral formations such as Chilean nitrates. Chilean nitrates have been used as a component in some fertilizers. Perchlorate easily dissolves in water and so can be carried into lakes and ponds, streams and rivers, and can migrate into the groundwater from overlaying soils.

Perchlorate disrupts iodine uptake in the thyroid gland and can interfere with thyroid hormone production. Due to possible adverse health effects, people should avoid using water containing perchlorate for drinking and cooking. The National Academy of Science has specified pregnant women, fetuses, infants, and individuals with thyroid disorders as populations that may be more sensitive to the health effects of perchlorate exposure.

EPA Region 10's preliminary exposure assessment calculations using the Oregon Department of Human Services Superfund Health Investigation & Education (SHINE) Program milk data collected from local stores from LUB indicate that the perchlorate intake from milk is 47% and 24% for one-year olds and three-year olds; respectively. During a national survey, FDA obtained similar results with preliminary estimation of perchlorate intake from milk at 47%. of the total perchlorate intake.

In January of 2006, EPA adopted a reference dose (RfD) for perchlorate of 0.0007 milligram/kilogram-day (mg/kg-day). Since previous studies in the LUB area indicated the presence of perchlorate from drinking water wells, to complete the exposure and intake scenario, EPA, Region 10 is conducting this one-time study to determine the concentrations of perchlorate in Grade A pasteurized milk available for consumption from major retail stores in the LUB.

The results obtained from this investigation are envisioned to address the contributory influence of milk products to the exceedances of the adopted RfD for perchlorate in the LUB area.

1.2.3 Previous Investigations

1.2.3.1 Preliminary Assessment/Site Inspection Report, North Morrow Perchlorate Study Area

In April 2005, Weston Solutions, Inc. (WSI) was contracted by the EPA to conduct a Preliminary Assessment (PA)/Site Inspection (SI) for the North

Morrow Perchlorate Study (NMPS) area. This report assessed groundwater and surface water conditions in the NMPS area and pathways and potential targets. In addition, existing groundwater and surface water data from previous studies was augmented and data gaps associated with nitrate and perchlorate in groundwater and surface water were filled. Further, potentially exposed populations were identified. Background samples were not collected for this project. Nitrate and perchlorate were not detected in soil or sediment samples; however, nitrate and perchlorate were detected in several groundwater wells and perchlorate was detected in one surface water sample. (WSI 2006a)

1.2.3.2 NMG ESI Report, Watermelon Phase

In August and September 2006, START and Oregon State University personnel collected 125 watermelons as part of the watermelon phase of the NMG ESI. The average nitrate concentration was 1.21 mg/kg and the average perchlorate concentration was 3.31 mg/kg, indicating nitrate and perchlorate contamination present in the locally grown watermelons. (E & E 2007)

1.2.3.3 June 2008 Site Visit

On June 25, 2008, one START member investigated the various types of milk available at licensed grocery and convenience stores in the cities of Hermiston, Stanfield, Boardman, Irrigon, and Umatilla. Area retail stores were determined using a list provided by the Oregon Department of Agriculture. Brands, milk types, processing plant codes, and container sizes were recorded and provided in a trip report to the EPA TM (E & E 2008) and are included in Table 1-1.

1.3 Project/Task Description and Schedule

1.3.1 Project Description

The primary objective of this sampling event is to gather data to determine if levels of perchlorate in milk such that when combined with other exposure routes exceed the adopted RfD. This will be accomplished by collecting on-shelf Grade A pasteurized milk samples from major retailers in the LUB.

The processing plant code will be used to determine the variety of milk sources, for the products of interest, in the LUB available for purchase. Processing plant codes are used nationally as a system for the identification of pasteurization plants at which milk products are packaged. Using these processing plant codes, milk can be traced back to the plant where the milk was packaged.

Ultimately to obtain the data set most representative of milk available for intake, each processing plant code would be sampled. The processing plant codes available in the LUB were determined during a reconnaissance of the local major retailers and are provided in Table 1-1.

While purchasing milk samples, the processing plant codes and lot numbers will be recorded for each container in the field logbook. To obtain the most representative data set, every attempt will be made to purchase one container of milk from each processing plant as listed in Table 1-1. The EPA TM will be

contacted for direction from the field if any containers listed in Table 1-1 are not available.

The milk samples will be analyzed for perchlorate and the data generated will be used to:

- Calculate the total perchlorate intake using regional drinking water data and FDA Total Diet Study food data. EPA collected regional milk data will be used in place of the FDA dairy data.
- Calculate the total perchlorate intake using regional drinking water data and Oregon Department of Human Services Superfund Health Investigation & Education (SHINE) Program food data. EPA-collected regional milk data will be used in place of SHINE milk data.
- The results obtained from the two calculations will be used to determine if the total perchlorate intakes exceed EPA's adopted RfD of 0.0007 mg/kg-day.

1.3.2 Schedule

The schedule for implementing the milk sampling phase of the NMG ESI is intended to be used as a guide. Adjustments to the implementation dates and the estimated project duration may be necessary to account for variable unforeseen or unavoidable conditions that the field team may encounter. Significant schedule changes that arise in the field will be discussed with the TM at the earliest possible opportunity.

The START-3 is targeting August 19, 2008 as the earliest period to conduct the milk ESI field work, which is estimated to take 1 day, including travel time to and from the site. The proposed schedule of project work presented in Table 1-2.

1.4 Quality Objectives and Criteria for Measurement Data

The project data quality objectives (DQOs) are to provide valid data of known and documented quality to document threat(s) or potential threat(s) to public health or the environment. The DQO process applied to this project follows that described in the document *Guidance for the Data Quality Objectives Process* (EPA 2000). See subsection 2.5 for a detailed measurement criteria discussion.

1.4.1 DQO Data Categories

All samples collected under this SQAP will be analyzed using definitive analytical methods. All definitive analytical methods employed for this project will be methods approved by the EPA. The data generated under this project will comply with the requirements for this data category as defined in *Data Quality Objectives Process for Superfund* (EPA 1993).

1.4.2 Data Quality Indicators

Data quality indicators (DQI), representativeness, comparability, completeness, precision, and accuracy, goals for this project were developed following guidelines presented in the EPA *Guidance for Quality Assurance Project Plans*, EPA QA/G-5 (EPA 2002).

