MALCOLM PIRNIE

ARCS II

Contract No. 68-W9-0051

FRANKLIN BURNS SITE
FRANKLIN TOWNSHIP, NEW JERSEY

Work Assignment No. 027-2LAJ

SUPERFUND ACCELERATED CLEANUP MODEL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DRAFT FINAL
QUALITY ASSURANCE PROJECT PLAN

Remedial Planning Activities at Selected Uncontrolled Hazardous Substance Disposal Sites USEPA Region II (NY, NJ, PR, VI)

Malcolm Pirnie, Inc.
2 Corporate Park Drive
White Plains, New York 10602

February 1994

MALCOLM PIRNIE

MALCOLM PIRNIE, INC.
ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

February 17, 1994

Ms. Kelley A. Chase
U.S. Environmental Protection Agency, Region II
26 Federal Plaza, 7th Floor, Room 759
Jacob Javits Federal Building
New York, NY 10278

Re: Transmittal of Draft Quality Assurance Project Plan
ARCS Contract No. 68-W9-0051
Work Assignment No. 027-2LAJ
Franklin Burns Site, Franklin Township, NJ

Dear Ms. Chase:

Malcolm Pirnie is pleased to submit one unbound and 12 bound copies of the Draft Final Quality Assurance Project Plan (QAPjP) for the Superfund Accelerated Cleanup Model (SACM) Remedial Investigation/Feasibility Study (RI/FS) to be conducted at the Franklin Burns Site in Franklin Township, Gloucester County, New Jersey.

This Draft Final QAPjP incorporates a response to all of the USEPA's November 9, 1993, comments on the July 1993 Draft QAPjP, and, in general, provides an update of the Draft Final QAPjP consistent with the February 1994 Draft Final Work Plan.

If you have any questions or require additional information, please feel free to call.

Very truly yours,

MALCOLM PIRNIE, INC.

Judith A. Bedard
Site Manager

c: Fernando Rosado, USEPA

8001-205-101

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BRANDYWINE TWO CHADDS FORD, PA 19317-9668 610-459-5840 FAX: 610-459-5845

ARCS II CONTRACT NO. 68-W9-0051
WORK ASSIGNMENT NO. 027-2LAJ

SITE NAME:
FRANKLIN BURNS SITE
DRAFT FINAL QUALITY ASSURANCE PROJECT PLAN

CONTRACTOR QA/QC SIGN-OFF

Malcolm Pirnie, Inc. has reviewed this draft document in accordance with the contractor's ARCS II QAPP and is submitting it to the USEPA, Region II in compliance with the requirements under Work Assignment No. 027-2LAJ and Contract No. 68-W9-0051.

This document has not been approved by USEPA Region II and is not intended for release to the public.

Judith A. Bedard
Judith Bedard
SITE MANAGER

Date: 2/10/94

Lisa Szegedi
Lisa Szegedi
SITE QA OFFICER

Date: 2/15/94

S. K. Krishnaswami
S. K. Krishnaswami
ARCS II PMO PROGRAM MANAGER[1]

Date: 02-10-94

Alan Greenlaw
Alan Greenlaw
ARCS II PMO QA MANAGER

Date: 2/15/94

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[1] To be signed by the Program Manager or other designated staff.

USEPA WORK ASSIGNMENT NUMBER: 027-2LAJ
USEPA CONTRACT NUMBER: 68-W9-0051
MALCOLM PIRNIE, INC.

DRAFT FINAL
QUALITY ASSURANCE PROJECT PLAN
FOR
SUPERFUND ACCELERATED
CLEANUP MODEL
REMEDIAL INVESTIGATION AND
FEASIBILITY STUDY

FRANKLIN BURNS SITE
FRANKLIN TOWNSHIP, GLOUCESTER TOWNSHIP, NJ

FEBRUARY 1994

FRANKLIN BURNS SITE
QUALITY ASSURANCE PROJECT PLAN

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1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

The Sampling and Analysis Plan (SAP) provides the details for the investigative activities described in the Draft Final Work Plan for the Franklin Burns Site dated February 1994 (Work Plan). The SAP consists of two documents: this Quality Assurance Project Plan (QAPjP) and the Field Sampling Plan (FSP) which defines in detail the sampling and data gathering methods to be used. The purpose of this QAPjP is to identify procedures to be implemented with the intention of achieving quality and integrity of data collected for the RI/FS at the Franklin Burns Site. This QAPjP is developed in accordance with the Malcolm Pirnie Quality Assurance Program Plan (QAPP).

As stated in the Work Plan, the chemical quality of the consolidated soil/ash piles on the Site and the sediment, surface water and ground water of the area in and around the Site, as well as the hydrogeology, are not well defined. The purpose of the RI is to determine the nature and, in some media, the extent of contamination at the Site and the shallow hydrogeology in the area of the Site. The purpose of this QAPjP is to identify procedures to be implemented for the purpose of achieving the collection of data during the RI/FS which is technically valid, legally defensible and useful in meeting the goals of the RI.

A comprehensive review of Site background information needed to design and implement the field investigation is presented in Section 2 and 3 of the Work Plan for this Site. A summary of the important aspects of that background research is presented here.

1.2 SITE DESCRIPTION

The Franklin Burns Site (Site) consists of seven separate land areas, referred to as Subsites 1 through 7, located in Franklin Township, Gloucester County in the State of New Jersey. The Subsites were used for the burning of insulated wire and possibly other electrical components, including transformers and capacitors, for the recovery and sale of copper. The burning operations resulted in the generation of ash piles containing hazardous substances and ranging in size (area) from approximately 480 to 15,000 square feet.

1.3 SITE HISTORY

Site burning operations are reported to have ceased in 1988. The Site has been inactive since that time. A complete Site and project description, including the following items, is included in the Work Plan:

* General objectives of the investigation;
* Physical description of the Site;
* Chronological history of the uses of the Site and the investigations that have occurred to date.
* Specific project objectives, including how the data collected will be used to address the objectives.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

2.1 GENERAL MANAGEMENT STRUCTURE

The United States Environmental Protection Agency (USEPA) Region II is the lead agency for the Franklin Burns Site RI/FS activities. They will have the overall responsibility of assuring that the investigations are conducted appropriately and that quality assurance/quality control (QA/QC) measures are observed. Malcolm Pirnie has been retained as an Alternative Remedial Contracting Strategy (ARCS) Region II lead contractor for Superfund sites in Region II. The Malcolm Pirnie ARCS Project Management Office (PMO) will direct and oversee all RI/FS investigations and appoint a Site Manager. The Site Manager will be responsible for planning, development and implementation of the RI/FS for the Franklin Burns Site. Subcontractors will be procured and directed by the USEPA and Malcolm Pirnie to perform analytical testing and dispose of contaminated ground water.

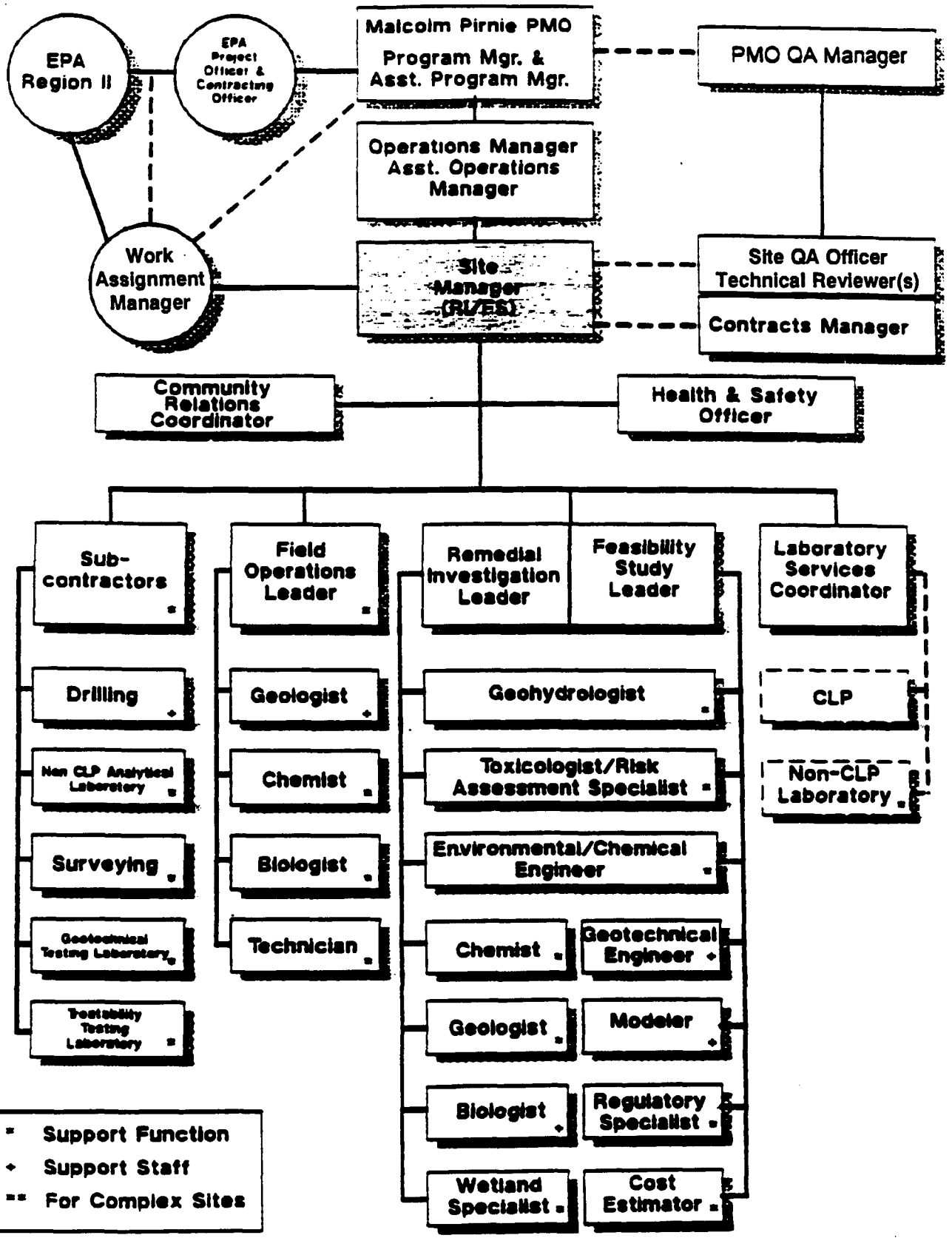
Project oversight and review will be provided by the USEPA Work Assignment Manager (WAM) in charge of this Site. The USEPA WAM and the Malcolm Pirnie PMO QA Manager shall be notified prior to any deviation from the approved Work Plan or FSP. Figure 2-1 presents the overall ARCS PMO structure and the project management and support organization that will be followed for the Franklin Burns Site RI/FS.

2.2 CORPORATE AND PROGRAM ORGANIZATION

2.2.1 Overview

A matrix management organization form is used at Malcolm Pirnie, Inc. (Malcolm Pirnie). The President is the Chief Executive Officer of the firm and is responsible for direction of the activities of the firm in accordance with the interest of the Board of Directors. Each of the firm's Vice Presidents is responsible to the President and each staff member is responsible to a Vice President through a Group Leader.

Corporate management and administrative functions are centralized at the White Plains Office. The quality of technical work is directed and controlled under the Corporate Technical Directors Program. The White Plains Office, as well as regional offices at diverse geographical locations, provide engineering and planning services for clients within their region. Technical



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MALCOLM PIRNIE

Franklin Burns Site
Franklin Township, New Jersey

TYPICAL ORGANIZATION FOR RI/FS

MALCOLM PIRNIE, INC.

FIGURE 2-1

expertise as well as management and administrative support is available on a mutually supportive basis from other regional offices and the White Plains Office. Designs, reports, studies and other engineering services are managed and developed on an individual project-by-project basis by interaction of the various environmental services groups at the different offices.

2.2.2 ARCS Program Quality Assurance Management Structure

The QA management structure of Malcolm Pirnie is presented in Figure 2-2. Key QA personnel are:

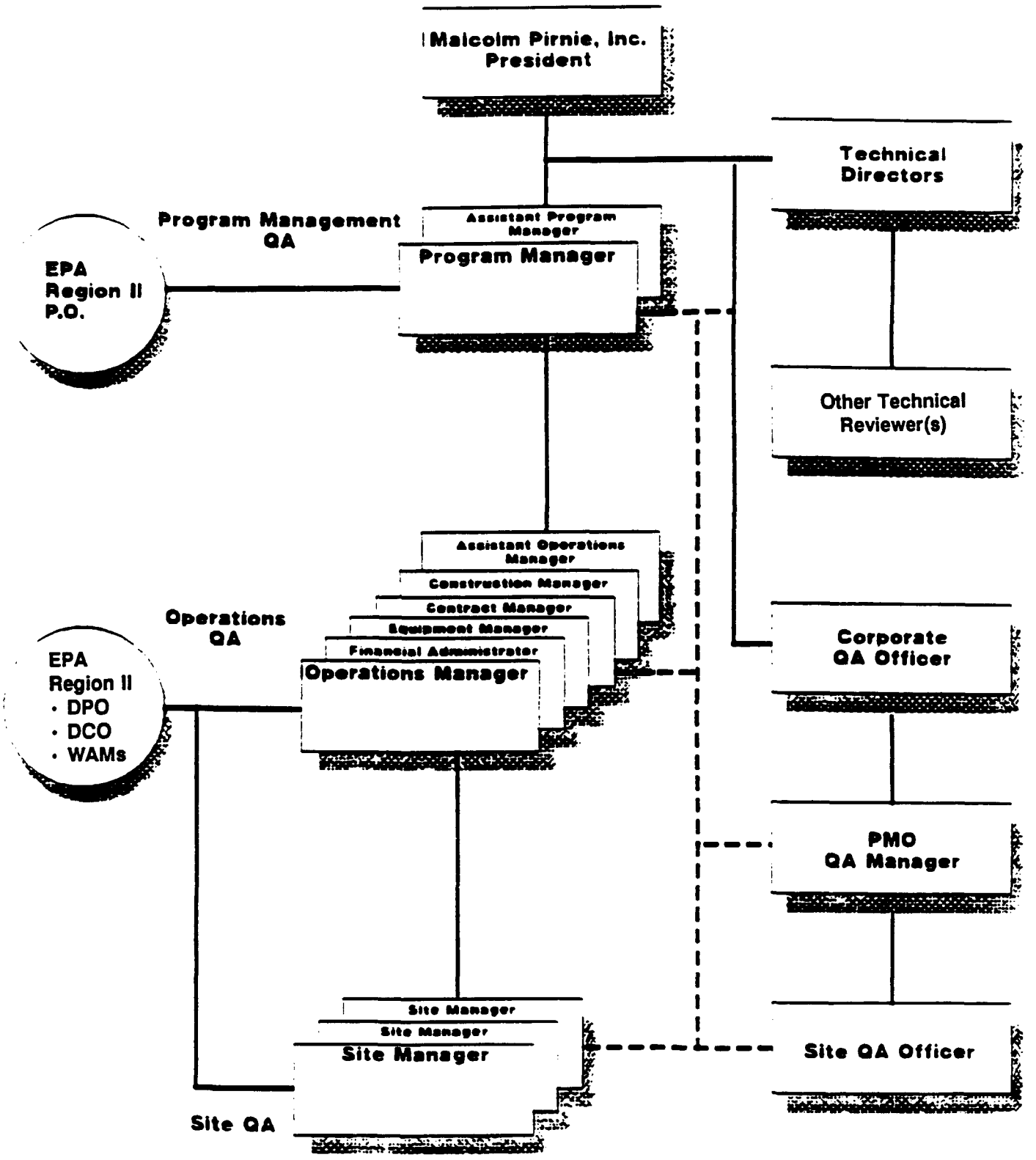
- Program Manager;
- Corporate QA Officer;
- Operations Manager;
- PMO QA Manager;
- Construction Manager;
- Site Manager;
- Site QA Officer; and
- Technical Reviewers.

The **Program Manager** has the final responsibility for the quality of work performed under the ARCS contract and will be the primary point of contact with the USEPA Region II. The **Corporate QA Officer** assures that QA/QC concerns are fully represented at the senior management level. He acts as a senior level troubleshooter for QA/QC issues raised by the PMO QA Manager.

The **Operations Manager** supervises and evaluates the performance of the Site Manager. He oversees work assignment performance.

The **PMO QA Manager** oversees the program-wide QA/QC efforts and is responsible for auditing technical activities, including field and file audits. He assures that proper QA/QC documentation is maintained. The PMO QA Manager monitors the activities of the Site QA Officer and any technical reviewers reviewing field operations. Administratively, the PMO QA Manager reports to the Corporate QA Officer. Functionally, the PMO QA Manager communicates with the Operations Manager and the Program Manager.

The **Site Manager** is responsible for executing all phases of a specific project and for applying the full resources of the project team on the project. The Site Manager has primary responsibility for overseeing quality control and development of the site specific Quality Assurance Project Plan. For construction administration projects, the PMO **Construction Manager** is responsible for overseeing QA/QC activities including: 1) contract document preparation, 2)



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MALCOLM PIRNIE

Franklin Burns Site
Franklin Township, New Jersey
QUALITY ASSURANCE PROGRAM ORGANIZATION

MALCOLM PIRNIE, INC.

FIGURE 2-2

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construction management work plan, 3) shop drawing reviews, 4) inspections and 5) subcontractor performance reviews.

Before substantive work begins on a project, the Site Manager must prepare a Work Plan. The Work Plan provides the technical approach for accomplishing the work, including quality control and review objectives, in addition to other Work Plan requirements. The **Site Manager** is responsible for preparing the site-specific FSP and QAPjP to be incorporated as part of the Site SAP.

The **Site QA Officer** specifies project QA/QC requirements for analytical detection limits, holding times, and for technical activities including, but not limited to the following:

- Field sampling, sample preparation, sample preservation, chain of custody preparation and sample shipment;
- Data quality objectives, including methods specification, detection limits and holding times;
- Analytical quality control requirements where a non-CLP laboratory is used;
- Data validation objectives;
- Conducting a QA Field Sampling Audit;
- Other site-specific QC requirements.

The Site QA Officer is responsible for reviewing the site-specific QAPjP prepared by the Site Manager. He or she is also responsible that CLP data validation is performed by USEPA Region II certified personnel or subcontractor.

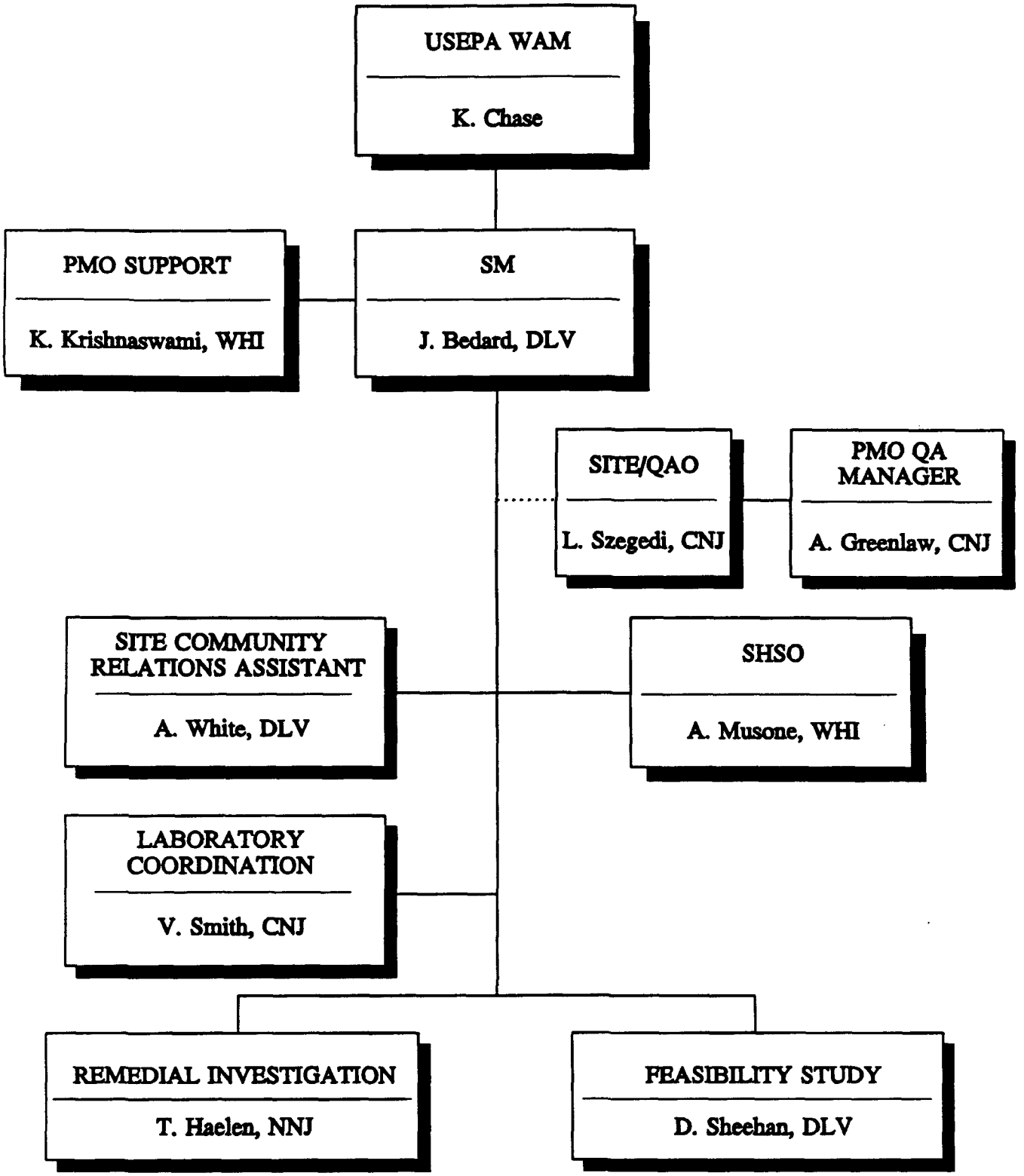
2.2.3 Project Management

The project organization is presented in Figure 2-3. In addition to the personnel listed in Figure 2-3, support for the project will be provided as needed by additional personnel located in the Malcolm Pirnie corporate offices at White Plains and other regional offices.