The basis for assessing each of the elements of data quality is discussed in the following subsections. Subsection 2.5 presents the QA objectives for measurement of analytical data and quality control (QC) guidelines for precision and accuracy. Other DQI goals are included in the individual Standard Operating Procedures (SOPs) in Appendix A and in the Laboratory Statement of Work (SOW).

1.4.2.1 Representativeness

Representativeness is a measure of the degree to which data accurately and precisely represents a population, including a sampling point, a process condition, or an environmental condition. Representativeness is the qualitative term that should be evaluated to determine that measurements are made, and physical samples collected, at locations and in a manner resulting in characterizing a matrix or media. Subsequently, representativeness is used to ensure that a sampled population represents the target population and an aliquot represents a sampling unit. This SQAP will be implemented to establish Representativeness for this project. Further, all sampling procedures detailed in the SQAP will be followed to ensure that the data will be representative of the media sampled. The SQAP describes the sample location, sample collection, and handling techniques that will be used to avoid contamination or compromise sample integrity, and ensure proper chain-of-custody of samples. Additionally, the sampling design presented in the SQAP will ensure that there are a sufficient number of samples and level of confidence that analysis of these samples will detect the chemicals of concern, if present.

1.4.2.2 Comparability

Comparability is the qualitative term that expresses the measure of confidence that two data sets or batches can contribute to a common analysis and evaluation. Comparability with respect to laboratory analyses pertains to method type comparison, holding times, stability issues, and aspects of overall analytical quantitation. The following items are evaluated when assessing data comparability:

- Determining if two data sets or batches contain the same set of parameters.
- Determining if the units used for each data set are convertible to a common metric scale.
- Determining if similar analytical procedures and quality assurance were used to collect data for both data sets.
- Determining if the analytical instruments used for both data sets have approximately similar detection levels.
- Determining if samples within data sets were selected and collected in a similar manner.

To ensure comparability of data collected during this investigation to other data that may have been or may be collected for each property, standard collection and measurement techniques will be used.

1.4.2.3 Completeness

Completeness is calculated for the aggregation of data for each analyte measured for any particular sampling event or other defined set of samples. Completeness is calculated and reported for each method, matrix, and analyte combination. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set. For completeness requirements, valid results are all results not rejected through data validation. The requirement for completeness is 95% for aqueous samples and 90% for soil and sediment samples. For the milk samples, the requirement for completeness is 95%.

The following formula is used to calculate completeness:

$$\% \text{ completeness} = \frac{\text{number of valid results} \times 100}{\text{number of possible results}}$$

For any instances of samples that could not be analyzed for any reason (holding time violations in which resampling and analysis were not possible, samples spilled or broken, etc.), the numerator of this calculation becomes the number of valid results minus the number of possible results not reported. For this investigation, all samples are considered critical. Therefore standard collection and measurement methods will be used to achieve the completeness goal.

1.2.4.4 Precision

Precision measures the reproducibility of measurements. It is strictly defined as the degree of mutual agreement among independent measurements as the result of repeated application of the same process under similar conditions. *Analytical* precision is the measurement of the variability associated with duplicate (two) or replicate (more than two) analyses. The laboratory control sample (LCS) determines the precision of the analytical method. If the recoveries of the analytes in the LCS are within established control limits, then precision is within limits. In this case, the comparison is not between a sample and a duplicate sample analyzed in the same batch. Rather, the comparison is between the sample and samples analyzed in previous batches.

Total precision is the measurement of the variability associated with the entire sampling and analysis process. It is determined by analysis of duplicate or replicate field samples and measures variability introduced by both the laboratory and field operations. Field duplicate samples and matrix duplicate spiked samples shall be analyzed to assess field and analytical precision, and the precision measurement is determined using the relative percent difference (RPD) between the duplicate sample results.

The following formula is used to calculate precision:

$$RPD = (100) \times \frac{(S1 - S2)}{(S1 + S2)/2}$$

where:

S1 = original sample value
S2 = duplicate sample value

In general, precision less than or equal to 35% relative percent difference will fulfill the DQOs.

1.4.2.5 Accuracy

Accuracy is a statistical measurement of correctness and includes components of random error (variability due to imprecision) and systemic error. It reflects the total error associated with a measurement. A measurement is accurate when the value reported does not differ from the true value or known concentration of the spike and standard. Analytical accuracy is measured by comparing the percent recovery of analytes spiked into an LCS to a control limit. For pesticide, PCB, volatile, and semivolatile organic compounds, system monitoring compound recoveries are also used to assess accuracy and method performance for each sample analyzed. Analysis of performance evaluation (PE) samples may also be used to provide additional information for assessing the accuracy of the analytical data being produced. In general, accuracy between 50% and 150% will fulfill the DQOs.

1.5 Special Training Requirements/Certification

No special training requirements or certifications are required for this project except for the 40-hour Hazardous Waste Operations and Emergency Response class and annual refreshers. Health and safety procedures for E & E personnel are addressed in the E & E site-specific Health and Safety Plan. This document is maintained in E & E's Seattle office. Included in the plan are descriptions of anticipated chemical and physical hazards, required levels of protection, health and safety monitoring requirements and action levels, personal decontamination procedures, and emergency procedures.

1.6 Documentation and Records

This document is meant to be combined with information presented in E & E's (2005b) *Region 10 START-3 Quality Assurance Project Plan*. This information is covered by the SOP found in Appendix A and the supplemental forms found in Appendix B. A copy of the START QAPP is available in E & E's Seattle office. Standards contained in the SOPs, the START QAPP, and the QMP will be used to ensure the validity of data generated by E & E for this project.

Following the completion of field work and the receipt of analytical data, a report summarizing project findings will be prepared. Project files, including work plans, reports, analytical data packages, correspondence, chain-of-custody

documentation, logbooks, corrective action forms, referenced materials, and photographs, will be provided to the EPA TM at the close of the project.
E & E will assemble and fully document a digital data set including all project sampling, analysis, and observation data. This digital data will be made available in a Microsoft-Access format.

Data

A summary description of the tables, the sources of information and other comments are provided below.

Field-Info

The field information table contains all sample collection related information. A Microsoft Access application (Sample Information System, SIS) will be used to input and store the data. The SIS provides the user with "smart" data input forms that will only allow for the entry of acceptable data field values. For each sampling event, the SIS will be updated to reflect the new samples collected. Once entered, the information will be checked and corrected where necessary. The table structure is presented below.