The responsibilities of key project staff positions are summarized below:

- Judith A. Bedard, Site Manager, is responsible primarily for development and implementation of the RI/FS, including coordination among the RI/FS leaders and support staff, maintaining a clear definition of and adherence to USEPA-approved scope, schedule and budget. As part of this responsibility, she will:

Figure 2-3
Franklin Burns Site, Franklin Township, NJ
SACM RI/FS
PROJECT ORGANIZATION



DLV, Delaware Valley Office, Chadds Ford, PA
CNJ, Central New Jersey Office, Cranbury, NJ
NNJ, Northern New Jersey Office, Mahwah, NJ
WHI, White Plains Office, White Plains, NY

1. Provide overall direction for preparation of work plans and tasks performed under this contract.

2. Maintain budgetary and schedule surveillance.

3. Indicate the types of sampling, field and monitoring QA records to be retained for the project based on this QAPjP.

4. In concert with the Program Manager, determine that task work plans, safety plans and sampling plans have been reviewed by appropriate technical reviewers prior to submittal to USEPA.

5. Approve reports and material for release to the USEPA and other external organizations.

- Terrance R. Haelen, Remedial Investigation Leader, reports directly to and works with the Site Manager and is responsible for developing and implementation of the field investigation, the analysis of samples, and the interpretation and presentation of data acquired from the Site. In addition, the RI Leader will be responsible for the preparation of the RI report. As part of his responsibilities, he will:

  1. Maintain all Quality Assurance policies that pertain to sampling, sample shipment and manifesting, environmental monitoring, field activities and deliverables.

  2. Direct field activities from the office through the Field Operations Leader.

  3. Provide for sampling, environmental monitoring and field QA audits through the Quality Assurance Officer.

- Daniel P. Sheehan, Feasibility Study Leader, is responsible for detailed evaluation of interim remedy alternatives. As part of his responsibilities, he will:

  1. Assist in project definition focused on achieving a FS that generates the proper type and quantity of data for use in the initial screening of interim remedy technologies/alternatives.

  2. Develop requirements for and evaluation of treatability study/pilot testing.

  3. Develop cost analysis of interim remedy alternatives.

  4. Prepare Feasibility Study report.

- Lisa Szegedi, Site Quality Assurance Officer, reports directly to the PMO QA Manager and is responsible for on-going surveillance of project activities to ensure conformance to this plan and to evaluate the effectiveness of its requirements. As QA Officer, Ms. Szegedi will have access to any personnel or subcontractors, as necessary, to resolve technical problems and has the authority to recommend that work be stopped when that work appears to jeopardize quality. Ms. Szegedi will audit field activities at least once and will also be available to respond to any QA/QC problem.

In addition, the Site QAO will be responsible that all corrective actions called for as a result of USEPA on-site field audits are addressed. As part of her responsibilities, she will:

1. Monitor the correction of quality problems and alert task leaders where similar problems might occur.

2. Develop and maintain project QA files for the retention of sampling, monitoring and field QA records.

3. Participate in QA audits and conduct QA Field Sampling Audit.

4. Recommend changes to the Project Manager to improve the effectiveness of the project in attaining its QA objectives for field, sampling and monitoring activities.

5. Periodically monitor that the QAPjP and FSP are being followed.

6. Review proposed additions and changes to this QAPjP.

7. Review all deliverables for technical content and quality objectives.

- Amy White, Community Relations Coordinator, responsible on an as-requested basis for assisting the USEPA Community Relations Officer. As requested, she will help keep the local communities informed of the activities at the Site and help anticipate and respond to community concerns.

- Angelo Musone, Health and Safety Officer, responsible for identifying and prescribing appropriate protective measures. As part of his responsibilities, he will:

  1. Either himself, or through an alternate, or through a designated member of the Field Operations Team be on-Site during field activities to monitor that health and safety procedures outlined in the Site-specific Health and Safety Plan (SHSP) are observed in the field.

2.2.4 Subcontractors

The following is a list of services to be subcontracted for the Franklin Burns RI/FS, under the direction of Malcolm Pirnie. At this point of time in the project, specific contractors have not been selected for the tasks. The selection process will be conducted by competitive bidding for services greater than $25,000 and will commence following the approval of this plan.

- Drilling Subcontractor: (To be determined)

  Responsibility: Consolidated soil/ash pile borings, subsurface soil sampling, monitoring well and piezometer installation.

  Tasks: Drill consolidated soil/ash pile borings, conduct split-spoon sampling, install

monitoring wells and piezometers, develop wells and piezometers, collect and transport RI generated soil wastes to specified on-Site locations on Subsite 1.

Contact: (To be determined)

- Surveying Subcontractor: (To be determined)

  Responsibility: Horizontal and vertical location of RI features.

  Tasks: Survey monitoring wells and piezometers, residential wells (if possible), surface water staff gauges, sampling locations (excluding consolidated soil/ash pile sampling locations) and other points of interest.

  Contact: (To be determined)

- Contractor for laboratory analysis. The CLP laboratory assigned by the USEPA will be responsible for all CLP analyses.

  Responsibility: Laboratory analysis according to USEPA protocols.

  Tasks: Analyze soil/ash, sediment, ground and surface water samples for a range of parameters.

  Contact: (To be determined)

- Contractor for disposal of contaminated hazardous ground water generated during Site operations (To be determined)

  Responsibility: Store and dispose of contaminated hazardous ground water in accordance with applicable New Jersey State and federal regulations.

  Tasks: Provide proper container(s) for the collection and storage of contaminated hazardous ground water generated during field activities. Dispose of collected hazardous ground water.

  Contact: (To be determined)

2.2.5 Quality Assurance/Quality Control Organization

Project quality assurance will be maintained under the direction of Lisa Szegedi, the Site Quality Assurance Officer, in accordance with this QAPjP. As part of the USEPA's effort to maintain the quality of this project, on-site field audits will be conducted by USEPA personnel to monitor the quality of the work. The Site QAO will review the USEPA audit results and be

responsible for making sure that corrective action is implemented. In addition, the Site QAO will also conduct one field audit related to each media to be sampled. In addition, the PMO PA Manager may visit the Site on one occasion to spot check activities. Quality Control for the following tasks will be the responsibility of the individuals and organizations listed below:

General Responsibility	General Tasks	Responsible for Quality Control
Field Sampling	Environmental Sampling (soil, sediment, ground water, surface water, air)	Lisa Szegedi
Hydrogeological Tests	Water Level Measure-ments	Lisa Szegedi
Laboratory Analyses	Soil, Sediment, Ground Water and Surface Water Analysis	CLP Analytical Laboratory
Validation	Validate Laboratory Data using USEPA Region II Guidelines	Valerie Smith and EPA Region II Certified Personnel
Laboratory Audits	Perform Systems and Performance Audits of Laboratory	USEPA-CLP Auditors and Lisa Szegedi
Field Audit	Perform Field Quality Control Audit	Lisa Szegedi and USEPA Personnel

The USEPA WAM for the Project, and the PMO QA Manager will be notified prior to any deviation from the approved work plan and FSP.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that will provide results which are legally defensible in a court of law. Specific procedures for sampling, chain of custody, laboratory instruments calibration, laboratory analysis, reporting of data, internal quality control, audits, preventive maintenance of field equipment, and corrective action are described in other sections of this QAPjP. In this section, the specific quality assurance objectives that are required for the data collected during the RI/FS to be useful are developed and specifically identified. This development is accomplished through the process of establishing Data Quality Objectives (DQOs). Establishing DQOs takes into consideration the intended use of the data, the procedures available for laboratory and field analysis and the resources available. The end result of this process is the development of specific quality requirements, or DQOs, for each data collection activity. Once the DQOs have been established, the analytical methods which are capable of supporting the DQOs are selected. Specific quality assurance objectives for the analytical methods are then determined. Section 4.1 of the Draft Final Work Plan for the Franklin Burns Site dated February 1994 outlines the specific DQOs for the data to be collected in conjunction with the Franklin Burns RI/FS. Table 4-1 of the Work Plan summarizes the analytical DQO levels associated with each data collection task. Specific objectives for accuracy, precision, completeness, representativeness, and comparability are presented below.

3.1 LEVEL OF QUALITY CONTROL EFFORT

Field rinse blank, trip blank, duplicate and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling program. Rinsate and trip blanks, prepared from certified analyte-free water, will be submitted to the analytical Laboratories to provide the means to assess the quality of the data obtained during field sampling. Rinsate blank samples are analyzed to check for procedural contamination at the Site which may cause sample contamination. Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage. Duplicate samples are analyzed to check for sampling and analytical reproducibility. Matrix spikes provide information about the effect of the sample matrix on the digestion and measurement methodology. All matrix spikes are performed in duplicate and are hereinafter referred to as MS/MSD samples. One matrix spike/matrix spike

duplicate will be collected for, at a minimum, every 20 investigative samples and, at a minimum, for each investigative sampling event. MS/MSD samples are designated/ collected for organic analyses only.

The general level of the QC effort will be one field duplicate for, at a minimum, every 20 investigative samples and, at a minimum, for each investigative sampling event. One volatile organic analysis (VOA) trip blank consisting of certified analyte-free water will be included along with each shipment of aqueous VOA samples. One rinsate blank will be collected for each type of sampling equipment each day a decontamination event is carried out.

MS/MSD samples are investigative samples. Soil MS/MSD samples require no extra volume for VOCs or extractable organics. However, aqueous MS/MSD samples must be collected at triple the volume for VOCs and double the volume for extractable organics. One MS/MSD sample will be collected/designated for, at a minimum, every 20 investigative samples per sample matrix (i.e., groundwater, soil) and, at a minimum, for each investigative sampling event. The number of duplicate and rinsate blank samples to be collected are listed in Table 3-1. Sampling procedures are specified in the Field Sampling Plan.

Based upon a request by the USEPA WAM and as ordered by the Region II Quality Assurance Officer, the following performance evaluation (PE) samples for dioxins/furans analysis will be collected for every 24 samples or less collected over a period of one week, whichever comes first, and analyzed by the same laboratory:

- One performance evaluation sample fortified with tetra- through octachloro dioxin and furan (PCDD/PCDF) and 2,3,7,8-TCDD. The concentration of this sample must also satisfy the requirements of the selected method of analysis when low or high resolution mass spectrometry is used.

- One performance evaluation interference fortified blank. This sample will be designated by the sampling team to the laboratory as "for spiking" with the appropriate volume of the matrix spiking solution specified in the analytical protocol. This sample must be analyzed in addition to the environmental matrix spike sample.

- One performance evaluation blank. An aliquot of uncontaminated sand or soil which must be identified by the sampling team as "Field Blank." This PE blank is required for sediment and soil samples only.

The level of QC effort provided by the laboratory will be equivalent to the level of QC effort specified under the CLP program for the Routine Analytical Services (RAS) parameters to be tested. The level of QC effort for testing of inorganics (metals and cyanide) will conform to the protocols of the current SOW/ILM02.0 with revisions through 2.1. The level of QC effort for

TABLE 3-1
QC SAMPLE SUMMARY
FRANKLIN BURNS SITE

MATRIX	ANALYSIS	NUMBER OF SAMPLES	NUMBER OF FIELD DUPLICATES	NUMBER OF FIELD BLANKS [6]	NUMBER OF TRIP BLANKS [7]	NUMBER OF MS/MSD [8] OR MS/MD [9] SAMPLES
Soil (Soil/Ash) Phase I	TCL VOCs/BN/AEs	30	2	2	NA	2 [8]
	TCL Pesticides/PCBs	15	1	1	NA	1 [8]
	TAL Metals	15	1	1	NA	1 [9]
	Cyanide	15	1	1	NA	1 [9]
	Physical Parameters [1]	15	1	NA	NA	NA
	Total Organic Carbon (TOC)	15	1	NA	NA	1 [8]
	RCRA Characteristics [2]	15	1	NA	NA	NA
	Phenols	15	1	1	NA	1 [8]
	Dioxin and Furans [3]	15	1	1	NA	1 [9]
Ground Water Monitoring Well Boring Soils Phase I	Physical Parameters					
	(a) Grain Size Distribution	5	NA	NA	NA	NA
	(b) Vertical Hydraulic Conductivity	5	NA	NA	NA	NA
Ground Water Phase I (2 Rounds)	TCL Pesticides/PCBs	44	4	2	NA	4 [8]
	TAL Metals (total) [5]	44	4	2	NA	4 [9]
	Cyanide	44	4	2	NA	4 [9]
	Phenols	44	4	2	NA	4 [8]
	Dioxin and Furans [3]	44	4	2	NA	4 [9]
Surface Water Phase I	TCL VOCs/BN/AEs	10	1	1	5	1 [8]
	TCL Pesticides/PCBs	10	1	1	NA	1 [8]
	TAL Metals (total) [5]	10	1	1	NA	1 [9]
	TAL Metals (filtered) [5]	10	1	1	NA	1 [9]
	Cyanide	10	1	1	NA	1 [9]
	Water Quality Parameters [4]	10	1	NA	NA	NA
	Phenols	10	1	1	NA	1 [8]
	Dioxin and Furans [3]	10	1	1	NA	1 [9]
Sediment Phase I	TCL VOCs/BN/AEs	14	1	1	NA	1 [8]
	TCL Pesticides/PCBs	14	1	1	NA	1 [8]
	TAL Metals	14	1	1	NA	1 [9]
	Cyanide	14	1	1	NA	1 [9]
	Physical Parameters	14	1	NA	NA	NA
	Total Organic Carbon	14	1	NA	NA	1 [8]
	RCRA Characteristics [2]	14	1	NA	NA	NA
	Phenols	14	1	1	NA	1 [8]
	Dioxin and Furans [3]	14	1	1	NA	1 [9]

FOOTNOTES:

(1) Physical Parameters – Bulk Density, Cation Exchange Capacity, Grain Size Distribution, and Moisture Content
(2) RCRA Characteristics – Ignitability, Corrosivity, Reactivity, and Toxicity (TCLP)
(3) In addition to QC samples, Performance Evaluation (PE) samples should be ordered by the Region II QAO at the request of the USEPA WAM.
(4) Water Quality Parameters – Alkalinity, BOD, COD, Dissolved Oxygen, Total Hardness, TDS, and TSS
(5) TAL metals ground–water samples will not be filtered. TAL metals surface water samples will be filtered and unfiltered.
(6) Number is estimated – actual number of QA/QC samples will depend on the field conditions and program schedule. Pesticide/PCB samples may increase based on total number of borings into the consolidated soil/ash pile on Subsite 3.
(7) Number is estimated – trip blanks are for VOC analysis only.
(8) MS/MSD – triple volume is required for one field aqueous sample per 20. No extra volume is required for soil samples.

testing of Target Compound List (TCL) organics (Volatiles, Semi-volatiles and Pesticides/PCBs) will conform to the protocols of SOW/OLM01.2 with revisions through 1.9. The level of QC effort for testing of TCL organics (Volatiles, Semivolatiles, and Pesticides/PCBs) for drinking water criteria will conform to protocols in 40 CFR Part 136, October 26, 1984, entitled "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; Final Rule and Interim Final Rule and Proposed Rule".

The QC level of effort for the field measurement of pH consists of pre-measurement calibration and a post-measurement verification using two standard reference solutions each time as appropriate to the sample pH. This procedure will be performed for each sample tested. The QC effort for field conductivity measurements will include daily calibration of the instrument using standard solutions of known conductivity.

3.2 ACCURACY, PRECISION, AND SENSITIVITY OF ANALYSIS

To measure and control the quality of analysis, and to ensure that the DQOs are met, certain QA parameters are defined and utilized in data analysis activities in this project. They are defined in the following paragraphs. It is recognized that the VOC/BN/AE analyses of composite soil samples will be of limited use, since due to incorrect collection methodology, they can not be validated or duplicated. These data will not be used in assessing the QA parameters.

Precision

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a measurement of the variability of a group of measurements compared to their average value. As such, it is extremely important to have a precise analysis. In this project, precision will be as determined by the USEPA-approved analytical methods and measured in terms of relative percent difference (RPD). For USEPA CLP analyses, the RPD control limits are listed in the appropriate contract scope of work (SOW).

Accuracy

Accuracy measures the bias in a measurement system. Sources of error include the sampling process, field contamination, preservation, handling, shipping, sample matrix, sample preparation and analysis techniques. In this project, sampling accuracy will be evaluated through the results of field and trip blanks, while analytical accuracy will be assessed through surrogate spike and matrix

TABLE 3-2
DATA QUALITY REQUIREMENTS AND ASSESSMENTS
FRANKLIN BURNS SITE

Parameter	Matrix	Detection Limit	Quantitation Limit	Estimated Accuaracy	Accuracy Protocol	Estimated Precision	Precision Protocol
TCL VOCs	Soil/Sediment	(2)	5 to 10 ug/Kg (1)	59 – 172 % (4)	CLP (RAS)	<=24 RPD (5)	CLP (RAS)
TCL BN/AEs	Soil/Sediment	(2)	330 to 1600 ug/Kg (1)	11 – 142% (4)	CLP (RAS)	<=50 RPD (5)	CLP (RAS)
TCL Pesticide/PCBs	Soil/Sediment	(2)	8 to 100 ug/Kg (1)	20 – 150% (4)	CLP (RAS)	<=50 RPD (5)	CLP (RAS)
TAL Metals	Soil/Sediment	(2)	0.1 to 1000 mg/Kg (3)	75 – 125% (6)	CLP (RAS)	<=20 RPD (5)	CLP (RAS)
Cyanide	Soil/Sediment	(2)	2.0 mg/Kg (3)	75 – 125% (6)	CLP (RAS)	<=20 RPD (5)	CLP (RAS)
Phenols	Soil/Sediment	5 ug/L	NA	75 – 125%	CLP (SAS)	<=25 RPD	CLP (SAS)
Total Organic Carbon (TOC)	Soil/Sediment	100 mg/Kg	NA	75 – 125% (6)	CLP (SAS)	+/-25 RPD	CLP (SAS)
Dioxin and Furans	Soil/Sediment	1-5 ug/Kg	NA	50-150%	CLP (SAS)	<=50 RPD	CLP (SAS)
Bulk Density	Soil/Sediment	NA	NA	NA	CLP (SAS)	+/-20 RPD	CLP (SAS)
Cation Exchange Capacity	Soil/Sediment	NA	NA	NA	CLP (SAS)	+/-20 RPD	CLP (SAS)
Grain Size Distribution	Soil/Sediment	NA	NA	NA	CLP (SAS)	+/-20 RPD	CLP (SAS)
Moisture Content	Soil/Sediment	NA	NA	NA	CLP (SAS)	+/-20 RPD	CLP (SAS)
Ignitability	Soil/Sediment	NA	NA	90-110%	CLP (SAS)	+/-25 RPD	CLP (SAS)
Corrosivity	Soil/Sediment	NA	NA	90-110%	CLP (SAS)	+/-25 RPD	CLP (SAS)
Reactivity	Soil/Sediment	25-50 mg/Kg	NA	75 – 125%	CLP (SAS)	+/-25 RPD	CLP (SAS)
Toxicity (TCLP)	Soil/Sediment	(2)	(1)	50-150%	CLP (SAS)	+/-20 RPD	CLP (SAS)
Hydraulic Conductivity (7)	Soil	NA	NA	NA	CLP (SAS)	+/-20 RPD	CLP (SAS)
TCL VOCs	Aqueous	(2)	10 ug/L (1)	76 – 115% (4)	CLP (RAS)	<=14 RPD (5)	CLP (RAS)
TCL BN/AEs	Aqueous	(2)	10-25 ug/L (1)	10 – 141% (4)	CLP (RAS)	<=50 RPD (5)	CLP (RAS)
TCL Pesticide/PCBs	Aqueous	(2)	0.05 to 1.0 ug/L	38 – 131% (4)	CLP (RAS)	<=14 RPD (5)	CLP (RAS)
TAL Metals (total)	Aqueous	(2)	5 to 5000 ug/L	75 – 125% (6)	CLP (RAS)	<=50 RPD (5)	CLP (RAS)
TAL Metals (filtered)	Aqueous	(2)	0.2 to 5000 ug/L (1)	75 – 125% (6)	CLP (RAS)	<=50 RPD (5)	CLP (RAS)
Cyanide	Aqueous	(2)	10 ug/L	75 – 125% (6)	CLP (RAS)	<=27 RPD (5)	CLP (RAS)
Phenols	Aqueous	5 mg/L	NA	75 – 125% (6)	CLP (SAS)	+/-25 RPD	CLP (SAS)
Dioxins and Furans	Aqueous	10-50 ng/L	NA	50-150%	CLP (SAS)	<=50 RPD	CLP (SAS)
Alkalinity	Aqueous	all ranges	NA	75 – 125% (6)	CLP (SAS)	+/-25 RPD	CLP (SAS)
Biochemical Oxygen Demand	Aqueous	1 mg/L	NA	75 – 125% (6)	CLP (SAS)	+/-25 RPD	CLP (SAS)
Chemical Oxygen Demand	Aqueous	3 mg/L	NA	75 – 125% (6)	CLP (SAS)	+/-25 RPD	CLP (SAS)
Total Hardness	Aqueous	10 mg/L	NA	75 – 125% (6)	CLP (SAS)	+/-25 RPD	CLP (SAS)
Total Dissolved Solids (TDS)	Aqueous	10 mg/L	NA	75 – 125% (6)	CLP (SAS)	+/-25 RPD	CLP (SAS)
Total Suspended Solids (TSS)	Aqueous	4 mg/L	NA	75 – 125% (6)	CLP (SAS)	+/-25 RPD	CLP (SAS)

(1) Quantitation limits are based on current CLP SOW requirements, where applicable.
(2) Refers to instrument detection limit. Must be less than quantitation limit.
(3) Limits are based on wet weight of sample. Actual reported limits, corrected to dry weight will be higher.
(4) Actual limits for matrix spike, surrogates and laboratory control samples are provided in the CLP SOW.
(5) Actual limits for relative percent difference (RPD) of matrix spike pairs and duplicates are provided in the CLP SOW.
(6) Estimated Accuracy based on CLP matrix spike recovery limits.
(7) If a clay layer is encountered in the installation of monitoring wells, a sample of the clay will be analyzed for vertical hydraulic conductivity.

spike recoveries. Table 3-2 provides a summary of quantitative QA objectives.

Sensitivity

The data generated during the RI will not always have practical detection limits less than ARAR criteria. Table 3-3 provides the CLP contract required quantitative limits (CRQLs) for organics and contract required detection limits (CRDLs) for inorganics.

The fundamental QA objective with respect to accuracy, precision, and sensitivity of laboratory analytical data is to achieve the QC acceptance criteria of the analytical protocols. The accuracy and precision requirements for RAS from the CLP are specified in the current SOW/OLM01.2 with revisions through 1.9 for organics and SOW/ILM02.0 with revisions through 2.1 for inorganics. The sensitivities required for CLP analyses will be the detection limits shown in Table 3-3 of this QAPjP. The accuracy, precision, and sensitivity requirements for SAS for the CLP are specified in each individual SAS request. The accuracy and precision of field screening equipment used to measure pH, conductivity, and temperature are outlined in Appendix A.

3.3 COMPLETENESS, REPRESENTATIVENESS AND COMPARABILITY

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is expected that the CLP laboratory will provide data meeting QC acceptance criteria for 90 percent or more for all samples tested. Following completion of the analytical testing, the percent completeness will be calculated by the following equations: completeness (%): =

$$\frac{\text{(number of valid data)}}{\text{(number of samples collected for each parameter analyzed)}} \times 100$$

Representativeness

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is a qualitative parameter which is dependent upon the proper design of the sampling program and proper laboratory protocol. The sampling network was designed to provide data representative of Site conditions. During development of this

TABLE 3-3
TARGET COMPOUND LIST/TARGET ANALYTE LIST
CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)[1]

FRANKLIN BURNS SITE

TCL	CRQL	
Volatiles	Water (ug/l)	Low Soil/Sediment[2,3] (ug/kg)
Chloromethane	10	10
Bromomethane	10	10
Vinyl Chloride	10	10
Chloroethane	10	10
Methylene Chloride	10	10
Acetone	10	10
1,1-Dichloroethene	10	10
1,1-Dichloroethane	10	10
1,2-Dichloroethene (total)	10	10
Carbon Disulfide	10	10
Chloroform	10	10
1,2-Dichloroethane	10	10
2-Butanone	10	10
1,1,1-Trichloroethane	10	10
Carbon Tetrachloride	10	10
Bromodichloromethane	10	10
1,1,2,2-Tetrachlorethane	10	10
1,2-Dichloropropane	10	10
cis-1,3-Dichloropropene	10	10
Trichloroethene	10	10
Dibromochloromethane	10	10
1,1,2-Trichloroethane	10	10
Benzene	10	10
Trans-1,3-Dichloropropene	10	10
Bromoform	10	10
2-Hexanone	10	10
4-Methyl-2-pentanone	10	10
Tetrachloroethene	10	10
Toluene	10	10
Chlorobenzene	10	10
Ethyl Benzene	10	10
Styrene	10	10
Xylenes (Total)	10	10

TABLE 3-3 (Continued)
TARGET COMPOUND LIST/TARGET ANALYTE LIST
CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)[1]

FRANKLIN BURNS SITE

TCL	CRQL	
Semivolatiles	Water (ug/l)	Low Soil/Sediment[2,3] (ug/kg)
Phenol	10	330
bis(2-Chloroethyl) ether	10	330
2-Chlorophenol	10	330
1,3-Dichlorobenzene	10	330
1,4-Dichlorobenzene	10	330
1,2-Dichlorobenzene	10	330
2-Methylphenol	10	330
2,2'-oxybis (1-Chloropropane)	10	330
4-Methylphenol	10	330
N-Nitroso-di-n-propylamine	10	330
Hexachloroethane	10	330
Nitrobenzene	10	330
Isophorone	10	330
2-Nitrophenol	10	330
2,4-Dimethylphenol	10	330
bis(2-Chloroethyoxy) methane	10	330
2,4-Dichlorophenol	10	330
1,2,4-Trichlorobenzene	10	330
Napthalene	10	330
4-Chloroaniline	10	330
Hexachlorobutadiene	10	330
4-chloro-3-methylphenol	10	330
2-Methylnaphthalene	10	330
Hexachlorocyclopentadiene	10	330
2,4,6-Trichlorophenol	10	330
2,4,5-Trichlorophenol	25	800
2-Chloronaphthalene	10	330
2-Nitroaniline	25	800
Dimethylphthalate	10	330
Acenapthylene	10	330

TABLE 3-3 (Continued)
TARGET COMPOUND LIST/TARGET ANALYTE LIST
CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)[1]

FRANKLIN BURNS SITE

TCL	CRQL	
Semivolatiles (Continued)	Water (ug/l)	Low Soil/Sediments[2,3] (ug/kg)
2,6-Dinitrotoluene	10	330
3-Nitroaniline	25	800
Acenaphthene	10	330
2,4-Dinitrophenol	25	800
4-Nitrophenol	25	800
Dibenzofuran	10	330
2,4-Dinitrotoluene	10	330
Diethylphthalate	10	330
4-Chlorophenyl Phenyl Ether	10	330
Fluorene	10	330
4-Nitroaniline	25	800
4,6-Dinitro-2-methylphenol	25	800
N-nitrosodiphenylamine	10	330
4-Bromophenyl Phenyl Ether	10	330
Hexachlorobenzene	10	330
Pentachlorophenol	25	800
Phenanthrene	10	330
Anthracene	10	330
Carbazole	10	330
Di-n-butylphthalate	10	330
Fluoranthene	10	330
Pyrene	10	330
Butyl Benzyl Phthalate	10	330
3,3'-Dichlorobenzidine	10	330
Benzo(a)anthracene	10	330
Chrysene	10	330
bis(2-ethylhexyl)phthalate	10	330
Di-n-octyl Phthalate	10	330
Benzo(b)fluoranthene	10	330
Benzo(k)fluoranthene	10	330
Benzo (a) pyrene	10	330
Indeno(1,2,3-cd)pyrene	10	330
Dibenzo(a,h)anthracene	10	330
Benzo(g,h,i)perylene	10	330
	10	330

TABLE 3-3 (Continued)
TARGET COMPOUND LIST/TARGET ANALYTE LIST
CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)[1]

FRANKLIN BURNS SITE

TCL	CRQL	
Pesticides/PCBs	Water (ug/l)	Low Soil/Sediment[2,3] (ug/kg)
alpha-BHC	0.05	1.7
beta-BHC	0.05	1.7
delta-BHC	0.05	1.7
gamma-BHC (Lindane)	0.05	1.7
Heptachlor	0.05	1.7
Aldrin	0.05	1.7
Heptachlor Epoxide	0.05	1.7
Endosulfan I	0.05	1.7
Dieldrin	0.10	3.3
4,4'-DDE	0.10	3.3
Endrin	0.10	3.3
Endosulfan II	0.10	3.3
4-4'-DDD	0.10	3.3
Endosulfan Sulfate	0.10	3.3
4,4'-DDT	0.10	3.3
Methoxychlor	0.50	17.0
Endrin Ketone	0.10	3.3
Endrin Aldehyde	0.10	3.3
alpha-chlordane	0.05	1.7
gamma-chlordane	0.05	1.7
Toxaphene	5.00	170.0
Aroclor-1016	1.0	33.0
Aroclor-1221	2.0	67.0
Aroclor-1232	1.0	33.0
Aroclor-1242	1.0	33.0
Aroclor-1248	1.0	33.0
Aroclor-1254	1.0	33.0
Aroclor-1260	1.0	33.0

TABLE 3-3 (Continued)
TARGET COMPOUND LIST
CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)[1]

FRANKLIN BURNS SITE

PCDD/PCDF[4]	CRQL[5]	
	Water (ng/L)	Soil (ug/Kg)
2378-TCDD	10	1
2378-TCDF	10	1
12378-PeCDF	25	2.5
12378-PeCDD	25	2.5
23478-PeCDF	25	2.5
123478-HxCDF	25	2.5
123678-HxCDF	25	2.5
123478-HxCDD	25	2.5
123678-HxCDD	25	2.5
123789-HxCDD	25	2.5
234678-HxCDF	25	2.5
123789-HxCDF	25	2.5
1234678-HpCDF	25	2.5
1234678-HpCDD	25	2.5
1234789-HpCDF	25	2.5
OCDD	50	5.0
OCDF	50	5.0

(4) The total concentration of all detected PCDDs & PCDFs will be reported. However, because of the number of non-2,3,7,8-substituted isomers that might be detected in a sample is unpredictable, it is not possible to assign CRQLs to the total homolog concentrations.

(5) All CRQL values listed here are based on the wet weight of the sample.

TABLE 3-3 (Continued)
TARGET COMPOUND LIST/TARGET ANALYTE LIST
CONTRACT REQUIRED DETECTION LIMITS (CRDL)[1]

FRANKLIN BURNS SITE

TAL	CRDL
Inorganics	Contract Required[4] Detection Level (ug/l)
Aluminum	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	3
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	5
Silver	10
Sodium	5000
Thallium	10
Vanadium	50
Zinc	20
Cyanide	10

TABLE 3-3 (Continued)
TARGET COMPOUND LIST/TARGET ANALYTE LIST
CONTRACT REQUIRED QUANTITATION/DETECTION LIMITS (CRQL/CRDL)[1]

FRANKLIN BURNS SITE

Notes:

(1) Specific quantitation/detection limits are highly matrix dependent. The quantitation/ detection limits listed herein are provided for guidance and may not always be achievable.

(2) Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, as required by the contract, will be higher.

(3) Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Volatile TCL Compounds are 125 times the individual Low Soil/Sediment CRQL.

Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Semivolatile TCL Compounds are 60 times the individual Low Soil/Sediment CRQL.

Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Pesticide/PCB TCL Compounds are 15 times the individual Low Soil/Sediment CRQL.

(4) The total concentration of all detected PCDDs & PCDFs will be reported. However, because of the number of non-2,3,7,8-substituted isomers that might be detected in a sample is unpredictable, it is not possible to assign CRQLs to the total homolog concentrations.

(5) All CRQL values listed here are based on the wet weight of the sample.

(6) These CRDL are the instrument detection limits obtained in pure water. The detection limits for samples may be considerably higher depending on the sample matrix.

network, consideration was given to past waste disposal practices, existing analytical data, physical setting and processes, and constraints inherent to the Superfund program. The rationale of the sampling network is discussed in detail in the Field Sampling Plan (FSP). Representativeness will be satisfied by insuring that the FSP is followed, proper sampling technique are used, proper analytical procedures are followed and holding times of the samples are not exceeded in the laboratory. Representativeness will be assessed by the analysis of field duplicated samples.

Comparability

Comparability expresses the confidence with which one data set can be compared with another. The extent to which existing and planned analytical data will be comparable depends on the similarity of sampling and analytical methods. The procedures used to obtain the planned analytical data, as documented in the QAPjP, are expected to provide comparable data. These new analytical data, however, may not be directly comparable to existing data because of difference in procedures and QA objectives.

4.0 SAMPLE COLLECTION PROCEDURES AND FIELD DOCUMENTATION

4.1 INTRODUCTION

Project sampling procedures and field documentation procedures are provided in detail in the Franklin Burns Field Sampling Plan provided as a separately bound document in this submittal of the Sampling and Analysis Plan. The purpose of the FSP is to provide current methods for sample collection, handling and documentation prior to analysis. The FSP relies on the USEPA documents "Compendium of Superfund Field Operations Methods" and "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" and the "Region II CERCLA Quality Assurance Manual, Revision 1, October, 1989", for guidance. The FSP also uses Malcolm Pirnie Standard Operating Procedures (SOPs) and USEPA accepted practices to assure that representative samples are delivered to the laboratory.

4.2 SAMPLING PROGRAM OVERVIEW

The sampling program for the Franklin Burns Site is presented in detail in FSP. See Section 4.0 of the FSP for listings of sampling activities, media to be sampled, types of analyses to be performed, the numbers of media samples to be collected, and surface water and sediment sampling locations.

4.3 SAMPLING TECHNIQUES

Samples of soil, surface water, sediment and ground water will be collected in accordance with procedures generally described in Section 4.0 of the FSP; more specifically described in Section 6.0 of the FSP; and described in detail in the Field Technical Procedures (FTPs) included in Appendix B to the FSP. Where specific procedures are not described, sampling will be in accordance with the USEPA publication entitled a Compendium of Superfund Field Operations, EPA/540/P-87/001, dated December 1987.

4.4 FIELD MEASUREMENT OF PHYSICAL PARAMETERS

Field measurement of physical parameters will be conducted in accordance with the SAIC FTPs in the RI/FS Field Sampling Plan. Due to the wide variety and case-specific application of these types of instrumentation, each procedure may require amendment to include manufacturer's instructions for specific instrument operation and maintenance procedures. These tests shall be performed and documented so that a second party can reproduce and check findings from the recorded data.

5.0 SAMPLE CUSTODY

5.1 OVERVIEW

Sample custody procedures are provided to assist in the timely, correct, and complete analysis of each sample for all parameters requested. A sample or evidence file is considered to be in your custody if it:

* is in your possession;
* is in your view, after being in your possession;
* is in your possession and you place them in a secured location; or
* is in a designated secure area.

Sample custody documentation provides a written record of sample collection and analysis and is required evidence in any enforcement actions against potentially responsible parties (PRPs). The sample custody procedures provide for specific identification of samples associated with an exact location, the recording of pertinent information associated with the sample, the time of sample collection and any preservation techniques, and provide for a written chain of custody record which serves as physical evidence of sample custody. Custody procedures will adhere to the procedures outlined in the USEPA documents "User's Guide to the Contract Laboratory Program", January 1991, EPA/540/8-89/012, and "Samplers Guide to the Contract Laboratory Program", December 1990, EPA/540/P-90/006. The chain of custody documentation system provides the means to individually identify, track and monitor each sample from the time of collection through final data reporting. Sample custody procedures are developed for three areas, Sample collection, Laboratory analysis, and Final evidence files, which are described below.

5.2 FIELD RECORDS AND SAMPLE COLLECTION

Chain-of-custody procedures document pertinent sampling data and all transfers of custody until the sample reaches the analytical laboratory. The chain-of-custody procedures assure that all samples are uniquely identified, correctly analyzed and traceable to their source. The documentation and custody requirements for field monitoring and samples collected for field analysis are different from samples collected for laboratory analysis. The sample packaging and shipment procedures for samples to arrive at the laboratory with the chain of custody intact are

summarized below. The protocol for specific sample numbering using case numbers and traffic report numbers if applicable and other sample designations are included in the FSP.

5.2.1 Field Procedures

(a) The field sampler is responsible for the care and custody of the samples until they are transferred or properly dispatched. As FEW people as possible should handle the samples. A Malcolm Pirnie Sample Management Officer will be designated by the Field Operations Leader for each sampling event.

(b) All bottles will be tagged with sample numbers and locations. The CLP Sample Management Office (SMO) number and stickers will be affixed.

(c) Sample tags are to be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample tag because the ballpoint pen would not function in freezing weather.

(d) The USEPA Work Assignment Manager (WAM) is to review all field activities to determine whether proper custody procedures were followed during the field work and decide if additional samples are required.

5.2.2 Field Records

The field logbook will provide the means of recording data collecting activities performed. As such, entries will be described in as much detail as possible so that persons going to the Site could re-construct a particular situation without reliance on memory. The field logbook serves as the permanent record of all analyses conducted in the field. The field log book will be a bound field survey book or notebook. All in-field analytical results will be recorded in the field logbook. Logbooks will be assigned to field personnel, but will stored in a designated place when not in use. Each logbook will be identified by the project-specific document number, i.e., for example FB Fieldbook No. 1. The title page of each logbook will contain the following:

* Person to whom the logbook is assigned.
* Logbook number.
* Project name.
* Project start date, and
* End date.

Entries into the logbook will contain a variety of information. At the beginning of each day, the date, start time, weather, names of all sampling team members present, level of personal

protection being used, and the signature of the person making the entry will be entered. The names of visitors to the Site, field sampling or investigation team personnel and the purpose of their visit will also be recorded in the field logbook. The field technicians will sign and date each field logbook page.

All pertinent information regarding measurements made and samples collected will be recorded. This information may include:

1. Field analytical equipment (include serial number)
2. Other measuring equipment (include serial number)
3. Calculations
4. Results
5. Calibration data for equipment

All entries will be made in ink and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark and the cross-out signed and dated. Whenever a sample is collected, a description of the location of the station shall be recorded. If sample locations have been pre-surveyed, the stake identification information, if available, will be recorded. If sample locations have not been surveyed or survey stake is not present, then a general sketch of the sample location will be made and the location will be staked. The number of the photographs taken of the station, if any, will also be noted. All equipment used to make measurements will be identified, along with the date of calibration.

Samples will be collected following the sampling procedures documented in the Field Sample Plan (FSP). The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, volume and number of containers. Observations such as sampling conditions or any problems will also be recorded. Sample identification numbers will be assigned prior to sample collection. Field duplicate samples, which will receive an entirely separate sample identification number, will be noted under sample description.

5.2.3 Sample Identification

The documentation system for laboratory samples is based on the sample documentation system described in the USEPA documents, "User's Guide to the Contract Laboratory Program " (January 1991) and the "Samplers Guide to the Contract Laboratory Program" (December 1990).

Sample identification procedures are also described in Section 4.4 of the FSP. All samples collected will have a label that contains the following information:

1. Project name and number
2. Field ID or sample station number
3. Date and time of collection
4. Designation of sample as grab or composite
5. Sample matrix
6. Sample preservation notes
7. Analytical parameters
8. Signature of Sampler

CLP samples will have a sample tag affixed to each container with the same information. CLP samples will also have a specific CLP label provided by the laboratory. All sample tags and labels will be completed in waterproof ink by the sampler. The sample labels will be protected with clear tape before shipping.