Field Name	Type	Size	Description
Sample-Num	Character	10	Sample Number
Station	Character	10	Station Identifier
Date	Date	8	Sample Date
Time	Numeric	4	Sample Time (24-Hour clock)
Sampler	Character	25	Person Name
Matrix	Character	6	Sample Matrix – (i.e., soil boring, groundwater, sediment)
Water Depth	Numeric	5.1	Depth of water as sediment sample
Description	Character	40	Sample Description
Comments	Character	40	Comments

Location

The general location of the retail store where the milk products will be purchased will be included in the chain-of-custody form. Refer to Table 1-1.

Lab Analytical

The Lab Analytical table will hold all of the sample analysis results provided by each laboratory analyzing samples. The integrity of each data file received from the labs will be checked and verified. Once the files are received, they will be appended into the SDMS Lab Analytical table. The "Sample-num" field will be used to link the "Lab Analytical" table with the "Field-Info" table. The table structure is presented below.

Field Name	Type	Size	Description
Sample-num	Character	10	Sample Number
Lab-id	Character	10	Laboratory Sample Identifier
Method	Character	25	Analytical Method Used

L-Matrix	Character	10	Laboratory Matrix
Cas-num	Character	15	Chemical Abstracts
Analyte	Character	40	Analyte Name
Result	Numeric	12.6	Analysis Result
Qual	Character	6	Sample qualifier
Quantitation-Limit	Numeric	12.6	Sample quantitation limit
Units	Character	10	Results unit
Date	Date	8	Date analyzed
Lab	Character	40	Lab name

For any Geographic Information Systems (GIS) produced maps, E & E shall provide the maps to EPA in hard copy and digital image (i.e. JPEG) formats.

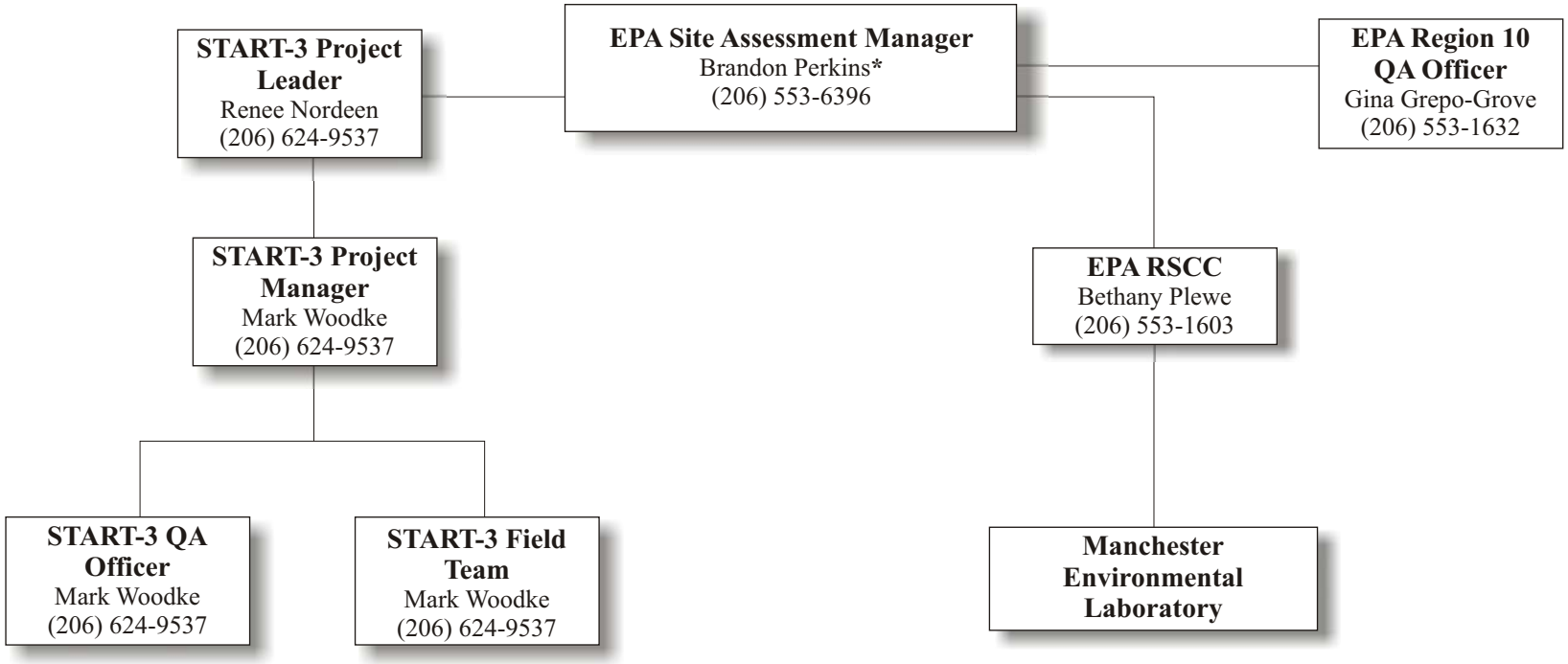
Table 1-1
Milk Sampling Information

Non Organic			
Brand[a]	**Milk Type**	**Container Code**	**Available At**
Darigold	1% Ultra Pasteurized	4134	Walmart
Darigold	Ultrapasteurized 2%	4134	Safeway
Darigold	Homogenized	4134	Walmart
Darigold	1%	4134	Safeway
Darigold	Fat Free	4134	Walmart
Viva Meadow Gold or Holland	Fat Free	1605	Irrigon Shell, Wal Mart, Mercado Los Gavilanes
Viva Meadow Gold	1%	1605	Walmart
Viva Meadow Gold or Great Value or Holland	2%	1605	Irrigon Shell, Walmart
Viva Meadow Gold	Vitamin D	1605	Walmart
Viva Meadow Gold	Whole	1605	Irrigon Shell
Disney	Low Fat	0608	Walmart
Disney	Reduced Fat	0608	Walmart
Lucerne	Whole	4118	Safeway
Lucerne	2%	4118	
Lucerne	1%	4118	
Lucerne	Fat Free	4118	
Sunshine Dairy or Western Family	Whole	5335	Stanfield Market, Rite Aid, Boardman Family Foods, Columbia Harvest
Sunshine Dairy or Western Family or Home Dairies	2%	5335	Stanfield Market, Rite Aid, Boardman Family Foods, Main Street Shell, Columbia Harvest
Western Family	1%	5335	Stanfield Market, Boardman Family Foods, Columbia Harvest
Western Family	Fat Free	5335	Stanfield Market, Boardman Family Foods, Columbia Harvest
Darilicious	Whole	No Code	Express Marts
Darilicious	2%	No Code	Express Marts
Darigold	Whole	4134	Express Marts, Main Street Shell
Darigold	2%	4134	Express Marts, Main Street Shell
Organic			
Brand	**Milk Type**	**Container Code**	**Available At**
Horizon Organic	Vitamin D	1604	Walmart
Heritage Foods Organic	Vitamin D	0608	Walmart
Heritage Foods Organic	Fat Free	0608	Walmart
Organics	Whole	4134	Safeway
Organics	2%	4134	
Organics	1%	4134	
Organics	Fat Free	4134	
Organics	Whole	4135	Safeway
Organics	2%	4135	
Organics	1%	4135	
Organics	Fat Free	4135	
Organic Valley Lactose Free	2%	27-421	Safeway