The project number is used instead of the Site name in order to preserve the anonymity of the Site. The bottles will be pre-numbered according to the Field Sampling Plan's numbering scheme presented in Section 4.4 of the FSP.

5.2.4 Sample Traffic Reports

Sample Traffic Reports will be filled out for all CLP-RAS analyses in accordance with the procedures given in the USEPA documents, "User's Guide to the Contract Laboratory Program", (January 1991) and "Samplers Guide to the Contract Laboratory Program", (December 1990). Sample traffic reports are now combined with the chain-of-custody form and copies of the organic and inorganic forms are provided in Appendix C.

5.2.5 Chain of Custody Procedures

At the time of sampling, a chain of custody form shall be filled out for each sample or group of samples. Appendix C provides copies of both a Malcolm Pirnie ARCS chain of custody form and a USEPA chain of custody form. These forms now combine both a chain of custody record and a sample traffic report. The following information will be recorded on the Traffic Report/Chain-of-Custody form:

1. Project name
2. Signature of samplers
3. Sampling station number
4. Date and time of collection

5. Grab or composite sample designation
6. Sample matrix with brief description
7. Sampling location description
8. Field identification number
9. Analyses requested
10. Preservation technique
11. Signatures and dates for transfers of custody
12. Air express/shipper's bill of lading identification numbers

The Traffic Report/Chain-of-Custody form serves as an official communication to the laboratory of the particular analyses required for each sample. The chain of custody record will accompany the samples from the time of sampling through all transfers of custody and kept on file at the laboratory where samples are analyzed and archived. The form is filled out in triplicate; one copy is retained by the Site Manager, one is sent to the laboratory, and the third will be submitted to the USEPA Sample Management Office. The sampler completes a chain-of-custody record to accompany each shipment from the field to the laboratory. Separate chain-of-custody records are filled out for split samples. Errors must be crossed through with a single line, initialed and dated. The completed chain of custody record is put in a zipper-lock bag and taped to the inside cover of the sample shipping container. The container is then sealed with custody seals and custody is transferred to the laboratory.

5.2.6 Special Analytical Services

Special Analytical Services (SAS) will be used in this project. The procedures for requesting services and shipping and documenting are provided in the USEPA documents "User's Guide to the Contract Laboratory Program" (January 1991) and the "Samplers Guide to the Contract Laboratory Program" (December 1990). SAS requests will be made by Malcolm Pirnie as far in advance as possible, with a minimum lead-time of eight weeks. The SAS Packing List is completed in the field and sent to the laboratory with the samples. An example of the SAS combined Packing List/Chain-of-Custody form is provided in Appendix C.

5.3 TRANSFER OF CUSTODY AND SHIPMENT

The custody of the samples must be maintained from the time of sampling, through shipment and relinquishment to the laboratory. All samples are required to be analyzed by the Contract Lab Program and therefore will be shipped according to procedures in the USEPA

documents, "User's Guide to the Contract Laboratory Program" (January 1991) and the "Samplers Guide to the Contract Laboratory Program" (December 1990). Instructions for transferring custody are given below.

(1) Samples are accompanied by a Chain-of-Custody Record shown in Appendix C. When transferring the custody of samples, the individuals relinquishing and receiving will sign, date, and note the time on the Record. This Record documents sample custody transfer from the sampler, through the shipper, to the analytical laboratory. A shipper will sign the Record. A common carrier will usually not accept the responsibility for handling chain-of-custody forms. In this case, the name of the carrier is entered under "Received by", the bill-of-lading number is recorded under "Remarks", and the Record is placed in a zipper-lock plastic bag and taped to the inside lid of shipping cooler.

(2) Samples will be packaged properly for shipment and dispatched to the appropriate laboratory via overnight delivery service for analysis, with a separate Chain-of-Custody Record accompanying each shipment (e.g., one for each cooler shipped). Samples are to be shipped within 24 hours of collection. Shipping containers will be sealed for shipment to the laboratory. A custody seal will be applied to each cooler to document that the container was properly sealed and to determine if the container was tampered with during shipment. CLP samples will be shipped in coolers sealed with USEPA custody seals in such a manner that the custody seal would be broken if the cooler were opened.

(3) The original Chain-of-Custody Record will accompany the shipment. The copy will be retained by the Field Operations Leader.

(4) If sent by post office mail, the package will be registered with return receipt requested. If sent by common carrier or air freight, proper documentation must be maintained, for example, bill of lading.

(5) If samples are split with a source or government agency, a separate Chain-of-Custody Record is prepared for the split samples and marked to indicate the samples are being split. If a representative is unavailable to sign the Record, the Field Operation Leader will note it in the field log.

Appendix B contains the Malcolm Pirnie SOP for sample packing and shipping.

5.4 LABORATORY CUSTODY PROCEDURES

Laboratory custody procedures will be equivalent to those described in the latest edition of CLP-Invitation For Bid (IFB) Statement of Work. The following items will be addressed in the written laboratory custody SOPs:

(1) A designated sample custodian accepts custody of the samples and verifies that the information on the sample labels matches that on the Chain-of-Custody Records. The sample custodian will document any discrepancies. The sample custodian will sign and date all appropriate receiving documents.

(2) Once the samples have been accepted by the laboratory, checked and logged in, they must be maintained in accordance with laboratory custody and security requirements.

(3) To assure traceability of samples while in the possession of the laboratory, a method for sample identification that has been documented in a laboratory SOP will be used to assign sample numbers.

(4) The following stages of analysis must be documented by the laboratory:

1) Sample Extraction/Preparation
2) Sample Analysis
3) Data Reduction
4) Data Reporting

(5) Laboratory personnel are responsible for the custody of the samples until they are returned to the sample custodian.

(6) When sample analyses and quality assurance checks have been completed in the laboratory, the unused portion of the sample must be stored or disposed of in accordance with CLP protocols. Identifying tags, labels, data sheets, chain-of-custody and laboratory records will be retained until analyses and quality assurance checks are completed in accordance with CLP protocols.

5.5 FINAL EVIDENCE FILES

This is the final phase of sample custody. The actual physical sample is stored by the laboratory until the USEPA allows its disposal. The chain of custody record and sample analysis request form copies held by the laboratory and Site Manager are archived by both in their respective project files for possible use as evidence in enforcement actions. Laboratory custody forms, sample preparation and analysis logbooks, and data packages shall become part of the laboratory final evidence file. Other relevant documentation including records, reports, correspondence, logs, field logbooks, pictures, and data review reports will be archived by Malcolm Pirnie for possible use as evidence in enforcement actions.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

6.1 INTRODUCTION

Instruments must be properly calibrated to produce technically valid data. Documented calibration and calibration check results verify that the instruments used for measurement are in proper working order and the data produced is reliable. The calibration requirements described or referenced in this Section are judged to be necessary to support the data quality objectives for this project. In the event that the data is used in court, documented calibrations are a necessary part of demonstrating that the data is legally defensible.

6.2 CALIBRATION PROCEDURES FOR FIELD EQUIPMENT

6.2.1 Field Equipment

The following table provides a list of the tasks that will require field equipment and the specific field instruments that will or may be used for each task.

Task	Field Instrument
Air Monitoring	HNU Model PI-101 Photoionization Detector
	Foxboro Model OVA 128 Flame Ionization Detector
	Ludlum Micro R radiation meter
	Lead and Copper Personal Air Sampler
	Miniram Model PDM-3
Surface and Subsurface Soil Sampling	HNu Model PI-101 Photoionization Detector
	Foxboro Model OVA 128 Flame Ionization Detector

Task	Field Instrument
Monitoring Well/Piezometer Development	Orion Model SA250 pH Meter
	Portable Turbidimeter
	Orion Model 230 Eh Meter
	YSI Model 33 Temperature-Specific Conductivity Meter
	YSI Model 50-B Dissolved Oxygen Meter
Ground Water and Surface Water Sampling	Orion Model SA250 pH Meter
	Orion Model 230 Eh Meter
	YSI Model 33 Temperature-Specific Conductance Meter
	YSI Model 50-B Dissolved Oxygen Meter

6.2.2 General Procedures

The operation and maintenance of the field equipment to be used during the air monitoring, surface water and ground water sampling tasks and soils and sediment sampling tasks are provided in the Malcolm Pirnie SOP in Appendix A. Specific calibration procedures for each instrument are also described in Appendix A. General calibration procedures and requirements follow.

- All instruments will be calibrated at least once a month.
- All instruments will have the calibrations checked at a minimum at the start of each day before measurements are made.
- The calibration and calibration checks are to indicate, where practicable, that the sensitivity of the instrument (practical detection limit) is adequate to meet project needs and that the instrument is accurate over the working range.
- All on-Site calibration information will be recorded in the field log book. This includes date and time, technician signature, calibration procedure, calibration results, calibration problems, recalibration and maintenance, and instrument serial numbers.

- All calibration standards will be of National Bureau of Standards (NBS) quality and their sources listed and documented so that standards are traceable. In addition, only technicians trained in the use of the field instruments will operate them. If the instrument readings are incorrect at the time of the initial calibration, the instrument will either be calibrated by the technician or returned to the manufacturer for calibration. If the instrument readings are incorrect after a continuing calibration check, the preceding sample results will be reviewed for validity and reanalyzed if necessary.

6.3 LABORATORY CALIBRATION PROCEDURES

All samples analyzed according to the USEPA CLP shall follow the procedures described in the Statement of Work (SOW). The calibration procedures and frequency are specifically described for each analysis contained in the SOW. All calibration results shall be recorded and kept on file and it will be verified by Malcolm Pirnie as part of data validation.

Laboratory analyses not covered in the USEPA SOW will follow the laboratory's calibration SOP for each analysis. Each instrument will be calibrated at least once each day according to the laboratory Standard Quality Procedure (SQP). The calibration will be checked with a check standard prior to the analysis of any sample. The standards used for calibrations are to be of NBS quality, with the preparation information recorded in a log book. The calibration will be recorded in the laboratory notebook for that analysis, and any printouts, chromatograms, etc., kept on file.

7.0 ANALYTICAL PROCEDURES

7.1 LABORATORY ANALYSIS

All ground-water, residential wells water samples, surface water, sediment, and soil samples collected during field sampling activities for the Franklin Burns RI/FS will be analyzed through the USEPA CLP program unless USEPA elects a non-CLP laboratory alternative. For the analysis of Target Compound List (TCL) and Target Analyte List (TAL) parameters by CLP protocols, the laboratory will follow methods detailed in the CLP Statement of Work (SOW/OLM01.2 with revisions through 1.9) for organic analyses and the CLP (SOW/ILM02.0 with revisions through 2.1) for inorganic analyses. Tentatively Identified Compounds (TIC) will require Gas Chromatograph/Mass Spectrometer (GC/MS) methods. Table 7-1 summarizes the analyte groups and USEPA methods to be used for chemical analysis.

All samples for Volatile Organic Analyte (VOA) analysis shall be screened as recommended in VOA CLP RAS SOW/OLM01.2. Samples which, as a result of the screening, would normally be quantitated using the VOA CLP "Low Concentration" method, shall be analyzed by the SOP for Volatile with the Low Detection Limits. If the result of the screening indicate that the VOA CLP "Medium Concentration" method should be used, then the sample shall be quantitated according to the CLP SOW for Organic analysis, Multi-media, High Concentration, dated 9/88, revision 4/89. This screening and multi-method approach is necessitated by the very low detection limits required by the State and USEPA while accommodating the potential for samples with high concentrations of VOAs.)

7.2 FIELD SCREENING ANALYTICAL PROTOCOLS

The procedures for calibration and field measurement of pH, Eh, specific conductance, turbidity, temperature, and dissolved oxygen are described in the SOPs of Appendix C of the Field Sampling Plan.

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TABLE 7-1
ANALYTICAL PROCEDURES
FRANKLIN BURNS SITE

MATRIX	ANALYSIS	PROCEDURE
Soil (Soil/Ash)/Sediment	TCL VOCs	CLP [1]
	TCL BN/AEs	CLP [1]
	TCL Pesticide/PCBs	CLP [1]
	TAL Metals	CLP [2]
	Cyanide	CLP [2]
	Phenols	EPA 9065A [5][7]
	Dioxins and Furans	CLP [3]
	Total Organic Carbon (TOC)	USEPA [6]
	Physical Parameters:	
	Bulk Density	Maximum Index ASTM D 4253-91 Minimum Index ASTM D 4254-91
	Cation Exchange Capacity	USEPA 9081A [5]
	Grain Size Distribution	ASTM D 422-63
	Moisture Content	ASTM D 2216-80
	RCRA Characteristics:	
	Ignitability	USEPA 1010 [5]
	Corrosivity	USEPA 9045 [5]
	Reactivity	USEPA 9030 [5]
	Toxicity (TCLP)	USEPA 1311 [5]
Soil (Ground Water Monitoring Well Boring Soils	**Physical Parameters:**	
	Grain Size Distribution	ASTM D 422-63
	Vertical Hydraulic Conductivity	ASTM D 5084-90
Aqueous	TCL VOCs (Surface Water Only)	CLP [1]
	TCL BN/AEs (Surface Water Only)	CLP [1]
	TCL Pesticide/PCBs	CLP [1]
	TAL Metals (Total)	CLP [2]
	TAL Metals (Filtered)	CLP [2]
	Cyanide	CLP [2]
	Phenols	USEPA 9065A [5]
	Dioxins and Furans	CLP [3]
	Water Quality Parameters:	
	(Surface Water Only)	
	Alkalinity	USEPA 310.1 [4]
	Biochemical Oxygen Demand	USEPA 405.1 [4]
	Chemical Oxygen Demand	USEPA 410.4 [4]
	Total Hardness	USEPA 130.2 [4]
	Total Dissolved Solids	USEPA 160.1 [4]
	Total Suspended Solids	USEPA 160.2 [4]

(1) USEPA Contract Laboratory Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration, OLM01.2, with revisons through OLM01.9.
(2) USEPA Contract Laboratory Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration, ILM02.0 with revisions through 2.1.
(3) USEPA Contract Laboratory Statement of Work for Dioxin Analysis, PCDD/PCDF DFLM01.1.
(4) All conventional extraction and analytical methods are taken from "Methods for Chemical Analysis of Water and Wastes", March 1983 rev., USEPA 600/4-79-02.
(5) All conventional extraction and analytical methods are taken from "Test Methods for Evaluating Solid Waste", SW-846.
(6) "Determination of Total Organic Carbon in Sediment", July 27, 1988, by L. Kahn of the USEPA.
(7) Distillation Method - "Procedures for Handling and Analysis of Sediment and Water Samples (CE/81-1)", May 1981. Method 1: Distillation, 4-Aminoantipyrine Colorimetric, page 3-355.
(8) *Tentative method selected, may be changed at a later date.*

8.0 INTERNAL QUALITY CONTROL CHECKS

8.1 INTRODUCTION

In order to monitor the quality of all data generated for this RI/FS, an appropriate number of quality control (QC) procedures shall be employed for each measurement. QC procedures shall be employed for all field and laboratory measurement systems. The employment of QC procedures permits the validation of the field or laboratory method and provides a measure of the ability of the particular system being used to meet the DQOs prior to the beginning of measurement or analysis. Once the measurement and analysis has begun, the employment of QC procedures permits the monitoring of the system output for quality. The QC results, presented along with the reported data, allows the data to be assessed for quality and, with other factors, a determination to be made on how well the data has met the DQOs.

Laboratory generated data is used to accurately identify and quantify hazardous substances, while field generated data is used in conjunction with the laboratory data for further investigating and delineating the contamination at the Site. Both laboratory and field internal QC procedures include steps to assure the data are reliable for the extent they will be used in the RI/FS. In general, laboratory QC programs are more rigorous than field QC programs.

8.2 FIELD QUALITY CONTROL

The intended data uses have been identified and the DQOs established for all field measurement activities in Section 3 of this QAPjP. The field measurements required and the instruments to be used are given in both documents of the SAP. The FSP describes the use and calibration of the field instruments. SOPs for the maintenance and calibration of these instruments are provided in Appendix A of the QAPjP.

QC procedures will be used to demonstrate that the instruments are producing reliable data. The QC checks employed for field instruments are as follows:

QC Procedure	Purpose	Frequency
Calibration Check	To assess/verify proper working order of instrument. Measures instrument accuracy and sensitivity.	Daily
Background Sample	Provides measure of instrument reliability.	Daily (Air only)

The QC check procedures will be performed by the field personnel during sample collection and the results will be recorded in field notebooks. Calibration checks and background samples will be analyzed daily. The calibration check verifies that the instrument is capable of accurately identifying and quantifying contaminants of concern. Background samples are similar to blanks and are an indicator of instrument reliability. All information pertaining to field quality control checks will be recorded in a field notebook.

The results of these QC procedures will be used by field personnel to monitor the instrument at the time of the analysis. If QC results indicate a problem with the instrument, corrective action will be taken and, if necessary, the samples will be reanalyzed. Measurements will be repeated as necessary so the data is as complete as possible. The QC results are used when the data is being reviewed as an indication of data quality and reliability.

QC samples will also be used to check field sample collection methods and provide a basis for evaluating the quality of the data collected. The following QC samples will be used to check field collection methods:

QC Sample	Purpose	Frequency
Trip Blank	Provides measure of potential volatile organic contamination from sample transport, the environment and/or shipping	Minimum of one per daily shipment of aqueous volatile samples

Field Rinse Blank	Measures potential contamination due to improper or inadequate decontamination of sample collection equipment	One per equipment type each day a decontamination event is carried out
Field Duplicate Sample	Checks field sampling precision	One per 20 samples

The QC samples are analyzed by the laboratory at the same time as the environmental samples. The number of QC samples to be collected is detailed in Section 3.0.

8.3 LABORATORY QUALITY CONTROL

8.3.1 CLP Samples

The scope and description of QC samples and QC methods are well detailed in the CLP Statement of Work (SOW) for each particular analysis. CLP RAS samples are characterized by rigorous QC and documentation. The SOWs for organic and inorganic analysis contain the type of QC samples and QC methods required and the frequency required. QC limits have been established for standards, blanks, duplicates, matrix spikes, surrogates and are contained in the SOWs. QC data will be reviewed by Malcolm Pirnie personnel to assess the validity of the data and determine if the DQOs have been met.

8.3.2 SAS Quality Control

All SAS analyses that are conducted for this RI/FS shall include the following QC procedures, if applicable:

		Frequency
1.	Calibration	As required
2.	Standards	Daily
5.	Method Blanks	Daily
6.	Duplicates	5%
7.	Matrix Spikes	5%
8.	Surrogates	Each sample
9.	QC Check Samples	Daily

8.3.3 SAS Quality Control Checks

The specific laboratory QC procedures will be similar to the procedures outlined in the specific CLP-IFB SOW whenever possible. For analyses where CLP QC procedures cannot be adapted to the analysis, a written procedure of quality control checks will be developed, referencing appropriate USEPA documents such as SW-846. The laboratory internal QC checks will include the analysis of duplicates, matrix spikes, matrix spike duplicates, blanks, internal standards, and surrogate standards. Malcolm Pirnie will be responsible for ensuring that QA/QC objectives are equivalent to CLP objectives when possible. Data validation and review by Malcolm Pirnie personnel will be the same as data validation for CLP data, described in Section 12.0. The validation process will assess whether the quality assurance objectives have been met by the QC procedures.

9.0 DATA REDUCTION, VALIDATION AND REPORTING

9.1 INTRODUCTION

The purpose of this section is to ensure that the large amounts of data produced by the laboratory are presented in a clear and useable format. In addition, data quality and technical validity must be verified prior to data use. Samples collected at this Site will be analyzed for parameters according to the CLP protocols, in which data reduction and reporting schemes are well developed and clearly defined. Additional (SAS) parameters will be analyzed for which there are no CLP protocols. Analysis of these parameters will follow the procedures for the analytical methods listed in Table 7-1. Data reporting will follow CLP format. The employment of these methods ensures comparability with other similarly analyzed environmental samples.

9.2 DATA REDUCTION

Data reduction is the process by which raw analytical data is converted into useable concentrations. The raw data, which takes the form of area counts or instrument responses, is processed and converted into concentrations expressed in terms of parts per million or parts per billion. These concentrations are the standard method for expressing the level of contamination present in environmental samples.

9.2.1 Field Measurements and Sample Collection

Raw data from field measurements and sample collection activities will be appropriately recorded in the field log book. If the data are to be used in the project reports, they will be reduced for the purpose of summarizing the data, and the method of reduction will be documented in the report.