[a] When more than one brand is available for the same type of milk and container code, only one of the listed brands will be purchased.

Table 1-2 Proposed Schedule

Activity	Start Date	Completion Date
Collect pertinent background information	6/23/08	
Mobilize to the site	8/19/08	8/19/08
Sample collection activities	8/20/08	8/20/08
Laboratory receipt of samples	8/20/08	8/20/08
Demobilization from the site	8/20/08	8/20/08
Laboratory analysis	8/21/08	9/20/08
Data validation	9/21/08	10/15/08
Writing of the project report	8/21/08	10/29/08
Target project completion date		11/21/08



KEY:

* Approving Authority

ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

NORTH MORROW GROUNDWATER
MILK PHASE SQAP
Morrow and Umatilla Counties, Oregon

Figure 1-1
PROJECT ORGANIZATION CHART

Date:	Drawn by:	
8/18/08	AES	10:START-3\06070004\fig 1-1

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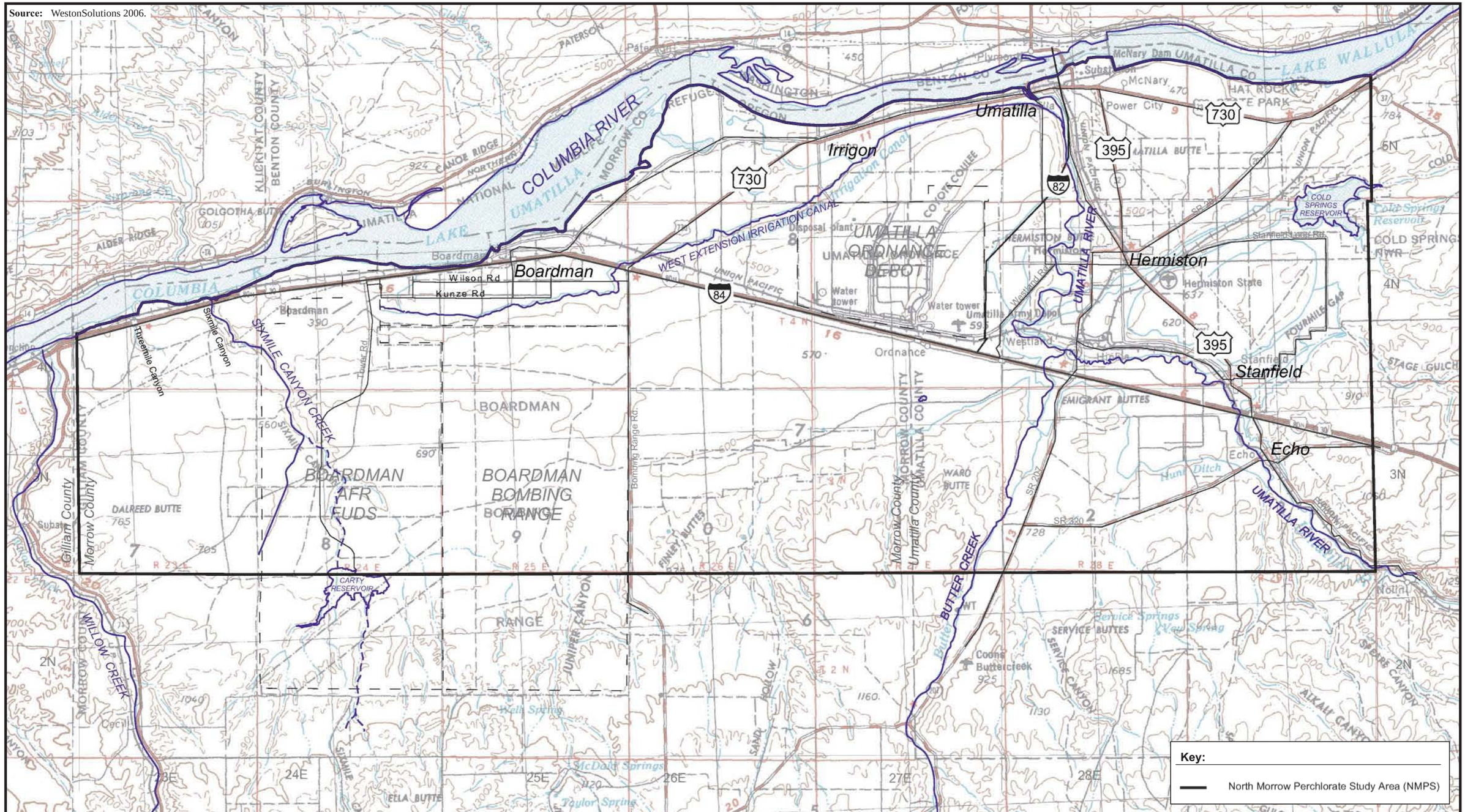
Source: WestonSolutions 2006.



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0 1.5 3
Approximate Scale in Miles

NORTH MORROW GROUNDWATER
MILK PHASE SQAP
Morrow and Umatilla Counties, Oregon

Figure 1-2
LOWER UMATILLA BASIN GROUNDWATER MANAGEMENT AREA TOPO

Date:	Drawn by:	
7/8/08	AES	10:START-3\06070004\fig 1-2

2 Measurement/Data Acquisition

2.1 Sampling Process Design (Experimental Design)

During the NMG ESI milk sample collection phase, milk will be purchased from various grocery stores in the area as determined by the EPA TM and listed in Table 1-1. Major milk sales outlets in the area were determined using information derived from a review of background information and a site visit conducted on June 25, 2008.