9.2.2 Laboratory Services

The process used to convert the instrument output into useable concentrations is clearly defined in the USEPA CLP-SOW for RAS parameters. The SOW presents in detail all information, equations and calculations used. Data resulting from SAS request will be

reduced, evaluated and reported as described above unless special procedures are given in the actual SAS request. Following data evaluation and reduction, the data will be sent to USEPA Region II for data validation.

9.3 DATA VALIDATION

Validation will be accomplished by comparing the contents of the data packages and QA/QC results to the requirements contained in both RAS and SAS methods. Raw data such as GC/MS Total Ion Current (TIC) chromatograms, GC chromatograms, and mass spectra, Inductively Coupled Argon Plasma (ICAP) and Furnace Atomic Absorption (FAA) data reports, and data station printouts will be examined to ensure that reported results are accurate. All data validation will be performed by USEPA Region II certified data validators in accordance with USEPA Region II protocols. The protocols for RAS analyte data validation are presented in:

* USEPA Contract Laboratory Program (CLP) National Functional Guidelines For Organic Data Review, Multi-Media, Multi-Concentration (OLM01.0) and Low Concentration Water, December 1990, Revised June 1991, for data prepared under USEPA CLP SOW for Organic Analysis Multi-Media, Multi-Concentration, Doc. No. OLM01.2, Revision OLM01.9 June 1991.

* Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analysis, October 1989 Revision for data prepared under USEPA CLP SOW for Inorganic Analysis, Multi-Media, Multi-Concentration, Doc. No. ILM02.0 with revisions through 2.1.

* USEPA Region II Standard Operating Procedures and Checklists for Inorganic Analysis (SOP HW-2, Revision 11 of 1/92), Organic Analysis (SOP HW-6 Revision 8 of 1/92), and Low Level Organic Analysis (SOP HW-13, Revision 1 of 6/91).

Region II Management Monitoring Branch (MMB) will validate the dioxin and furan data and USEPA has indicated that these data will be validated in accordance with Polychlorinated Dibenzodioxins/Polychlorinated Dibenzofurans Data Review (SOP No. 11, Revision 1 of 9/92). The protocols for SAS analyte data validation are taken from the above-referenced documents as well as the analytical methods referenced in each SAS request.

9.4 DATA REPORTING

The laboratory will report data consistent with CLP reporting requirements and will include the following (as applicable):

1. Narrative including statement of samples received, description of any deviations from RAS or SAS standard procedures, explanation of qualifications regarding data quality, and any other significant problems encountered during analysis.

2. Up to 20 extractable organic compounds not included in the RAS analytes, tentatively identified and quantified against the nearest internal standard.

3. An organic QA/QC report including Forms I to X, surrogate spike results for each sample, matrix spike and matrix spike duplicate results, method blank results, and initial and continuing calibration checks.

4. An inorganic QA/QC report including Forms I to XIII spike and duplicate results, method blank results, and initial and continuing calibration checks.

5. Field and laboratory chain-of-custody documentation pertaining to each sample delivery group analyzed.

One copy of the data package (excluding dioxins and furans) will be delivered to Malcolm Pirnie personnel, trained by USEPA in data validation, for data assessment. The data package will contain the case narrative. One copy of the data validation report and data usability report will be submitted to USEPA. This package will include the sampling analysis and summary forms. Section 14.0 provides greater details on the reporting requests for data assessment and validation.

The QA reporting for data packages will consist of the following precision and accuracy protocols as performed on the appropriate QA samples:

For precision, the relative percent difference (RPD) will be calculated:

$$RPD = \frac{D_1 - D_2}{(D_1 + D_2)/2} \times 100$$

RPD = Relative Percent Difference
D_1 = First Sample Value
D_2 = Second Sample Value (Duplicate)

For accuracy, the percent recovery (%R) of spikes will be calculated:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

SSR = Spike Sample Results
SR = Sample Results
SA = Spike Added from Spiking Mix

Field sample precision will be assessed through analysis of duplication samples and the above RPD equation. Accuracy will be assessed through the analysis of check standards and the above percent recovery equation. Field data will also be assessed in relation to specific project needs.

10.0 QUALITY ASSURANCE AUDITS

10.1 INTRODUCTION

In order to monitor the capability and performance of all RI/FS activities, audits will be conducted by Malcolm Pirnie QA personnel and the USEPA. Technical systems audits (TSAs) are conducted to determine the suitability and capability of project activities to meeting project quality goals. TSAs include on-Site field audits to monitor the field techniques, procedures and the overall implementation of the Work Plan and the SAP. These will be conducted periodically by both the Site Quality Assurance Officer (QAO) and by USEPA personnel as part of their quality assurance effort. Performance audits (PAs) are conducted to measure the accuracy of operating measurement systems. Data quality audits (DQAs) are conducted to determine if the data generated by the sampling and analysis satisfies the predetermined DQOs. The Site QAO will be responsible for conducting DQAs of all data submitted from project activities. The USEPA is responsible for conducting TSAs and PAs of CLP laboratories. In addition, the USEPA Region II is to conduct audits of Malcolm Pirnie's RI/FS activities as part of their quality assurance effort.

The PMO QA Manager is to perform periodic audits of QAO efforts to review whether QA objectives are being met. Such an audit may occur as part of this project. In addition to this auditing, one program audit is to be conducted per year by the Malcolm Pirnie Corporate QAO and the PMO QA Manager, to assure that program QA objectives are being met at the project QA level.

10.2 TECHNICAL SYSTEMS AUDITS

Technical systems audits consist of evaluation and review of all components of a measurement system to determine its capability to meet project quality goals and to determine if the procedures of the system are being properly followed.

The following components of each measurement system will be reviewed, with other items added as necessary:

1. Sample collection and analytical activities,
2. Equipment calibration techniques and records,
3. Decontamination and equipment cleaning,
4. Equipment suitability and maintenance/repair,
5. Background and training of personnel,
6. Sample containers, preservation techniques and chain of custody,
7. Data log books and
8. Monitor siting.

TSAs are conducted initially, prior to the operation of each measurement system, to determine if the system is capable of producing data that will meet the DQOs. This initial audit includes a careful evaluation of both field and laboratory QC procedures. Once the system is approved and shortly after it becomes operational, a TSA is conducted to monitor the performance of the measurement activities. This includes an audit of field procedures to determine if the appropriate SOPs are being followed. In addition, TSAs will determine if this QAPjP is being implemented in the field.

Field audit forms are provided in Appendix D. A written report of the QA audits will be prepared by the Site QAO and submitted to the Site Manager and the PMO QA Manager. The report will identify any deficiencies found and recommend corrective action. The PMO QA Manager will assist with corrective action and maintain an on-going log of the audit activities. Follow-up reports describing corrective actions which have been completed will be submitted by the Site Manager to the PMO QA Manager.

Four field audits will be conducted by the Site QAO during the Franklin Burns RI/FS, one for each type of environmental sampling to be performed (i.e., soil borings, surface water sampling, sediment sampling, and ground-water sampling). These audits are to take place during the first day each type of sampling is performed. As long as the field team demonstrates proficiency in the sampling procedures being audited, a second audit of this procedure will not be required; however, a follow-up audit will be required for any audit

that indicates a corrective action is necessary. Any follow-up audits will be an out-of-scope service.

10.3 PERFORMANCE AUDITS

A performance audit (PA) is conducted on all laboratories by sending them a performance evaluation (PE) sample for analysis. The PE sample is a sample of known concentration that is analyzed by the laboratory and the analytical results are compared with the actual concentration. The results provide a measure of laboratory performance that is used along with other QA criteria to monitor laboratory capability. The USEPA administers required PAs to CLP laboratories every six months.

10.4 DATA QUALITY AUDITS

Data Quality Audits (DQAs) are conducted to determine if the data is adequate to support the DQOs and to determine the cause of deficiencies in the event that the data quality is not adequate. This audit will be conducted by the Site QAO after the data has been fully validated. The Site QAO will first determine to what extent the data can be used to support the decision-making process. Secondly, the Site QAO will identify the cause of any deficiencies in the data, whether technical, managerial, or both. Finally, the Site QAO will submit a written report concerning the DQA to the Site Manager and the PMO QA Manager.

11.0 PREVENTATIVE MAINTENANCE

11.1 PURPOSE

The purpose of the preventative maintenance program is to keep the sampling, field testing and analytical equipment working properly and thereby assure proper performance, avoid erroneous results and minimize equipment downtime. The preventive maintenance program also provides for the documentation of all maintenance to be used as evidence of instrument maintenance and for scheduling future maintenance. This section describes the equipment maintenance program for field equipment and those responsible for implementation of the program at the Franklin Burns Site. The specific equipment maintenance procedures are given in the equipment SOPs and the preventative maintenance SOPs presented in Appendix A. The laboratory preventative maintenance program is the responsibility of the laboratory and only the minimum requirements are mentioned here.

11.2 RESPONSIBILITIES

Title	Responsibilities
Field Operations Leader	Keeping all maintenance records. Development and implementation of maintenance program.
Equipment Manager	Maintaining the store of equipment within the Malcolm Pirnie ARCS inventory. Carrying out all maintenance according to schedule. Informing field team members of specific maintenance requirements. Keeping records of all maintenance done under his care. Sending out equipment for service/repair. Maintaining adequate supply of spare parts.
Field Personnel	Maintenance of all equipment located on-site on a regular basis and after each use. Keeping supply of spare parts on-hand.

11.3 PREVENTIVE MAINTENANCE PROGRAM

The preventive maintenance program consists of three parts: normal upkeep, service and repair, and formal recordkeeping. Normal upkeep consists of daily procedures that include cleaning, lubrication and checking the batteries of the equipment. The following is a partial list of normal upkeep procedures and a partial list of important spare parts.

Normal upkeep for environmental monitoring equipment performed daily or after each use:

1) Cleaning
2) Lubrication of moving parts
3) Check/charge battery
4) Inspect for damage
5) Check for operation problems
6) Inspect all hoses and lines

Partial list of important spare parts for environmental monitoring instruments planned for use at the Franklin Burns Site:

1) Fuses
2) HNU-UV lamp
3) Probes
4) Spare battery
5) Calibration gas refills
6) Septa
7) OVA - Ignitor
   - Particle filters
   - Filter cup

The normal upkeep is done daily after each use and includes inspecting for damage, signs of problems, and charging the batteries if necessary. Equipment-specific normal upkeep procedures are described in the SOP for each instrument and the preventive maintenance SOP in Appendix A.

Minor service and repair will be done by the Equipment Manager who is trained in the service and repair of field instruments. Equipment in need of major or more complex repair and service will be sent to the manufacturer.

All maintenance, servicing and repair of equipment shall be recorded and kept on file. Field personnel shall record maintenance and instrument problems in the instrument

or field log books. These will ultimately be held on file by the Field Operations Leader. The Equipment Manager shall keep a record of all equipment released to the field and a record of all maintenance and service on file.

11.4 LABORATORY INSTRUMENT MAINTENANCE

For all CLP laboratories, preventive maintenance procedures will be clearly defined and written for each measurement system and required support equipment. Maintenance activity, preventive or repair, will be documented on standard forms maintained in log books. Written procedures will include maintenance schedules, problem identification procedures, space for describing problems and repair notes, and failure analysis protocols. Service contracts and regularly scheduled in-house maintenance will be included, along with a list of critical spare parts.

11.5 RENTAL EQUIPMENT

Information verifying maintenance and upkeep of rental equipment will be obtained prior to use of the equipment, and a record of this information will be retained.

12.0 DATA ASSESSMENT

12.1 INTRODUCTION

All analytical data received from the analytical laboratories will be assessed to determine to what extent the data can be used in making sound project decisions. The goal of data assessment is to characterize the data so that project decisions are made using data that is of a sufficient quality to support those decisions. The different levels of quality needed to support the various project decisions have been stated in the form of the DQOs. Where the DQOs are met, the data is useful in making necessary decisions. The extent that the DQOs have been met determines the extent that the data is useful.

In order to determine how well the DQOs have been met, all data received from the analytical laboratories will be reviewed and validated by Malcolm Pirnie personnel who have received certification through the USEPA Region II data validation courses. The data packages will be validated in accordance with the USEPA documents, "CLP Organics Data Review and Preliminary Review" SOP No. HW-6, Revision No. 8, January 1992, and "Evaluation of Metals Data for the Contract Laboratory Program" SOP No. HW-2, Revision No. 11, January 1992. Region II Management Monitoring Branch (MMB) will validate the dioxin and furan data and USEPA has indicated that these data will be validated in accordance with Polychlorinated Dibenzodioxins/Polychlorinated Dibenzofurans Data Review (SOP No. 11, Revision 1 of 9/92). The data will be reviewed and validated, using the intended data uses and DQOs being used to aid in decisions regarding data usefulness.

The data obtained through the CLP RAS and SAS program, Level IV and Level V, respectively, will be subjected to rigorous review according to the above protocols and SOPs. The uses of Level IV and Level V data require this rigorous review so that the quality is known. All other levels of data will be validated to a lesser extent to develop a more general idea of the quality of the data. When possible, the above protocols and SOPs will be used as guidelines.

12.2 DATA ASSESSMENT

12.2.1 Field Measurements

Field data will be assessed by the Site Quality Assurance Officer (QAO). The Site QAO will review the field results for compliance with the established QC criteria that are specified in the QAPjP and FSP. Accuracy of the field measurements will be assessed using daily instrument calibration, calibration check, and analysis of blanks. Precision will be assessed on the basis of reproducibility by multiple readings of a single sample. Data completeness will be calculated using Equation 12-1.

$$\text{Completeness} = \frac{\text{Valid Data Obtained}}{\text{Total Data Planned}} \times 100 \qquad \text{Equation 12-1}$$

12.2.2 Laboratory Data

Laboratory results will be assessed for compliance with required precision, accuracy, completeness and sensitivity as follows:

Precision

Precision of laboratory analysis will be assessed by comparing the analytical results between matrix spike/matrix spike duplicate (MS/MSD) for organic analysis, and laboratory duplicate analyses for inorganic analysis. The relative percent difference (RPD) will be calculated for each pair of duplicate analysis using Equation 12-2.

$$RPD = \frac{D_1 - D_2}{(D_1 + D_2)/2} \times 100 \qquad \text{Equation 12-2}$$

RPD = Relative Percent Difference, in percent
D_1 = First Sample Value
D_2 = Second Sample Value (Duplicate)

Accuracy

Accuracy of laboratory results will be assessed for compliance with the established QC criteria that are described in Section 3.0 of the QAPjP using the analytical results of method blanks, reagent/preparation blank, matrix spike/matrix spike duplicate samples, rinsate blanks, and trip blanks. The percent recovery (%R) of matrix spike samples will be calculated using Equation 12-3.

$$\%R = \frac{SSR - SR}{SA} \times 100$$ Equation 12-3

SSR = Spike Sample Results
SR = Sample Results
SA = Spike Added from Spiking Mix

Completeness

The data completeness of laboratory analyses results will be assessed for compliance with the amount of data required for decision making. The completeness is calculated using Equation 12-1.

Sensitivity

The achievement of method detection limits depend on instrumental sensitivity and matrix effects. Therefore it is important to monitor the instrumental sensitivity to be able to achieve data quality through constant instrument performance. The instrumental sensitivity will be monitored through the analysis of method blank, calibration check sample, and laboratory control samples, etc., in accordance with SW-846 methodology or SOPs approved by USEPA for hazardous constituents/parameters that cannot be analyzed using SW-846 methods.

13.0 CORRECTIVE ACTION

13.1 NON-CONFORMANCE REPORTS

Corrective action will be undertaken when a non-conforming condition is identified. A non-conforming condition occurs when QA objectives for precision, accuracy, completeness, representativeness or comparability are not met, or when procedural practices or other conditions are not acceptable.

When a non-conforming condition occurs, it will be investigated by the Site QAO, who will then prepare a non-conformance report on the condition. The non-conformance report will be reviewed by the PMO QA Manager, and the approved report will be issued to the Site Manager, the Program Manager, the USEPA WAM, and, if applicable, a responsible officer of the involved laboratory. The non-conformance report will describe the unacceptable condition and the nature of corrective measures recommended. A schedule for compliance will also be provided. An example of the non-conformance form is given in Figure 13-1.

13.2 CORRECTIVE ACTION

The non-conformance report will be transmitted to a responsible officer of the CLP or non-CLP laboratory, the USEPA WAM, the Program Manager, PMO QA Manager, and the Site Manager. The non-conformance report will specify in writing the corrective action recommended to be taken, including measures to prevent a recurrence of the original deficiency. Appropriate documentation of corrective action will also be prepared. The Site QA Officer will monitor implementation of the corrective action and provide a written record as to whether the original problem has been resolved.

13.3 STOP-WORK ORDER

A Stop-Work Order may be issued based on the findings of the Site QAO if corrective action does not adequately address a problem or if no resolution can be reached. To issue a Stop-Work Order, written authorization is required from the Site Manager and

NONCONFORMANCE REPORT

NCR NO.	INITIATING OFFICE:	DATE:	TYPE NCR

NONCONFORMANCE DESCRIPTION *(Attach Additional Pages as Required)*

REPORTED BY *(Name)*	TITLE	DATE

CONCURRENCE *(Cognizant Manager)*:

RECOMMENDED DISPOSITION: *(Attach Additional Pages as Required)*

- ☐ REPERFORM PER PROCEDURE/INSTRUCTION NO. _____
- ☐ ACCEPT-AS-IS
- ☐ REJECT
- ☐ OTHER *(Explain Below)*

ACTION ASSIGNED TO *(Name)*	TITLE	DATE

ACTION TAKEN:

EVALUATED/ACCEPTED BY *(Manager)*:	DATE

CORRECTIVE ACTION REQUIRED:

CORRECTIVE ACTION DETERMINATION BY *(Name)*:	TITLE	DATE

QUALITY ASSURANCE CLOSEOUT *(Name)*	DATE

300884

MALCOLM PIRNIE

Franklin Burns Site
Franklin Township, New Jersey

NONCONFORMANCE REPORT FORM

MALCOLM PIRNIE, INC.

FIGURE 13-1

the USEPA WAM. If disagreement occurs among these individuals, it will be brought before successively higher levels of management until the issue is resolved.

13.4 DOCUMENTATION OF THE STOP-WORK ORDER

The conditions and need for a Stop-Work Order will be documented in sufficient detail to permit evaluation of the deficiency and determination of proper corrective action. Pertinent communications will be attached to the Stop-Work Order and referenced in the appropriate spaces. Such communications include discussions, correspondences or telephone conversations which pertain to evaluation of the problem and potential solutions and implementation of the preferred solution.

13.5 RESUMPTION OF WORK

In order for work to resume following a Stop-Work Order, the Site Manager and the USEPA WAM must rescind it in writing.

13.6 COURSE AND ACTION TO PREVENT RECURRENCE

The Site QA Officer is responsible for tracking non-conforming conditions, evaluating the effectiveness of corrective measures and assuring that the necessary steps have been taken to prevent recurrence of the original problem.

13.7 FIELD CHANGES

The Site Manager is responsible for all Site activities. In this capacity, the Site Manager is authorized to modify Site programs in response to changing Site conditions. At such times, the responsible Field Operations Leader will notify the Site Manager of the anticipated change, obtain the approval of the Site Manager and implement the necessary changes. The Site Manager will notify in writing the Site QA Officer, the Operations Manager, and the USEPA WAM. A copy of the notification will be attached to the file copy of the affected document. If an unapproved action has been taken during a period of

deviation, the action will be evaluated to determine the significance of any departure from established procedures.

Changes in the program will be documented on a field change request which is signed by the Field Operations Leader and the Site Manager. The Site Manager will maintain a log for the control of field change requests.

The Site Manager is responsible for controlling, tracking and implementing the identified changes. Completed field change requests are distributed to affected parties which will include as a minimum: Operations Manager, Site Manager, Site QA Officer, Field Operations Leader and the USEPA WAM. The process for requesting a variance in the working documents of an RI/FS is outlined the Standard Operating Procedure presented in Appendix E.

14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

14.1 FREQUENCY

At regular (preferably monthly) intervals, the PMO QA Manager will submit a Quality Assurance report to the Program Manager and the Operations Manager on the performance of the quality assurance program for each Site assignment. Problems or issues which arise between regular reporting periods may be identified to program management at any time.

14.2 CONTENTS

The monthly Quality Assurance reports will contain:

- Results of system and performance audits conducted during the period;
- An assessment of the measurement data, including accuracy, precision, completeness, representativeness, and comparability;
- A listing of the non-conformance reports including stop-work orders issued during the period, related corrective actions undertaken, and an assessment of the results of these actions; and
- Identification of significant quality assurance problems and recommended solutions.

15.0 REFERENCES

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USEPA, 1989, Region II CERCLA Quality Assurance Manual, Final Copy, Revision 1., October 1989.

USEPA, 1990, Samplers Guide to the Contract Laboratory Program, December 1990, EPA/540/P-90/006.

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USEPA, 1991, Model Quality Assurance Project Plan, Region V, Office of Superfund, May 1991.

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USEPA, 1992a, CLP Organics Data Review and Preliminary Review, SOP No. HW-6, Revision No. 8, January 1992.

APPENDIX A

MONITORING, MEASURING AND TESTING EQUIPMENT MAINTENANCE

EQUIPMENT CALIBRATION AND MAINTENANCE PROCEDURES

Calibration and maintenance procedures for the equipment identified below are presented in this Appendix.

- HNu Model PI-101 Photoionization Analyzer
- Foxboro Model OVA 128 Flame Ionization Detector
- Miniram Model PDM-3 Respirable Dust Meter
- Ludlum Model 12S Micro R Meter
- Hach Model 16800 Portable Turbidimeter
- Orion Model SA250 pH Meter
- Platinum Eh Electrode
- YSI Model 33 S-C-T Meter
- Glass-Mercury Thermometer
- YSI Model 51B Dissolved Oxygen Meter
- In-Situ Model SE1000B Hermit Data Logger with In-situ Pressure Transducers
- Solinst Model 121 Interface Meter
- Lead and Copper Personal Air Sampler

CALIBRATION AND MAINTENANCE OF HNu PHOTOIONIZATION ANALYZER

Accuracy

The HNu PI-101 is temperature compensated so that a 20 degrees Celsius change in temperature corresponds to a change in reading of less than two percent full-scale at maximum sensitivity. The useful range of the instrument is from 0.2 to 2000 ppm. Response time is less than three seconds to 90 percent of full-scale.

Calibration

Prior to use, the HNu meter will be checked using a pressurized cylinder of isobutylene. The isobutylene will be certified by HNu Systems Inc. to be 100 ppm of isobutylene in air. The HNu meter is calibrated to benzene at the manufacturer. Thus, the 100 ppm of isobutylene check gas should deflect to 63 ppm on the meter scale.

Maintenance

1. If any of the following conditions occur, consult the troubleshooting guide provided in the Instruction Manual:

   a. No meter response in any switch position (including BATT CHK).
   b. Meter response in BATT CHK, but reads zero or near zero for all others.
   c. Instrument reads correctly in BATT CHK and STBY, but not in measuring mode.
   d. Instrument responds in all positions, but signal is lower than expected.
   e. Erratic meter movement occurs.
   f. Instrument response slow or irreproducible.
   g. Low battery indicator.

   Should the troubleshooting techniques fail to resolve the problem, send the instrument to the manufacturer for repair and maintenance.

2. The light source window will be cleaned at a minimum of every two weeks. Cleaning frequency will be based on meter performance when checked against 100 ppm of isobutylene in air.

3. The meter battery will be checked at the beginning and end of each day. If the needle is not within or above the green battery arc on the scale-plate, the battery will be recharged prior to making any measurements.

Data Validation

A daily log will be kept to document equipment and standards utilized. Recorded information for the equipment will include the name, model number, and data of calibration. Standards used in calibration of equipment will be documented by trade name, lot number and expiration date. Any unusual readings and routine maintenance procedures will also be documented.

CALIBRATION AND MAINTENANCE OF OVA FLAME IONIZATION DETECTOR

Foxboro Flame Ionization Detector/Organic Vapor Analyzer (OVA)

Primary calibration of the Organic Vapor Analyzer is accomplished at the factory using methane of known concentrations in air and making adjustments to the four potentiometers located on the circuit board inside the instrument. This primary adjustment is relatively stable over time and should not concern field operators. The primary calibration may be checked during factory maintenance procedures which will be required for each unit. Maintenance schedules will be established by the Project Manager.

All OVAs will be calibrated to methane, and records kept on file to document the procedure. A 5 liter gas sampling bag is filled with "clean" air. One cubic centimeter (cc) of a pure methane gas from a calibration cylinder is injected through the septum of the gas sampling bag. The sampling bag is then agitated to ensure complete diffusion of the sample. The concentration in parts per million (ppm) (volume/volume) will be equal to the sample size in cubic centimeters divided by the volume of the bag in cubic centimeters, times 1,000,000. Therefore,

$$\frac{1 \text{ cc}}{5{,}000 \text{ cc}} \times 1{,}000{,}000 = 200 \text{ ppm}$$

Note: 1 liter = 1,000 cc

The outlet of the sampling bag is connected to the air sampling line of the OVA. The GAS SELECT knob is then adjusted until the meter reading on the OVA is 200 ppm.

Since the instrument is calibrated to methane, the concentration read for other compounds must be expressed as "methane equivalent" concentrations. It is possible to calibrate the instrument with other gases by adjusting the GAS SELECT knob on the Sidepack control panel. However, this requires a supply of the gas of interest at a known concentration. Cylinders of various gases are commercially available and should be requested with the gas of interest and the balance as air. The calibration gas should be withdrawn from the cylinder and placed in a sample bag of known volume from which it may be drawn into the OVA. By making the appropriate calculations, samples of known

concentration can be prepared. As the OVA draws in the sample, the GAS SELECT knob is turned until the calibrated concentration of the sample is read on the meter. The instrument is now calibrated to directly read the concentration of the compound of interest.

CALIBRATION AND MAINTENANCE OF RESPIRABLE DUST METER

The Miniram Model PDG-3 has been factory-calibrated using a representative dust, but the user may change the calibration constant of the instrument for a specific type of aerosol if he wishes. Such a calibration should be performed by obtaining a concurrent filter collection (e.g., by means of a personal filter sampler), sampling from the same environment within which the Miniram is placed. The average concentration obtained by the Miniram at the end of the test should be compared with the filter-gravimetric-determined concentration. The ratio of the two concentration values can then be used to correct the Miniram calibration. The comparison run should be replicated several times (to minimize errors) to obtain an average ratio.

To change the Miniram calibration, proceed as follows:

1. Place Miniram in a clean environment (e.g., air conditioned office).
2. Remove battery pack.
3. Disconnect battery connector (remember that all stored data will thus be lost/erased from Miniram memory).
4. While leaving battery pack lying next to Miniram, re-connect the two units (i.e., plug in connector).
5. Immediately observe Miniram display. It will be performing a slow segment-by-segment display checkout. As soon as it displays ".00," press OFF, thus interrupting the initial automatic zero checkout. Wait until the display indicates "OFF" and then press MEAS and wait approximately 36 seconds.
6. Observe 10-second readings (typically in the range of 1 to 3 mg/m^3) and record manually a few consecutive readings. Calculate the average of these values.
7. Identify small potentiometer screw (visible through an opening in the foil

shield of the open Miniram) opposite the digital output jack. Adjust this potentiometer, using a fine screw driver, until the average Miniram is increased or decreased (with respect to the average obtained in step 6) by the desired ratio (e.g., as determined by previous gravimetric comparison runs).

8. Shut off Miniram, reposition and secure battery pack, and re-zero instrument. All subsequent concentration readings are now corrected by the desired ratio.

CALIBRATION AND MAINTENANCE OF LUDLUM MODEL 12S MICRO R METER

Description

The Ludlum Model 12S Micro R Meter utilizes an internally mounted 1" x 1" NaI scintillator for counting low level gamma radiation.

Range Multiplier Selector Switch is a 6-position switch marked OFF, BAT, X1000, X100, X10, X1. Turning the range selector switch from OFF to BAT position provides the operator with a battery check of the instrument. A BAT check scale on the meter provides a visual means of checking the battery-charge status. Moving the range selector switch to one of the range multiplier positions (X1000, X100, X10, X1) provides the operator with an overall range of 0 to 3000 Micro R/hr. Multiply the scale reading by the multiplier for determining the actual scale reading.

AUDIO ON-OFF Toggle Switch in the ON position operates the unimorph speaker, located on the left side of the instrument. The frequency of the clicks is relative to the rate of the incoming pulses. The higher the rate, the higher the audio frequency. The audio should be turned OFF when not required to reduce battery drain.

Fast-Slow Toggle Switch provides meter response selection. Selecting the "F" position of the toggle switch provides 90% of the final meter reading in 4 seconds. In "S" position, 90% of the final meter reading takes 22 seconds. Set on "F" for fast response and larger meter deviation. "S" position should be used for slow response and damped meter deviation.

RES Button, when depressed, provides a rapid means to drive the meter to zero.

Range Calibration Adjustments are recessed potentiometers located under the calibration cover on the right side of the front panel. These adjustment controls allow individual calibration for each range multiplier.

DIS Adjustment allows the input sensitivity to be adjusted from 30 to 100 millivolts. The gain is normally set for 40 millivolts at the factory.

Operating Procedures

- Install two "D" size batteries
- Switch range to BAT. Meter should deflect to the battery check portion of the scale.
- Turn instrument range switch to X1000. Expose detector to check source.
- Check calibration.
- Depress RES switch. Meter should zero.

Calibration

The meter should be calibrated annually by either the manufacturer or by a calibration facility.

Calibration controls are located on the front of the instrument under the calibration cover. The controls may be adjusted with an 1/8-inch blade screwdriver.

The high voltage should be set at the minimum value. Connect pulses (negative 40 millivolt pulse) to meter. Set gain for 40 millivolt sensitivity.

NOTE: Measure High Voltage with a Model 500 Pulser or a High Impedance voltmeter with a high meg probe. If one of these instruments is not available, use a voltmeter with a minimum of

1000 megohm input resistance.

A. CPM Calibration

- Provide 360,000 counts per minute (CPM) with meter set on X1000 scale.
- Calibrate meter to read 2 micro R/hr.
- Decrease counts by factors of 10; calibrate X100, X10, and X1 scales to read 2 micro R/hr.
- Turn up high voltage in 50 volt increments.
- Plot HV vs. count rate until detector voltage rating is reached.
- Expose detector to Am-241 source and repeat above procedure.
- Compare both sets of data; select operating voltage to correspond with maximum source count and minimum background count.

B. Cesium Calibration

- Set instrument to X1000 scale.
- Expose to Cs-137 source at 2 Micro R/hr point.
- Adjust calibration pot so that meter reads 2000 Micro R /hr.
- Repeat for each scale at 200, 20 and 2 Micro R/hr.

Maintenance

NEVER STORE THE INSTRUMENT OVER 30 DAYS WITHOUT REMOVING THE BATTERIES. ALTHOUGH THIS INSTRUMENT WILL OPERATE AT VERY HIGH AMBIENT TEMPERATURES, BATTERY SEAL FAILURE CAN OCCUR AT TEMPERATURES AS LOW AS 100 o F. NEGLECTED BATTERY SEAL FAILURE WILL SURELY CAUSE ONE AWFUL MESS.

Instrument maintenance consists of keeping the instrument clean and periodically checking the batteries and calibration.

At three month intervals, the batteries should be removed and the battery contacts cleaned of any corrosion. If the instrument has been exposed to a very dusty or corrosive atmosphere, more frequent battery servicing should be used.

Use a spanner wrench to unscrew the battery contact insulators, exposing the internal contacts and the battery springs. Removing the handle will facilitate access to these contacts.

CALIBRATION AND MAINTENANCE OF TURBIDIMETER

Accuracy

A Hach Model 16800 Portable Turbidimeter will be used for all turbidity measurement. The Hach 16800 will be operated in the range of 0 to 100 nephelometric turbidity units (NTU). A nickel/cadmium battery with approximately ten hours operating time per chang built into the 16800 meter. Readings are repeatable to within $\pm$1% of full scale.

Calibration and Operation

To ensure consistently accurate results, perform standardization before each set of tests.

1. Turn the instrument off and check the mechanical zero setting. Adjust the screwdriver adjustment control on the meter face if necessary to obtain a zero-NTU reading.

2. Press the power switch to ON and perform a battery check by pressing the BATT CHECK switch and verifying that the meter indicates in the BATTERY CHECK area. If not, charge the battery pack.

3. Place the focusing template into the cell holder. The focusing template will block all light from reaching the detector and allow the instrument to be zeroed electronically in Steps 4 and 5.

4. Press the 1.0 range switch and adjust the ZERO control for a reading of zero NTU.

5. Press the 10 range switch and verify that the meter still indicates zero NTU. Readjust the ZERO control if necessary.

6. Remove the focusing template and the 90-NTU turbidity standard into the cell holder. Use the black dot on the standard vial to orient the vessel in the same position each time, thereby eliminating variations due to rotation.

7. Place the light shield over the turbidity standard and allow the meter to stabilize.

8. Adjust the SPAN control for a reading of 90 NTU. Remove the light shield and turbidity standard. The instrument is now ready for use.

Taking the Turbidity Measurement

1. Press the appropriate range switch. Select the range that will exceed the expected turbidity of the sample under test.

2. Place the focusing template into the cell holder and adjust the ZERO control for a reading of zero NTU. Remove the focusing template. In the 100 range, place the cell riser into the cell holder before inserting the test sample.

3. Fill a clean sample cell to the white line with the sample to be measured and placed it into the cell holder. Use the white dot on the sample cell to orient the cell in the same position each time. Cover the sample cell with the light shield and allow the meter to stabilize. Read the turbidity of the sample.

Operational Notes

1. The sample size for all turbidity measurements should be 18 ml. Use the line on the sample cell as a level indicator. Variations in sample volume can affect the accuracy of the determinations.

2. When operating the instrument under bright ambient light conditions, protect the detector between measurements by inserting the focusing template or covering the cell holder with the light shield.

Maintenance

1. The battery pack will be recharged overnight subsequent to its use in the field.

2. Broken or highly scratched sample cells will be replaced. Small, slight scratches may be covered with a light coat of silicone oil. Cells with a build up of matter which cannot be removed will be discarded.

3. Lamp and focusing adjustments are not considered routine maintenance and will be performed only when the instrument readings are suspect.

Data Validation

All instrument calibrations will be documented, indicating the meter readings before and after the meter has been adjusted.

CALIBRATION AND MAINTENANCE OF THE ORION SA 250 pH METER

Accuracy

An Orion SA 250 pH meter will be used for on-site pH and temperature measurement. The SA 250 meter will be equipped with a suitable combination pH electrode and automatic temperature compensation (ATC) probe. Temperature differential between the pH buffer standards and samples is automatically compensated for by the meter. The SA 250 meter has resolution capability to 0.1 or 0.01 standard pH units. Department of Transportation and Mil specifications have been met or exceeded for shock, vibration and moisture.

Check Out Procedure and Calibration

Prior to initial daily use, the SA 250 meter will be checked according to the following procedure.

Meter Check Out Procedure

1. Slide power switch to ON position. Attach BNC Shorting Plug to BNC connector on top of meter. Refer to Figure B-6.1.
2. If LO BAT indicator on LCD remains on, the battery must be replaced.
3. Slide mode switch to mV. Display should read 0 + 0.3.

4. Slide mode switch to temp. Display should read 25.0. If 25.0 is not displayed, using , , and X10 keys, until 25.0 is displayed and press enter.

5. Slide mode switch to pH .01. Press iso. Display should read the letters ISO then a value of 7.00. If 7.00 is not displayed, scroll until 7.00 is displayed and press enter.

6. Press slope. Display should read the letters SLP then a value of 100.0. If 100.0 is not displayed, scroll until 100.0 is displayed and press enter.

7. Press sample. Observe the letters pH then a steady reading of 7.00 + 0.02 should be obtained. If not, press cal and scroll until 7.00 is displayed and press enter. Press sample and observe a reading of 7.00.

8. Remove the shorting plug. After a successful completion of steps 1-8 the meter is ready to use with an electrode.

Electrode Connections

1. Attach electrodes with BNC connectors to sensor input by sliding connector onto input, pushing down and turning clockwise to lock into position. Connect reference electrodes with pin tip connectors by pushing connector straight into reference input.

   NOTE: If using a combination electrode with a BNC connector, the reference pin-tip jack is not used.

Calibration

Calibration of the SA 250 meter will be performed using two standard buffer solutions of pH = 7.00 s.u. and pH = 4.01 s.u. Buffer solutions are standardized at 28 degrees Celsius against National Bureau of Standards certified pH = 6.88 and pH = 9.18 reference samples prior to measuring the pH of any sample. The following procedure used for calibrations:

1. Connect electrode(s) to meter. Slide the mode switch to pH.1 4.01.

2. Place electrode(s) into pH_2 7.00 buffer.

3. Press cal. The display will alternate between .1. and the pH value of the buffer, indicating this is the first buffer and a value has not been entered. Wait for a stable pH display and press enter. The correct display will freeze

for 3 seconds then advance to .2. indicating the meter is ready for the second buffer.

4. Rinse electrode(s) and place into pH = 4.01 buffer. Wait for a stable pH display and press enter .

   After the second buffer value has been entered the letters PH will be displayed. The meter is now calibrated and automatically advances to sample mode.

5. Rinse electrode(s), place into sample. Record pH directly from the meter's display.

The use of the ATC probe eliminate the need for temperature calibration.

Maintenance

---

1. When not in use or between measurements, the pH probe will be kept immersed in or moist with pH = 7.000 buffer solution.

2. The battery will be placed when the "LO BAT" indicator remains on during the instrument check out.

3. The pH electrode will be replaced whenever the probe is cracked or irremovable deposits build up on the junction.

4. If response time or stability problems develop and cannot be corrected the meter will be sent to the manufacturer for maintenance.

Data Validation

All instrument calibrations will be documented, indicating the meter readings before and after the meter has been adjusted. The pH buffers used to calibrate the meter will also be documented. This is important, not only for data validation, but also to establish maintenance schedules and component replacement.

CALIBRATION AND MAINTENANCE OF ORION PLATINUM Eh ELECTRODE

Accuracy

An Orion platinum Eh electrode and the Orion SA 250 PH meter will be used for on-site oxidation-reduction potential (redox) measurement. The SA 250 meter has resolution capability to 1 mV. Refer to previous section for the calibration and maintenance of the SA 250.

Check Out Procedure and Calibration

Checking the electrode is necessary only when there is evidence of malfunction that cannot be traced to other causes. Fill the electrode with ORION Cat. No. 900011 filling solution for checking procedure.

1. Prepare solution A (0.1 M potassium ferrocyanide and 0.05 M potassium ferricyanide): weigh out 4.22 g reagent-grade $K_4Fe(CN)_6 \bullet 3H_2O$ and 1.65 g reagent-grade $K_3Fe(CN)_6$. Place in a 100 ml volumetric flask. Add about 50 ml distilled water and swirl to dissolve solids. Dilute to volume with distilled water.

2. Prepare solution B (0.01 M potassium ferrocyanide, 0.05 M potassium ferricyanide, and 0.36 M potassium fluoride): weight out 0.42 g reagent-grade $K_4FE(CN)_6$, 1.65 g reagent-grade $K_3FE(CN)_6$, and 3.39 g reagent-grade $KF \bullet 2H_2O$. Place in a 100 ml volumetric flask. Add 50 ml distilled water and swirl to dissolve solids. Dilute to volume with distilled water.

3. Transfer solution A to a 150 ml beaker. Place electrode in the solution and wait until the reading stabilizes. The potential should be about 234 mV.

4. Rinse electrode and repeat the measurement with solution B. The potential should be about 66 mV greater in solution B than in solution A.

Maintenance

---

1. When not in use the electrode may be kept in water or air. If left in air, remove salt crystals on the outside of the electrode sleeve by rinsing with distilled water, drain filling solution from chamber, flush out with distilled water, store dry. See cleaning procedure.

2. The electrode can be routinely cleaned without disassembling. To remove precipitate that forms on the outside wall or tip of the electrode, rinse with distilled water. If sample or precipitate clogs the space between the electrode sleeve and the inner cone, clean the chamber by flushing out the filling solution. To do this, invert the electrode to moisten the O-ring. Holding the electrode by the cap with one hand, push the outer sleeve up into the cap with the other hand, allowing filling solution to drain from the chamber. If the chamber is not completely clean, repeat. Fill with filling solution.

3. To remove salt deposits formed inside the electrode:
   - Fill wash bottle to half with distilled water.
   - Invert electrode so that glass membrane points up.
   - Invert the wash bottle so that its bottom points up.
   - Insert nozzle of wash bottle into electrode filling hole and squeeze bottle. Filling solution will drain out of chamber.
   - Fill chamber with distilled water from wash bottle. Repeat steps 2-4.
   - Continue to repeat steps 2-5 until all salts have been removed.

4. To change the filling solution in the reference chamber, simply clean the electrode and fill with the new solution, using the following procedure:

   - Tip the electrode to moisten the O-ring. Holding the electrode by the cap with one hand, push the sleeve up into the cap with the other hand allowing solution to drain from the chamber.