Conditions potentially contributing to deviations from the projected sampling locations include new observations or information obtained in the field that warrants an altered sampling approach. Significant deviations from the planned sampling locations or number of samples to be collected will be discussed with the EPA TM before implementation and will be documented on a Sample Plan Alteration Form (SPAF-Appendix B). Every attempt will be made to collect representative samples with the equipment being used.

2.1.1 Sample Locations

Sample locations have been pre-selected to achieve the objectives discussed in subsection 1.3.1. All samples will be submitted to US EPA Manchester Environmental Laboratory (MEL) located in Port Orchard WA for perchlorate analysis following modified EPA method 6860. Table 2-1 presents the anticipated number and types of samples, analytical methods, specific requirements for sample container size and type, sample preservation and holding times, and special handling requirements for samples expected to be collected at the site. Table 2-2 summarizes the number of QA/QC samples to be submitted according to the method requirements.

2.1.2 Logistics

Milk sample containers collected for fixed laboratory analysis will be hand-delivered to the MEL for analysis. The number of START personnel present while purchasing milk will be limited to one person. The START personnel will wear casual clothing appropriate for the time of year; contractor-specific clothing (i.e., clothing bearing the company logo, etc.) will not be worn. The transportation vehicle will be large enough to store the milk without drawing attention to the vehicle. Milk processing (labeling, bagging, etc.) will not occur at the grocery or convenience stores. No photographs will be taken at the grocery or convenience stores. All conversations by START personnel with the vendors will be casual and non-threatening.

Once purchased, milk samples will be placed in coolers and cooled to 0° – 4.4^o C and maintained at this temperature until delivery to EPA Region 10 MEL. To protect samples from moisture and cross contamination, the sample cartons will be inserted into a properly closed zip-locking plastic bag. Ice will be used to cool samples. The ice level in the cooler will be kept slightly above the milk level inside the cartons. The tops of cartons will not be buried in ice. Care will be taken to not crush or damage milk cartons.

Sample aliquots collected for fixed laboratory analysis will be delivered to the EPA Region 10 MEL as directed by the EPA. All fixed-laboratory samples will be delivered by the START PM within one day of sample collection. Sample control and shipping are discussed in subsection 2.3.

Upon receipt of milk samples, EPA Region 10 MEL will homogenize then transfer milk from original half gallon cartons to 32 ounce, wide mouth, HDPE sample bottles for freezing and storage. This volume still allows for multiple analyses if needed and is a sturdier container.

2.1.3 Coordination with Federal, State, and Local Authorities

The START-3 will keep the EPA TM informed of field event progress and issues that may affect the schedule or outcome of the ESI , will discuss problems encountered, will inform the EPA of unusual contacts with the public or the media, and will obtain guidance from the EPA regarding project activities when required. Additionally, the START-3 will notify the EPA RSCC with changes to the sampling schedule for MEL analyses and will provide delivery information on every sample shipment within 24 hours of shipment or before noon on Friday for Saturday delivery. All samples will be delivered to the laboratory within 24 hours of sample collection.

2.2 Standard Operating Procedures

The START-3 will utilize the following SOP (Appendix A) while performing field activities:

- Field Activity Logbooks; and
- Sample Packaging and Shipping.

2.3 Sample Handling and Custody Requirements

This subsection describes sample identification and chain-of-custody procedures that will be used for the NMG ESI field activities. The purpose of these procedures is to ensure that the quality of the samples is maintained during collection, transportation, storage, and analysis. All chain-of-custody requirements comply with E & E's SOPs for sample handling. All sample control and chain-of-custody procedures will follow the EPA's (2004) *Contract Laboratory Program Guidance for Field Samplers*.

Examples of sample documents used for custody purposes are provided in Appendix B (with the exception of field logbooks) and include the following:

- Sample identification numbers,

- Sample labels,
- Custody seals,
- Chain-of-custody records or traffic reports,
- Field logbooks,
- Sample Collection Forms, and
- Analytical request forms.

During the field effort, the site manager or delegate is responsible for maintaining an inventory of these sample documents. This inventory will be recorded in a cross-referenced matrix of the following:

- Sample location,
- Sample identification number,
- Analyses requested and request form numbers, and
- Chain-of-custody record numbers

Brief descriptions of the major sample identification and documentation records and forms are provided below.

2.3.1 Sample Identification

All samples will be identified using the sample numbers assigned by the EPA RSCC. Each sample label will be affixed to the milk container and covered with clear tape. A sample tracking record will be kept as each sample is collected. The following will be recorded: location, matrix, sample number, and observations. In addition to the EPA-assigned sample number, samples will be tracked with a sample code system designed to allow easy reference to the sample's origin and type. The sample code key will not be provided to the laboratory. Table 2-3 summarizes the sample tracking and location codes.

2.3.1.1 Sample Labels

Sample labels attached to sample containers will be used to identify all samples collected in the field. The sample labels will be placed on the containers so as not to obscure any QA/QC lot numbers on the containers. Field identification will be sufficient to enable the information to be cross-referenced with the project logbook. For chain-of-custody purposes, all QA/QC samples will be subject to the same custodial procedures and documentation as site samples.

To minimize handling of sample containers, labels will be completed before sample collection to the extent possible. In the field, the labels will be filled out completely using waterproof ink, then attached firmly to the sample containers and protected with clear tape. The sample labels will provide the following information at a minimum:

- Sample number,
- Sample location identification code,
- Date and time of collection,
- Sample collector;
- Analyses required, and
- pH and preservation (when required).

2.3.1.2 Custody Seals

Custody seals are preprinted gel-type seals, designed to break into small pieces if the seals are disturbed. Sample shipping containers (e.g., coolers, drums, cardboard boxes, etc., as appropriate) will be sealed in as many places as necessary to ensure security. Seals will be signed and dated before use. Clear tape will be placed over the seals to ensure that the seals are not broken accidentally during shipment. Upon receipt at the laboratory, the custodian will check (and certify by completing the package receipt log) that seals on shipping containers are intact.