   - Fill the electrode with distilled water and then drain the reference chamber by retracting the sleeve, as explained above. Now perform this filling and draining procedure twice with the new filling solution.

   - Fill the electrode with the new solution. Although the electrode is ready for use, readings may drift slightly for about a half hour while the electrode equilibrates with the new solution.

Data Validation

All instrument calibrations will be documented, indicating the meter readings before and after the meter has been adjusted. The electrode filling solutions used to calibrate the meter will also be documented. This is important, not only for data validation, but also to establish maintenance schedules and component replacement.

CALIBRATION AND MAINTENANCE OF SPECIFIC CONDUCTANCE METER

Accuracy

The calibrated accuracy of the specific-conductance meter (YSI, Inc. Model 33 S-C-T Meter) ±4.5 percent; this represents the worst-case error resulting from errors in the instrument and probe combined. Instrument error alone ranges from ±2.5 to ±3.0%.

Calibration

The specific-conductance meter will be calibrated by turning the MODE control to REDLINE and adjusting the REDLINE control so the meter needle lines up with the redline on the meter face. If this cannot be accomplished, the batteries must be replaced. Recalibration should be done at the factory.

Maintenance

The only maintenance required is battery replacement. Two "D" size alkaline flashlight cells, such as Eveready E95 or equivalent, will provide 200 hours of operation. Accuracy will not be maintained if zinc-carbon "D" cells are used. Battery replacement is indicated when the redline adjustment cannot be accomplished.

Replace batteries every six months to reduce the danger of corrosion due to leaky batteries. To replace batteries, remove the screws from the rear cover. The batter holders are color coded. The positive end must contact the red holder.

Data Validation

All instrument calibrations will be documented, indicating the meter readings before and after the meter has been adjusted. This is important, not only for data validation, but also to establish maintenance schedules and component replacement.

CALIBRATION AND MAINTENANCE OF GLASS-MERCURY THERMOMETER

To check the glass-mercury thermometer, both the thermometer and the YSI temperature probe should be immersed into the same beaker of water. Any differences in temperature should be noted and recorded in the field log. The thermometer should be kept clean and protected from breakage in a hard tube or case.

CALIBRATION AND MAINTENANCE OF DISSOLVED OXYGEN METER

Accuracy

The calibrated accuracy of the dissolved oxygen meter (YSI Model 51B Dissolved Oxygen Meter) will be better than ± 0.2 mg/l when calibrated within $\pm 5°C$ of actual sample temperature. Temperature which can also be measured with this instrument, has an accuracy of $\pm 0.7°C$ over the full scale temperature range of -5°C to +45°C.

Calibration

1) Switch instrument to OFF and adjust meter mechanical zero.

2) Switch to ZERO and adjust to "O" on mg/l scale.

3) Switch to FULL SCALE and adjust to "15" on mg/l scale.

4) Prepare probe for operation, plug into instrument, wait up to 15 minutes for probe to stabilize. Probe can be located in calibration chamber or ambient air.

5) Switch to CALIB O_2 and adjust CALIB control until meter indicates local altitude on short scale in upper right corner of meter.

NOTE: It is desirable to calibrate probe in a high humidity environment. See instruction manual for more detail on calibration and other instrument and probe characteristics.

Maintenance

1) When not in use or between measurements, keep the dissolved oxygen probe immersed in or moist with deionized water.

2) Replace batteries after 1000 hours of operating or if full scale adjustment cannot be made. Use Eveready 935 "C" size or equal.

3) Membranes will last indefinitely depending on use. Average replacement is 2-4 weeks. Probe should be stored in humid environment to prevent drying out.

4) Calibrate daily.

Data Validation

All instrument calibrations will be documented, indicating the meter readings before and after the meter has been adjusted. Each preparation of probe and method of calibration will also be documented. This is important, not only for data validation, but also to establish maintenance schedules and component replacement.

CALIBRATION AND MAINTENANCE OF THE SOLINST INTERFACE METER

General Operation

The Solinst Model 121 Interface Meter works with an infra-red circuit that detects the presence of a liquid. A conductivity circuit differentiates between conductive liquid (water) and non-conductive liquid (LNAPL or DNAPL product).

Before commencing any measurements, carry out the following electronics and battery condition checks.

1. Turn the main switch on (Main switch is a toggle switch on reel faceplate). The steady tone and two lights will be activated (as long as the probe switch is off, but the main switch is on).

2. Remove the probe from the holder and turn the probe switch on (Probe switch is the knurled ring at the top of the probe). Steady tone and two lights activate.

3. The infra-red circuit is checked by inserting the cleaning brush into the base of the probe until it reaches the zero measurements point (The zero measurement point is the junction between the stainless steel body of the probe and the brown Teflon/Delrin base plug). This cuts the infra-red beam causing the steady tone and two lights to activate.

4. The conductivity circuit is checked by inserting the probe into normal tap water, as far as the measurement zero point. This causes a single light and intermittent tone to activate.

General Operation

After each use, the tape should be wiped clean and carefully rewound onto the reel. The probe should be cleaned as follows:

1. Wash probe thoroughly with alconox detergent;

2. Use a cleaning brush through the side and base holes to remove all product from the inner part of the probe;

3. Use steel wool to scrub the bottom pin;

4. Rinse the probe thoroughly with distilled water and wipe dry; and

5. Return the probe to the holder, ensuring that both switches are turned off.

NOTES:
- Battery will drain rapidly if probe is left on
- Do not drop probe; damage to probe tip may result
- O-ring seals may be affected by the use of cleaning fluids other than detergent and water.

<u>To replace batter inside reel:</u>

1. Remove three screws in faceplate and carefully lift to one side to prevent damage to wiring.

2. Replace with specified battery, noting proper polarity.

3. Replace faceplate and three screws, being careful to keep all wires within the hub.

To replace probe battery:

1. Remove three screws (Phillips type) at top of probe.
2. Gently pull body apart to expose the battery holder.
3. Remove and replace battery with type specified.
4. Ensure correct polarity.
5. Check O-rings for damage and replace if necessary.
6. Lubricate O-rings lightly with non-petroleum based lubricant prior to reassembly and push probe body back together ensuring that the three wire connector is placed below the battery in the slot provided prior to reassembly of the probe.
7. Replace Phillips screws but do not over-tighten.

WARNING: LOW BATTERY IN PROBE CAN RESULT IN WATER LIGHT STAYING "ON"

NOTE: ALWAYS REPLACE BOTH BATTERIES AT THE SAME TIME.

LEAD AND COPPER PERSONAL AIR SAMPLER

If any calibration and/or maintenance is required for the lead and copper personal air samplers, manufacturer's recommendations will be implemented regarding any calibration and maintenance procedures.

APPENDIX B

SAMPLE PACKING AND SHIPPING

1.0 OBJECTIVE

This guideline provides instructions for sample packaging and shipping in accordance with United States Department of Transportation (DOT) regulations.

2.0 APPLICABILITY

The guidelines is applicable to all samples taken from uncontrolled hazardous substance sites for analysis at laboratories away from the site.

3.0 DEFINITIONS

Carrier--A person or firm engaged in the transportation of passengers or property.

n.o.s.--Not otherwise specified.

n.o.i.--Not otherwise indicated.

ORM--Other regulated material.

DOT Classifications for Hazardous Materials--The following classifications, set forth by the DOT in the Code of Federal Regulations (49 CFR 173.2):

1. Radioactive material
2. Poison A
3. Flammable liquid
4. Nonflammable gas
5. Flammable liquid
6. Oxidizer
7. Corrosive material (liquid)
8. Poison B
9. Corrosive material (solid)
10. Irritating material

11. Combustible liquid (in containers having capacities exceeding 110 gal)

12. ORM-B

13. ORM-A

14. Combustible liquid (in containers having capacities of 110 gal or less)

15. ORM-E

4.0 GUIDELINES

Samples collected at uncontrolled hazardous substance facilities usually have to be transported elsewhere for analysis. Samples must be transported to protect their integrity, as well as to protect against any detrimental effects from leakage or breakage. Regulations for packaging, marking, labeling, and shipping hazardous materials and wastes are promulgated by the United States Department of Transportation and described in the Code of Federal Regulations (49 CFR 171 through 177, in particular 172.402h, Packages Containing Samples).

4.1 RESPONSIBILITIES

The Project Manager or team leader is responsible for determining that samples are properly packaged and shipped. Sampling personnel and shippers (if used) are responsible for implementing the packaging and shipping requirements. The chain-of-custody procedures and requirements are described SOP 2.

4.2 EQUIPMENT

The following equipment is used in packaging and shipping samples:

1. Samples bottles, provided by designated laboratories

2. Polyethylene bags, 2 mil or thicker

3. Metal paint cans, 1 gal

4. Packing material, vermiculite, bubble pack or similar noncombustible packing material

5. Picnic coolers or ice chests, preferably metal, capable of withstanding impact caused by a 4-ft drop

4.3 PACKAGING, MARKING, AND LABELING METHODS

4.3.1 Environmental Samples

Packing

Environmental samples can be packaged following the procedures for samples classified as flammable liquids or flammable solids. See Standard Operating Procedure 6 for details on the collection of environmental samples. Marking, labeling, and shipping papers do not apply.

Environmental samples can also be packaged without being placed inside metal cans as required for flammable liquids. For example, sample containers properly identified and with a sealed lid can be enclosed in sealed polyethylene bags and packed in metal picnic cooler-type containers. Sufficient noncombustible, absorbent cushioning material such as "bubble pack" must be used to minimize the possibility of sample container breakage. Ice or "blue ice" is added to low-concentration samples. To further reduce the possibility of leakage, the sample container, and the sample bottles and absorbent material can be placed in a larger bag that is also sealed.

Marking and Labeling

A complete sample identification tag or label must be affixed to sample containers. The words "Environmental Sample" should be marked on the outside container.

No DOT marking or labeling is required.

Shipping Papers

No DOT shipping papers are required for environmental samples. However, the appropriate chain-of-custody forms must be included with the shipment.

Transportation

There are no DOT restrictions on the mode of transportation for environmental samples.

4.3.2 Unanalyzed Hazardous Waste Site Samples, Excluding Those from Closed Containers

The procedures to be used to pack, mark, and ship hazardous waste samples are presented below. A checklist summarizing these procedures has been developed and is provided as Table 3-1. This checklist should always be consulted prior to sample shipment to ensure that all sample-handling requirements are satisfied.

Packaging

Packaging procedures are as follows:

1. Collect samples in accordance with the procedures given in SOP 6 of this manual. Allow sufficient ullage (approximately 10 percent by volume) so container is not liquid-full at 130°F. If a solid material is being collected, the container plus contents shall not exceed 1 lb net weight.

2. Attach properly completed sample identification tag or a Malcolm Pirnie, Inc. sample label to sample container.

3. Seal sample container and place in 2-mil-thick (or thicker) polyethylene bag (one sample per bag). Tags should be positioned to enable them to be read through bag.

4. Place sealed bag inside a metal can with incombustible, absorbent cushioning material (e.g., vermiculite or earth) to prevent breakage (one bag per can). Pressure-close the can and sue clips, tape, or other positive means to hold the lid securely, tightly, and effectively.

5. Mark and label this container as indicated below.

6. Place one or more metal cans (or a single 1-gal bottle), surrounded by incombustible packaging material for stability during transport, into a strong outside container, such as a metal picnic cooler or a fiberboard box.

7. Mark and label the outside container and complete shipping papers as described below.

Marking and Labeling

Use abbreviations only where specified. Place the following information (either hand-printed or on preprinted labels) on a metal can (or bottle): laboratory name and address and "Flammable Liquid, n.o.s." (if not liquid, write "Flammable Solid, n.o.s.").* Place the following labels on the outside of the can (or bottle): "Cargo Aircraft Only" and "Flammable Liquid" or, if not liquid, "Flammable Solid." ("Dangerous When Wet" label should be used if the solid has not been exposed to wet environment.)

(NOTE: If the cans are placed in an exterior container, both that container and the inside cans must have the same markings and labels as above. "Laboratory Samples" and "THIS SIDE UP" or "THIS END UP" should also be marked on the top of the outside container, and upward-pointing arrows should be placed on all four sides of the exterior container.)

Shipping Papers

Complete the carrier-provided bill of lading and sign the certification statement. If carrier does not provide these documents, use standard industry form, providing the following information in the order listed (one form may be used for more than one exterior container): "Flammable Liquid, n.o.s." (or "Flammable Solid, n.o.s.," as appropriate); "Cargo Aircraft Only"; "Limited Quantity" or "Ltd. Qty."; "Laboratory Samples"; "Net Weight ____" or "Net Volume____" (of hazardous contents), by item, if more than one metal can is inside an exterior container. The net weight or net volume must be placed just before or just after the "Flammable Liquid, n.o.s." or "Flammable Solid, n.o.s." description.

A chain-of-custody record form (see SOP 2 of this manual) must be properly executed and included in the exterior container.

Unless samples are driven to the laboratory, a team member must accompany shipping container(s) to the transport carrier and, if required, open outside container(s) for freight inspection.

4.3.3 Unanalyzed Hazardous Waste Site Samples Taken From Closed Containers

Slightly different procedures apply to hazardous waste site samples taken from closed containers. The procedures to be followed be site personnel for packaging, marking, and labeling are presented below. They are rarely used and are provided for information only.

This packaging, marking, labeling, and shipping methods provides a worst-case procedure for materials classed as Poison A (49 CFR 173.328). In the absence of reliable data that exclude the possibility of the presence of Poison A chemicals or compounds, these procedures must be followed.

Packaging

The following packaging procedures are to be used:

1. Collect sample in polyethylene or glass container which is of an outer diameter narrower than the valve hole on a DOT spec. 3A1800 or 3AA1800 metal cylinder. Fill sample container allowing sufficient ullage (approximately 10 percent by volume) so it will not be liquid-full at 130°F. Seal sample container.

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*Using "Flammable" does not convey the certain knowledge that a sample is in fact flammable, or how flammable, but is intended to prescribe the class of packaging in order to comply with DOT regulations. just before or just after the "Flammable Liquid, n.o.s." or "Flammable Solid,

n.o.s." description.

2. Attach properly completed sample identification tag and EPA sample control label to sample container.

3. With a string or flexible wire attached to the neck of the sample container, lower the container into a metal cylinder that has been partially filled with incombustible, absorbent, loose packaging material (vermiculite or earth). Allow sufficient cushioning material between the bottom and sides of the container and the metal cylinder to prevent breakage. After the cylinder is filled with cushioning material, drop the ends of the string or wire into the cylinder valve hole. Only one sample container may be placed in a metal cylinder.

4. Replace valve, torque to 250 ft-lb (for 1-in. opening) and replace valve protector on metal cylinder using Teflon tape.

5. Mark and label cylinder as described below.

6. One or more cylinders may be placed in a strong outside container.

7. Mark and label outside container and complete shipping papers as described below.

The samples may not be transported by Federal Express Corporation (air cargo) or other common carrier aircraft, or by rented, nongovernment aircraft. (Samples may be shipped by ground transport or government aircraft.)

Marking and Labeling

Use abbreviations only where specified. Place the following information (either handprinted or on preprinted labels) on the side of the cylinder, or on a tag wired to the cylinder valve protector: "Poisonous Liquid or Gas, n.o.s"* and the laboratory name and address. Place the label "Poisonous Gas" on the cylinder ("Poisonous Liquid" label not acceptable here, even if liquid).

(NOTE: If the metal cylinders are placed in an outside container, both the container and cylinders inside must have the same markings and labels as above. In addition, "Laboratory Sample" and "Inside Packages Comply with Prescribed Specifications" should be marked on the top of the outside container. "THIS SIDE UP" marking should be placed on the outside container and upward-pointing arrows on four sides.)

*Using "Poisonous" does not convey the certain knowledge that a sample is in fact poisonous, or how poisonous, but is intended to prescribe that class of packaging in order to comply with DOT regulations.

Shipping Papers

Complete the shipper-provided bill of lading and sign the certification statement. If carrier does not provide these documents, use standard industry form, providing the following information in the order listed (one form may be used for more than one exterior container; use abbreviation only as specified): "Poisonous Liquid, n.o.s."; "Limited Quantity" or "Ltd. Qty."; "Laboratory Samples"; "Net Weight ____ or "Net Volume ____" (of hazardous contents), by cylinder if inside an exterior container. The net weight or net volume must be placed just before or just after the "Poisonous Liquid, n.o.s." marking.

A chain-of-custody record form must also be properly executed and included in the container or with the cylinder.

Unless the samples are driven to the laboratory, a team member will accompany shipping containers to the transport carrier and, if required, open outside container(s) for freight inspection.

4.4 RECORDS

A shipping certification form must be completed for all samples to be shipped.

TABLE 3-1

Packaging

1. Check DOT 172.500 table for appropriate type of package for hazardous substance.
2. Check for container integrity, especially the closure.
3. Check for sufficient absorbent material in package.
4. Check for sample tags and log sheets for each sample.

Shipping Papers

1. Check that entries contain only approved DOT abbreviations.
2. Check that entries are in English.
3. Check that hazardous material entries are specially marked to differentiate them from any nonhazardous materials being sent using same shipping paper.
4. Be certain all hazardous classes are shown for multiclass materials.
5. Check total amounts by weight, quantity, or other measure used.
6. Check that any limited-quantity exemptions are so designated on the shipping paper.
7. Offer driver proper placards for transporting vehicle.
8. Check that certification is signed by shipper.
9. Make certain driver signs for shipment.

RCRA Manifest

1. Check that approved state/federal manifests are prepared.

TABLE 3-1
RCRA MANIFEST (Cont'd)

2. Check that transporter has the following: valid EPA identification number, valid driver's license, valid vehicle registration, insurance protection, and proper DOT labels for materials being shipped.

3. Check that destination address is correct.

4. Check that driver knows where shipment is going.

5. Check that driver is aware of emergency procedures for spills and accidents.

6. Make certain driver signs for shipment.

7. Make certain one copy of executed manifest and shipping document is retained by shipper.

APPENDIX C

SAMPLE MANAGEMENT

1.0 OBJECTIVE

The objective of these guidelines is to provide general reference information on sample management procedures.

2.0 LIMITATIONS

These limitations apply to all sample management procedures excepting requirements of project-specific sample management plans.

3.0 DEFINITIONS

Contract Laboratory Program (CLP). All samples collected will be analyzed at an approved laboratory within the EPA CLP. The EPA CLP was developed to retain laboratory services that will ensure that all environmental samples collected under the Superfund Program will be analyzed in accordance with recognized EPA laboratory methods and QA/QC procedures.

Target Compound List (TCL). It is a list of chemical substances consisting of 126 organic compounds, 23 metallic elements, and cyanide. The list is broken into four subdivisions: volatiles, semivolatiles, pesticide/PCBs, and total metals and cyanide.

Routine Analytical Services (RAS). Laboratory analysis for substances or parameters shown on the TCL in addition to the analysis for 2,3,7,8-TCDD dioxin, in solid and aqueous samples.

Special Analytical Services (SAS). Laboratory analysis for substances or parameters not shown on the TCL (with the exception of dioxin) and high-concentration samples. Analysis of non-soil/sediment, nonaqueous matrices, and analysis of RAS compounds using non-RAS protocols.

Trip Blanks. Trip blanks are used to check for sample contamination originating from sample transport, shipping, and from site conditions. Trip blanks are necessary when aqueous samples and rinsate blanks are collected for volatile organic analysis.

Rinsate Blanks. Rinsate blanks are used to check sampling equipment decontamination. Rinsates are collected for each type of sampling equipment used on site. Demonstrated analyte-free water is poured over the equipment and collected into containers and analyzed for the analytes of concern.

Environmental Duplicate. These are two separate samples collected at the same sampling point. Environmental duplicates are used to determine field sampling precision and are collected at a frequency of at least 5 percent per matrix.

Matrix Spike/Matrix Spike Duplicates (MS/MSD). The process by which standard mixes of various TCL compounds are added to environmental samples prior to extraction/ digestion. The sample is split into duplicates and analyzed. The analysis is used to evaluate the matrix effect of the sample upon the analytical methodology. Volume for MS/MSD analysis is collected at a frequency of at least 5 percent per matrix/concentration.

Low-Concentration Sample. Samples in which a compound may be present at concentration levels less than 10.0 ppm.

Medium-Concentration Sample. Samples in which a compound may be present at concentration levels equal to or greater than 10.0 ppm to as much as 15 percent 150,000 ppm) of the total sample.

High-Concentration Sample. Samples in which a compound may be present at concentration levels greater than 15 percent (150,000 ppm) of the total sample.

4.0 GUIDELINES

The purpose of sample management is to assume that all samples collected during a hazardous waste site investigation sampling episode will be accounted for when the project is completed. The purpose is achieved by adhering to the following procedures that outline a generic method of sample management.