2.3.1.3 Chain-of-Custody Records and Traffic Reports

For samples to be analyzed at the EPA MEL, the chain-of-custody records, analyses required forms, and/or analytical traffic report forms will be completed as described in the *Contract Laboratory Program Guidance for Field Samplers* (EPA 2004). The EPA's FORMS II Lite software will be used to electronically enter information for the chain-of-custody and traffic report forms. The chain-of-custody record, analyses required forms, and analytical traffic reports will be completed fully at least in duplicate by the field technician designated by the site manager as responsible for sample shipment to the appropriate laboratory. Information specified on the chain-of-custody record will contain the same level of detail found in the site logbook. The custody record will include the following information:

- Name and company or organization of person collecting the samples,
- Date samples were collected,
- Type of sampling conducted (composite or grab),
- Sample number (using those assigned by the EPA RSCC),
- Location of sampling station (using the sample code system described in Table 2-3),
- Number and type of containers shipped,
- Analysis requested, and
- Signature of the person relinquishing samples to the transporter, with the date and time of transfer noted and signature of the designated sample custodian at the receiving facility.

The relinquishing individual will record all shipping data (e.g., air bill number, organization, time, and date) on the original custody record, which will be transported with the samples to the laboratory and retained in the laboratory's file. Original and duplicate custody records, together with the air bill(s) or delivery note(s), constitute a complete custody record. It is the site manager's responsibility to ensure that all records are consistent and that they become part of the permanent job file.

2.3.1.4 Field Logbooks and Data Forms

Field logbooks (or daily logs) and data forms are necessary to document daily activities and observations. Documentation will be sufficient to enable participants to reconstruct events that occurred during the project accurately and

objectively at a later time. All daily logs will be kept in a bound notebook containing numbered pages. All entries will be made in waterproof ink, dated, and signed. No pages will be removed for any reason.

Minimum logbook content requirements are described in the E & E SOP entitled *Field Activity Logbooks* found in Appendix A. If corrections are necessary, these corrections will be made by drawing a single line through the original entry (so that the original entry is legible) and writing the corrected entry alongside. The correction will be initialed and dated. Corrected errors may require a footnote explaining the correction.

2.3.2 Custody Procedures

The primary objective of chain-of-custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses. A sample is in custody when it is:

- In someone's physical possession,
- In someone's view,
- Locked up, or
- Kept in a secured area that is restricted to authorized personnel.

2.3.2.1 Field Custody Procedures

The following guidance will be used to ensure proper control of samples while in the field:

- As few people as possible will handle samples.
- The sample collector will be responsible for the care and custody of collected samples until they are transferred to another person or dispatched properly under chain-of-custody rules.
- The sample collector will record sample data in the field logbook.
- The site team leader will determine whether proper custody procedures were followed during the field work and will decide if additional samples are required.

When transferring custody (i.e., releasing samples to a shipping agent), the following will apply:

- The coolers in which the samples are packed will be sealed and accompanied by two copies of the chain of custody record(s). When transferring samples, the individuals relinquishing and receiving them must sign, date, and note the time on each of the chain of custody record(s). This will document sample custody transfer.
- Samples will be dispatched to the laboratory for analysis with separate chain of custody records accompanying each shipment. The chain of custody records will be signed by the relinquishing individual, and the method of shipment, name of courier, and other pertinent information will be entered in the chain of custody record before placement in the shipping container. Shipping containers will be sealed with custody seals for shipment to the laboratory.

- All shipments will be accompanied by chain of custody records identifying their contents. The original custody records kept in a zip-locking bag and taped inside the lid of the cooler will accompany each cooler shipment. The other copies will be distributed appropriately to the site team leader and site manager.

- If sent by common carrier, a bill of lading will be used. Freight bills and bills of lading will be retained as part of the permanent documentation.

2.3.2.2 Laboratory Custody Procedures

A designated sample custodian at the laboratory will accept custody of the shipped samples from the carrier and enter preliminary information about the package into a package or sample receipt log, including the initials of the person delivering the package and the status of the custody seals on the coolers (i.e., broken versus unbroken). The custodian responsible for sample log-in will follow the laboratory's SOP for opening the package, checking the contents, and verifying that the information on the chain-of-custody agrees with the samples received. The commercial laboratory will follow its internal chain-of-custody procedures as stated in the laboratory QA manual. The laboratory will check the temperature blank inside the cooler and document it in the sample log-in form. Should the temperature be greater than what is required by the Statement of Work or the method, the sample custodian will inform the region and proceed to follow the course of actions stipulated in the SOW or specified by the regional QAO.

2.4 Analytical Methods Requirements

This subsection discusses the analytical strategy (subsection 2.4.1) and the analytical methods (subsection 2.4.2).

2.4.1 Analytical Strategy

The EPA's MEL will perform analysis on all samples as determined by the TM. The analyses to be applied to samples sent to the laboratories are listed in Table 2-1. These analyses were selected based on the probable hazardous substances used or potentially released to the environment.

2.4.2 Analytical Methods

Samples designated for off-site analytical laboratory analyses will be submitted to the EPA's MEL for analysis. MEL analyses will take place within the standard four-week turnaround time period with validation by EPA chemists for these analyses taking place within the standard three-week turnaround time period. Hardcopy and electronic data results from the MEL will be delivered to the START upon completion of each sample delivery group. Table 2-2 summarizes laboratory instrumentation and methods to be used for the NMG milk phase ESI.

For cases in which laboratory results exceed QC acceptance criteria, reextraction and/or reanalysis will occur as indicated in the applicable analytical method. The respective laboratory analysts will be responsible for ensuring that appropriate

sample analysis procedures are followed and for taking appropriate actions to ensure deficiency correction.

2.5 Quality Control Requirements

QC checks for sample collection will be accomplished by a combination of chain-of-custody protocols and laboratory QA procedures as prescribed in the sampling or analytical methods. No QC samples (i.e., double blind performance evaluation samples) are planned for this activity outside of the normal laboratory QC criteria outlined in the analytical methods. These QC samples include blanks, calibration verifications, spikes, duplicates, (for inorganics) interference check samples, and serial dilutions. Results from these samples will be compared to QC requirements listed in subsection 4.1.2. All of the analyses that will be performed for this project will produce definitive data. DQI targets for this project are specified in subsection 1.4 (Data Quality Objectives) and are summarized in Table 2-1 of this SQAP. Bias on estimated qualified data shall be determined by the validation process. In accordance with the objectives outlined in this document and the QA levels defined by the EPA (1993), the EPA has defined the DQOs and has determined that the sampling and analyses performed under this sampling effort will conform to the definitive data without quantitative error and bias determination criteria. The laboratories' DQOs for completeness and the field team's ability to meet the DQO for representativeness are set at 90%. Precision and accuracy requirements are outlined in Table 2-2.

One temperature blank consisting of milk in a carton half the size of the largest sample will be included in each cooler shipped to the analytical laboratories. One quart milk samples will be purchased for use as temperature blanks. Temperature blanks allow the laboratories to obtain a representative measurement of the temperature of samples enclosed in a cooler without disturbing the actual samples. The field team will package and label the temperature blank like a regular milk sample; however the analytical laboratory will only measure the temperature of the blank. The temperature blank will not be analyzed for hazardous substances, will not be given a sample number, and will not be listed on the chain of custody form. The temperature blank will be clearly labeled: USEPA TEMPERATURE BLANK.

2.6 Instrument Calibration and Frequency

All instruments and equipment used during fixed laboratory sample analyses will be operated, calibrated, and maintained according to the manufacturers' guidelines and recommendations, as well as criteria set forth in the applicable analytical methodology references and/or in accordance with the laboratory's QA manual and SOPs.

2.7 Inspection/Acceptance Requirements for Supplies and Consumables

This information is covered by the SOPs, the START-3 QAPP (E & E 2005b), and the START-3 QMP (E & E 2005a). Standards contained in these documents

will be used to ensure the validity of data generated by E & E for this project. Sample jars are precleaned by the manufacturer; certification documenting this is enclosed with each box of jars. The START will include this documentation as part of the site file.

2.8 Data Acquisition Requirements (Nondirect Measures)

No data will be used from other sources.

2.9 Data Management

This document is meant to be combined with information presented in E & E's QAPP and QMP for Region 10 START-3. Copies of the START QAPP and QMP are available in E & E's Seattle office. Standards contained in these documents will be used to ensure the validity of data generated by E & E for this project. Data validation will be performed as listed in subsection 4.1.2. Data tracking, storage, and retrieval are tracked through the TDD Tracking Form, which records where the paper and electronic data are located. Electronic data will be archived by TDD.

Table 2-1 Proposed Sample Analyses

Media	Analysis/Method	Method Description/ Detection Limit	Proposed Number of Samples	Total Number of Containers [a]	Proposed Laboratory
Milk	Perchlorate/ Modified EPA Method 6860	IC/MS	33	33	MEL

Key:
EPA = United States Environmental Protection Agency.
IC = Ion chromatography.
MEL = Manchester Environmental Laboratory.
MS = Mass spectrometer.

Table 2-2 Proposed Sample Laboratory Requirements

Sample Media	Analysis	Method[a]	Preservation	Container	Holding Time
Milk	Perchlorate	Modified EPA Method 6860	0° C ± 4.4° C	1 – 0.5 gallon plastic or wax-coated cardboard	Analysis within 28 days of collection

[a] The method reporting limit is 0.8 microgram per liter. The accuracy limits are 80% - 120% for the laboratory control samples and 70% - 130% for matrix spike and matrix spike duplicate samples. The precision limits are ± 15% for mid-range samples and ± 50% for low range samples.

Key:
°C = Degrees Celsius.
EPA = United States Environmental Protection Agency.

Table 2-3 Sample Coding

Digits	Description	Code	Example
1,2	Source Code	BF	Boardman Family Foods
		CH	Columbia Harvest
		EM	Express Mart
		F2	Fruit Stand 2
		IS	Irrigon Shell
		ML	Mercado Los Gavilanes
		MS	Main Street Shell
		RA	Rite Aid
		SF	Safeway
		ST	Stanfield Main Street Market
		WM	Wal-Mart
3,4	Consecutive Number	01	(First Sample of Source Type)
5,6	Matrix Code	MK	Milk

3 Assessment/Oversight

3.1 Assessment and Response Actions

The EPA QAO or designee may conduct an audit of the field activities for this project. The auditor will have the authority to issue a stop work order upon finding a significant condition that adversely would affect the quality and usability of the data. The EPA TM will have the responsibility for initiating and implementing response actions associated with findings identified during the site audit. The actions taken also may involve the EPA PO, contracting officer, and/or QAO. Once the response actions have been implemented, the EPA QAO or designee may perform a follow-up audit to verify and document that the response actions were implemented effectively. In-house audits performed by the START-3 may be conducted in accordance with the E & E START-3 *Quality Management Plan* (2005a). No audits are planned for the NMG ESI.

If major deviations from the QA requirements of the project and the SOW were observed in the data validation process, the EPA QAO will contact the laboratory to correct the problem. If the laboratory is not responsive to the request, the QAO will inform the Regional PO and the TM of the situation. A brief narrative will be written explaining the contract deviations and recommendations will be given based on the quality of the submitted data. Reduced payment and/or reanalysis at the laboratory's expense shall be pursued by the Regional PO. Resampling and subsequent re-analysis will be decided by the TM. Additional sampling for corrective actions and/or any addendum to this SQAP shall be documented using the Corrective Action Form and the SPAF (Appendix B). Corrective actions will be conducted in accordance with E & E QMP specifications.

3.2 Reports to Management

Debriefing of the EPA TM occurs by the START PM on a daily basis. Laboratory deliverables will be Contract Laboratory Program-equivalent deliverables for MEL data. Once the project is complete and the resulting data is obtained, the START PM will prepare a final project report. The report will include a summary of the activities performed during the project and the resulting data (along with any statements concerning data quality). The report will be approved by the EPA TM prior to being forwarded to the individuals identified in the data distribution list located in the Table of Contents section of this SQAP.

The START-3 corrective action program is addressed in Section 3 of the QMP. Corrective actions will be conducted in accordance with these QMP specifications.

4 Data Validation and Usability

4.1 Data Review, Validation, and Verification Requirements

The data validation review of data packages will include an evaluation of the information provided on the analytical data sheets and required support documentation for all sample analyses; the supporting sample collection documentation, including chain-of-custody forms; and documentation of field instrument calibration, sample results, and/or performance checks (if required by the method). The QA review also will examine adherence to the procedures as described in the cited SOPs and the specified analytical methods in the SQAP.

4.1.1 Data Reduction

Data reduction includes all processes that change the numerical value of the raw data. All fixed-laboratory data reduction will be performed in accordance with the appropriate methodology and will be presented as sample results.

4.1.2 Data Validation

Data generated by the MEL will be validated by the EPA TM designated validator (i.e., EPA QA office or contractor). All of the data validations will be performed in accordance with the QA/QC requirements specified in the SQAP, the technical specifications of the analytical methods, and the following documents when applicable:

- USEPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (2007).

The QC parameters of interest for the EPA organic methods that will be used on the NMG ESI samples are presented in these documents. When applicable, QC criteria listed in the applicable analytical method will be used for validation.

Validation deliverables will include a QA memo discussing QA conformance and deviations issues which may have affected the quality of the data. Data usability, bases of application of qualifiers, and percentage of qualified data will also be discussed in the QA memo. The analysis data sheets (Forms I) with the applied validation qualifiers and bias determination for estimated-qualified values will also be a part of the validation deliverables. The following qualifiers shall be used in data validation:

- U = The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.
- J = The associated numerical value is an estimated quantity because the reported concentrations were less than the sample quantitation limits or because quality control criteria limits were not met.
- UJ = The material was analyzed for, but not detected. The reported detection limit is estimated because Quality Control criteria were not met.
- R = The sample results are rejected (analyte may or may not be present) due to gross deficiencies in quality control criteria. Any reported value is unusable. Resampling and/or reanalysis is necessary for verification.
- H = High bias.
- K = Unknown bias.
- L = Low bias.
- Q = Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

4.1.3 Data Assessment Procedures

Following data validation and reporting, all project-generated and -compiled data and information will be reconciled with the objectives specified in subsection 1.3.1 to assess the overall success of ESI activities. This data assessment, including points of achievement and departure from project-specific objectives, will be discussed in the QA section of the ESI report.

4.2 Data Verification

The analytical QA requirements and data validation requirements will be as specified in subsection 4.1.2 (EPA 2007).

The EPA TM will perform the final review and approval of the data. The EPA TM and/or QAO will look at matrix spike/matrix spike duplicates, laboratory blanks, and laboratory duplicates to ensure they are acceptable. The EPA TM and/or designee also will compare the sample descriptions with the field sheets for consistency and will ensure that any anomalies in the data are documented appropriately.

Data QA memoranda reports will be generated as part of the NMG ESI if the START-3 is responsible for data validation. If the EPA Region 10 QA office or its designee performs the data validation, then additional reports regarding data usability will be generated by the START-3.

4.3 Reconciliation with Data Quality Objectives

The DQIs target for this project is discussed in subsection 1.4 of this SQAP. The data validation will be used as a tool to determine if these targets were met. Also, using the compiled data, E & E and the TM will determine the variability and soundness of the data and the data gaps that will need to be filled to meet the objectives of the project.

Once the data results are compiled, the EPA TM and/or the EPA QAO will review the sample results to determine if they fall within the acceptance limits as defined in this SQAP. Completeness also will be evaluated to determine if the completeness goal for this project has been met. If DQIs do not meet the project's requirements as outlined in this SQAP, the data may be discarded and resampling and reanalysis may occur. The TM will attempt to determine the cause of the failure (if possible) and make the decision to discard the data and resample. If the failure is tied to the analysis, calibration and maintenance techniques will be reassessed as identified by the appropriate laboratory personnel. If the failure is associated with the sample collection and resampling is required, the collection techniques will be reevaluated as identified by the START-3 PM.

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A Standard Operating Procedures

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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Appendix

A Sample Logbook 11

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 (EST) 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: G. 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

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

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.

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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

TITLE:	SAMPLE PACKAGING
CATEGORY:	ENV 3.16
REVISED:	March 1998

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:**	March 1998

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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.

When dropping off the sample packages at Airborne or Federal Express, do not indicate that these samples may be hazardous. This will only raise questions and delay the shipment. Although you may have an idea of the kind of contamination that is contained in the samples, you must remember that you are sending these samples to a laboratory for analyses to determine the amount and type of contamination, if any. Until that is determined, the presumption is that the samples are environmental in nature and not subject to the hazardous materials restrictions.

B Supplemental Forms

JN996 - VOA JN997 - VOA JN998 - VOA

Corrective Action Form

Project Name and TDD Number:
_____

Sample Dates Involved: _____

Measurement
Parameter:_____
_____

Acceptable Data Range: _____
_____

Problem Areas Requiring Corrective Action:
_____
_____
_____
_____

Measures Required to Correct Problem:
_____
_____
_____
_____

Means of Detecting Problems and Verifying Correction:
_____
_____
_____
_____

Initiator's Name: _____ Date: _____

Project Officer: _____ Date: _____

QA Officer: _____ Date: _____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

CUSTODY SEAL

Date:
Signature:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

USEPA Contract Laboratory Program
Organic Traffic Report & Chain of Custody Record

1. Case No.:
DAS No.:

R

2. Region:	3. Date Shipped:	4. Chain of Custody Record	Sampler Signature:
Project Code:			
Account Code:	Carrier Name:	Relinquished By: (Date/Time)	Received By: (Date/Time)
CERCLIS ID:	Airbill:	1)	
Spill ID:			
Site Name/State:	Shipped To:	2)	
Project Leader:		3)	
Action:		4)	
Sampling Co.:			

5. ORGANIC SAMPLE No.	6. MATRIX/ SAMPLER	7. TYPE	8. ANALYSIS/ TURNAROUND	9. TAG No./ PRESERVATIVE/Bottles	10. STATION LOCATION	11. SAMPLE COLLECT DATE/TIME	12. INORGANIC SAMPLE No.	13. QC Type

14. Shipment for Case Complete?	15. Sample(s) to be used for laboratory QC:	16. Additional Sampler Signature(s):	17. Chain of Custody Seal Number:
18. Analysis Key:	Type: Comp, Grab (from Box 7)		19. Shipment Iced? _____

20. TR Number:

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA 20191-3400 Phone 703/264-9348 Fax 703/264-9222

REGION COPY

SAMPLE PLAN ALTERATION FORM

Project Name and Number: _____

_____

_____

Material to be Sampled: _____

_____

_____

Measurement Parameters: _____

_____

_____

Standard Procedure for Field Collection & Laboratory Analysis (cite references): _____

_____

_____

_____

Reason for Change in Field Procedure of Analytical Variation: _____

_____

_____

Variation from Field or Analytical Procedure: _____

_____

_____

Special Equipment, Materials, or Personnel Required: _____

_____

_____

_____

CONTACT	APPROVED SIGNATURE	DATE
Initiator:		
START PL:		
EPA TM:		
EPA QA Officer:		