Request for Analytical Services

In anticipation of a sampling episode, RAS requests are to be made using a CLP Data Management Request Sheet, or contact the Malcolm Pirnie, Inc., Regional Sample Control center (MPI-RSCC) Coordinator by 11 am the Tuesday prior to the week of the scheduled sampling event, unless otherwise indicated by MPI-RSCC Coordinator.

Note: SAS requests require a minimum of 4 weeks advance notice to obtain laboratory space. Be sure to contact MPI-RSCC Coordinator as soon as you suspect special sampling requirements for your site, so the proper procedure can be determined. (A minimum of 8 weeks notice is requested.)

RAS Sampling Requests

RAS sampling requests include low- and medium-concentration aqueous and soil/sediment samples for TCL analysis (including cyanide). RAS requests also include dioxin analysis in aqueous and soil/sediment samples.

The laboratories within the CLP are under contract to deliver data based on the latest date of sample receipt in each sample group. Approved RAS requests are issued a case number. Unique case numbers are issued for each sampling project occurring at one site over a specific scheduled time period.

SAS Sampling Requests

SAS sampling requests include the following:

- o High-concentration aqueous and soil/sediment samples for analysis of both TCL and non-TCL parameters.
- o Low- and medium-concentration aqueous and soil/sediment samples for analysis of non-TCL parameters.

In most cases, SAS requests will be made in addition to RAS requests (RAS plus SAS). Additional SAS services may include:

- o Lower detection limits for one or more of the TCL pollutants
- o Additional non-TCL compounds
- o Special sample preparation procedures
- o Inorganic parameters including nitrates, sulfates, ammonia, sulfides, and chlorides
- o Sample filtration procedures for inorganic analysis
- o Fast turnaround of less than 30 days for analysis of TCL parameters
- o Sample homogenization procedures for inorganic analysis
- o Less than 1 ppb detection limit for dioxin (TCDD)

Examples of SAS only requests are as follows:

- o High-concentration samples
- o Analysis for non-RAS (TCL) parameters only, with the exception of dioxin in soil and water
- o Analysis for nonaqueous or non-soil/sediment samples
- o Analysis based on non-RAS methods
- o Analysis of any special matrix sample (air, biota, wipes)
- o Analysis of TCDD by high resolution GC/HRMS or GC/MS/MS
- o Analysis of TCDF (furans)

o Analysis of TCDD in fish tissue and/or water

Attachment A contains examples of RAS and SAS request forms.

Sample Preparation

Prior to commencement of a sampling episode the proper containers, labels, preservation techniques, and blanks must be prepared. The types of samples to be collected will be the basis for determining the method of sample preparation.

All sample containers must be cleaned and prepared in accordance with OSWER Directive #9240.0-05, "Specifications and Guidance for obtaining Contaminant Free Sample Containers."

Sample Containers

Malcolm Pirnie will purchase certified clean, approved sample containers from an approved supplier. Malcolm Pirnie will label and prepare all bottles and add preservatives at the time of sampling, where necessary. Copies of certifications will be kept in site files and brought to the site while sampling.

Each bottle used to collect a sample must be identified by supplier and lot number to ensure that it is permanently associated with the sample collected in that particular container. This procedure also applies to containers used for quality control blanks such as trip and rinsate blanks, as well as the containers used to carry demonstrated analyte-free water to be used for blank preparation. This is to ensure that for all samples collected, the specific sample bottles used can be traced to the sample container contractor QC and custody records applicable to their identifying lot numbers.

Attachment A lists the sample container requirements for all levels of organic and inorganic sample collections.

Sample Preservation

Sample preservation is required for low-concentration samples. Sample preservation for RAS dioxin aqueous and soil/sediment samples requires that the samples be kept out of direct sunlight. Sample preservation is not required for medium- and high-concentration aqueous and soil/sediment samples. The following sample preservation measures are required for low-concentration samples:

o Low-concentration aqueous organic samples:

- Base/neutral/acid (BNA) extractables and pesticides/PCB samples must be cooled to 4°C. Ice must be placed in double zip-lock bags to prevent leakage. The ice bags should be placed by the neck and along the sides of the sample containers.

- Volatile organic samples must be preserved with 6 Molar hydrochloric acid (6 M HCl) to pH ≤ 2. The samples must be cooled to 4°C and air bubbles must not be present in the vials. Hydrochloric acid is dispensed from a disposable glass pipet into the vials. The amount of 6 M HCl to be added to the vials, prior to sample collection, is first determined on a separate volume of sample in a test vial.

o Low-concentration aqueous inorganic samples:

- Total metal samples are preserved with nitric acid (HNO_3) to a pH <2. Nitric acid solution is dispensed from 5-milliliter ampules. Indicator paper sensitive to pH 2 should be used to determine whether enough HNO_3 has been added to the sample to attain the desired pH. In most cases, one 5-mL ampule containing 2 to 3 mLs of HNO_3 per sample will be sufficient.

  The indicator paper must not be dipped into the sample container. Instead, pour a few drops of sample onto the paper and let the excess sample volume fall into a 1 liter widemouth polyethylene bottle or another designated container. The excess sample volume will be discarded with the wastewater at the end of the day. The container should be rinsed out and disposed of with dry wastes. The samples must be cooled to 4°C.

- Cyanide samples are preserved with sodium hydroxide (NaOH) following tests for the presence of oxidizing agents and sulfides (S^{2-}) with appropriate test papers. The samples are preserved with approximately 2 mls of sodium hydroxide solution to a pH >12. The samples must be cooled to 4°C.

o Low-concentration soil/sediment organic samples:

- There are no preservation requirements; however, it is required to pack with ice in order for samples to cool to 4°C.

o Low-concentration soil/sediment inorganic samples:

- It is optional to pack with ice and cool total metal samples to 4°C.

- Cyanide samples must be iced and cooled to 4°C.

Trip Blanks

Trip Blanks for a sampling episode will be prepared in the following manner:

o One trip blank is required for each day that aqueous environmental samples are collected for volatile analysis.

- Trip blanks are only necessary for aqueous environmental samples. If rinsates are the only aqueous samples collected, then a trip blank is not necessary.

- Trip blanks consist of two 40 mL septum vials into which 4-5 drops of 6M hydrochloric acid (HCl) is introduced prior to filling them with demonstrated analyte-free water.

- Trip blanks are prepared in, and carried to, the field where aqueous sampling occurs.

- Trip blanks are treated as separate aqueous samples and the appropriate paperwork must be completed. The trip blank is described as No. 3 "Leachate" in Column A of the organic traffic report, and the words "trip blank" must appear in Column D under special handling. (Attachment A - Organic Trip Report)

- The trip blank must be stored away from solvents and must be preserved, packaged, cooled to 4°C and shipped to the laboratory with the other aqueous samples.

Rinsate Blanks

- Rinsate blanks should be collected for each type of equipment used each day a decontamination event is carried out. It is permissible to use the same aliquot of water on all equipment associated to a particular matrix for analysis of semi-volatile organics, pesticides, PCBs and inorganics. The rinse must be performed sequentially on all sampling equipment. However, a separate field rinse blank must be collected for each piece of equipment associated to a particular sample matrix which will be analyzed for volatile organics.

- Rinsate blanks consist of pouring demonstrated analyte-free water over clean equipment and collecting it into sample containers to be analyzed for the analytes of concern.

- For full TCL/TAL analysis the rinsate will have the same volume as a low concentration aqueous environmental sample and the sample containers are filled in the following order: VOA vials, BNA/Pest./PCB bottles, total metals and Cyanide (if applicable).

- The rinsate blank is described as No. 3 "Leachate" in Column A or the organic and inorganic traffic report and "rinsate' in Column D under Special Handling. The type of equipment that is rinsed is written in Column D on both the organic and inorganic traffic reports. (Attachment A - Inorganic Traffic Report)

- Rinsate blanks are preserved, packaged, and shipped in the same manner as low concentration aqueous environmental samples.

- Environmental duplicates and matrix spike/matrix spike duplicates (see below) are quality control samples taken in the field for each sample group.

The sample group is defined as one of the following whichever occurs more frequently:

- Each case of field samples received
- Each 20 samples within a case
- Each 14-calendar-day period during which field samples within a case are received, beginning with receipt of the first sample in the sample case group.

Environmental Duplicates

- Samples for duplicate analysis are collected for each matrix sampled at a frequency of at least 1 in 20 samples per matrix.
- Sufficient quantity of matrix must be collected from the same sample location to fill a duplicate set of sample containers. The duplicate volume is shipped to the laboratory under a separate CLP sample number.
- For aqueous environmental samples the volatile organic fraction is collected first, then the fraction for extractable organic analysis, followed by the fraction for inorganic analysis of the environmental sample. Next the extractable organics then the inorganic fraction of the environmental duplicate is collected.
- For soil/sediment samples the volatile organic fraction is collected as colocated grab samples. The nonvolatile fraction is collected into a stainless steel bowl and mixed prior to collecting the fraction for extractable organic analysis and then the fraction for inorganic analysis. Separate bowls should be used to collect the environmental sample and the environmental duplicate.
- The collected volumes are divided, preserved, packaged and shipped to the lab as separate samples for analysis.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) & Matrix Spike/Matrix Duplicate (MS/MD)

- The designation of a sample for MS/MSD analysis for organics and MS/MD analysis for inorganics is required for 1 in 20 environmental samples per concentration/matrix.
- Additional volume must be collected from the same sample location and shipped to the lab using the same CLP numbers.
- Three times the total volume is necessary for collection of aqueous MS/MSD samples. Two times the total volume is necessary for collection of aqueous MS/MD

samples. The sample containers are filled in the following order: VOA vials, BNA/Pest./PCB bottles, total metals and Cyanide (if applicable).

- The MS/MSD samples are noted on the organic traffic reports.
- The MS/MD samples are noted on the inorganic traffic reports.

Custody Procedures

Prior to completion of a sampling episode the care and custody of the samples must be performed. Procedures for the packaging and shipping of samples and the documentation generated during that process is outlined in the following section.

Packaging and Shipping Samples

- Decontaminate and towel dry the outside of the sample container (Alconox and tap water rinse). Make sure the caps are tightly sealed prior to decontamination.
- Apply custody seal (signed and dated) (Attachment A) to container and cap. Septum vials should not be covered over the top. Apply seals around the circumference of the vial.
- Tape the container and cap using masking tape. Again, do not cover septums.
- Attach the sample tags to each sample (Attachment A).
- Place the containers in ziplock bags. The two 40 ml vials may be placed in one bag with extra air space eliminated.
- Segregate organic and inorganic fractions of samples. Put 1-2 inches of vermiculite in the bottom of the coolers. 1-10 samples may be written on each Traffic Report/Chain of Custody (TR/COC). A minimum of one form is necessary for each cooler of samples. Do not split samples, other than separating organic and inorganic fraction, into separate coolers.
- When enough samples have been collected to fill a cooler, prepare the TR/COC. Many times these forms can be partially completed in the office. If more than one TR/COC form per cooler is necessary than number them 1 of 2, 2 of 2 etc. However, each TR/COC must only represent samples collected on one date.
- Each cooler requires one address label on the outside. Tape label to top of cooler lid using clear tape. Leave room on one cooler for the Federal Express Airbill/Window for the shipment of coolers to each lab.
- Place the last two copies of the TR/COC's in the cooler in a ziplock bag, these copies do not have the site name on them, and tape it to the inside lid of the cooler.

Retain the remaining paperwork and send to the MPI-RSCC Coordinator. The site manager must attempt to complete the Receipt for Samples (Attachment F) and have the site representative sign it.

- o When all paper work is filled out and the samples packed in their respective coolers, recheck documentation with the site manager. Fill the cooler with vermiculite and secure the containers from movement within the coolers.

- o Apply custody seals to the cooler. Place two custody seals diagonally across from each other where the cooler lid meets the cooler on both the hinged and unhinged sides. Then apply two or more layers of fiberglass strapping tape around the cooler over the custody seals.

- o Place arrow labels marking "this end up" on opposite sides of the cooler.

- o Fill out RAS/SAS Sample Call-In Form (Attachment A). Call shipping information to the MPI-RSCC Coordinator (609-860-0100), by 4:30 pm or by 9:00 am the following morning and also call shipping information directly to RSCC Viar & Co. at (703) 519-1442 (RAS) or (703) 519-1459 (SAS).

- o Send all remaining paperwork to MPI-RSCC Coordinator for proper distribution.

- o All samples will be shipped by overnight carrier within 24 hours of sample collection.

Documentation

During field activities and prior to completion of the following documentation, field logbooks must be generated. During the sampling episode all duties and activities of concern must be entered into a logbook.

All logbook entries must be dated, legible, and initialed and contain accurate and inclusive documentation of an individual's project activities. Because the logbook forms the basis for the later written reports, it must contain only facts and observations. Language should be objective, factual, and free of personal feelings or other terminology which might prove inappropriate. Entries made by individuals other than the person to whom the logbook was assigned are dated and signed by the individual making the entry. Individuals must sign each logbook assigned to them.

Any information obtained during the sampling episode will then be expressed in the following documents.

Traffic Reports/Chain-of-Custody

The Sample Management Office provides preprinted traffic reports to track the shipment of samples through the CLP. For RAS, multisample traffic reports (TRs) are used.

Multisample TRs reference CLP analytical fractions, not sample containers and volumes, and may be used to document the shipment of 1 to 20 samples under one case number.

RAS CLP sample types are defined by the following analytical programs:

- Inorganic analysis - Total Metals, Cyanide, or both
- Organic analysis - Volatile Organics (VOA), Base/Neutral/Acid Extractables (BNAs), Pesticide/PCBs, or any combination of these
- VOA only - Volatile organics analysis - fast turnaround - 14 days

A CLP sample is collected from one matrix and consists of all the sample volume required for analysis under one RAS analytical program from the sample location. For example, a surface water sample to be analyzed for full TCL parameters would represent two CLP samples - one aqueous sample to be analyzed under the inorganic program (total metals, cyanide, or both), and one aqueous sample to be analyzed under the organic program (volatile organics, BNAs, and pesticides/PCBs).

Unique sample numbers are assigned for each CLP sample. The sample numbers are provided on adhesive labels. The type of analysis is printed on most of these labels. The appropriate label must be applied to the correct container.

Sample numbers for inorganic analysis for Region 2 are in the format MBX 123 and have seven labels per strip: two for total metals, two for cyanide, and three extra.

Organic sample numbers are in the format BX 123 and have ten labels per strip: four for extractables (BNAs, Pesticide/PCBs), two for VOAs, and four blank labels. One sample number must be used for water samples, and another sample number must be used for soil samples; the same sample number must never apply to both types of samples. Unused portions of labels must be destroyed and not reused.

Chain-of-Custody

Custody of a sample is defined by the following:

- It is in your possession, or
- It is in your view, after being in your possession, or
- It was in your possession, and you locked it up, or
- It is in a designated secure area.

Each person involved with the sample must know Chain-of-Custody procedures. The procedures should be included in the Project Plan or be published and available to all

personnel. Due to the evidentiary nature of sample collecting investigations, the possession of samples must be traceable from the time that samples are collected until they are introduced as evidence in legal proceedings. To maintain and document sample possession, Chain-of-Custody procedures are followed.

The Chain-of-Custody records must be prepared as the sample containers are being packaged for shipping. Since samples are shipped in commercial coolers, a separate Chain-of-Custody record should be prepared for the contents of each cooler. The record must be signed and dated just prior to sealing the coolers for shipment. Enter the actual time at which the COC is prepared. The Chain-of-Custody record used in Region 2 is serialized.

Sample Labels

A sample label must be affixed to each sample container. Information provided on the sample label must include the following:

- Case number: The case number must be the same as that provided in the top right corner of the traffic report.
- Sample number: This is the MPI-designated sample number. It is associated with the sample source location on a site map.
- Date: Indicate the month, day, and year the sample was collected.

All information recorded should be printed on labels using indelible (waterproof) ink. The sample matrix is provided on the preprinted CLP numbered sample tables. Clear, acetate tape must be applied over all labeling to maintain label integrity during decontamination procedures.

Custody Seals

The custody seal has an adhesive side which enables it to stick where it is applied. The custody seal must be signed and dated and is applied to sample containers and coolers in such a manner as to reveal if the container was opened during transit.

Receipt for Samples Form

Upon completion of the site inspection, before the field team leaves the site, the site owner, operator, or agent in charge must be given a completed "Receipt for Samples" form describing the samples collected.

The number and description of samples collected must be provided. The case number must not be indicated on the form. The site owner, operator, or authorized agent is the person the samples are "Transferred by" and must sign accordingly. As a receipt for samples is required by law, it is required that when the owner, operator or authorized agent is not

available to accept the receipt, indicate that fact on the bottom of the document and have it placed in the Sample Management Documentation section of the project file.

Distribution of Documentation

After all sampling and documentation is completed the following outline will be used for the distribution of the documentation generated.

Laboratory

- Bottom 2 copies of Traffic Report

Site Owner/Representative

- Top white copy of the Receipt for Samples Form

Site Manager for Project File

- 1 xerox copy of all the Traffic Reports
- 1 xerox copy of the airbills
- Pink copy of the Receipt for Samples

MPI-RSCC Coordinator

- Top 2 copies of the TR/COC
- Two copies of the Sampling Trip Report (when completed)
- Any extra unused CLP labels and paperwork
- Bottle Lot Number Form
- Federal Express Airbill Receipts
- Yellow Copy of Receipt for Samples

MPI-RSCC to Distribute To

RSCC/ESAT Weston, Inc.

- 2nd page of all the Organic and Inorganic TR/COCs

Viar & Co.

- Top copy of the Inorganic and Organic TR/COC

MPI-RSCC Files

- Sample Trip Report
- Copy of all TR/COCs
- Extra Labels and Paperwork

- Bottle Lot Number Form
- Federal Express Airbill Receipts
- Yellow Copy of Receipt for Sample Form

5.0 REFERENCES

U.S. Environmental Protection Agency. Region 2, Environmental Services Division, Monitoring Management Branch, CERCLA Quality Assurance Manual, October 1989, Revision 1.

User's Guide to the Contract Laboratory Program, U.S. EPA Office of Emergency and Remedial Response, January 1991.

Code of Federal Regulations, Title 49, Transportation Revised, October 1, 1986.

USEPA Contract Laboratory Program (CLP) National Functional Guidelines For Organic Data Review, Multi-Media, Multi-Concentration, Doc. No. OLM01.0, Revised June, 1991.

USEPA CLP SOW for Organic Analysis Multi-Media, Multi-Concentration, Doc. No. OLM01.0, Revision OLM01.8 June 1991.

USEPA Contract Laboratory Program (CLP) National Functional Guidelines For Evaluating Inorganic Analysis, Revised October, 1989.

USEPA CLP SOW for Inorganic Analysis, Multi-Media, Multi-Concentration, Doc. No. ILM01.0, December 1990.

ATTACHMENT A

MALCOLM PIRNIE

ARCS Contract# 68-W9-0051

CONTRACT LABORATORY PROGRAM DATA MANAGEMENT REQUEST SHEET

(Shaded Areas for MPI-RSCC Use Only)

Site Name: _____
Site Location: _____
Job Number: _____

Date Requested: _____
Proposed Sampling Date(s): _____
Proposed Shipping Date: _____

Actual Start Date: _____
Actual Completion Date: _____

SM/FTL: _____

Turnaround Time:
Routine _____ Fast _____ # of days _____

Case Number: _____

SAS Number: _____

Laboratories:

Organic: _____

Inorganic: _____

SAS/Other: _____

ROUTINE ANALYTICAL SERVICES (RAS)

SAMPLE TYPE		ORGANICS						INORGANICS					
		Full TCL Organics		VOA Only		Other		TAL Only		TAL + Cyanide		Other	
		R	C	R	C	R	C	R	C	R	C	R	C
Trip Blanks:													
Rinsates:													
	Soil Sampling Equipment												
	Aqueous Sampling Equipment												
Aqueous Environmental Samples:													
	Low Concentration												
	Medium Concentration												
Solid Environmental Samples:													
	Low Concentration												
	Medium Concentration												

R= # of Requested Samples C= Actual # Collected

Signature: _____ Date: _____

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SPECIAL ANALYTICAL SERVICES (SAS)

No. of Samples		Concentration	Sample Type/Matrix	Type of Analysis	Suggested Method
R	C				

Additional Comments: _____

R= # of Requested Samples C= Actual # Collected

U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/557-2490

SAS Number

SPECIAL ANALYTICAL SERVICES

Client Request

☐ Regional Transmittal ☐ Telephone Request

A. EPA Region/Client: _____

B. RSCC Representative: _____

C. Telephone Number: ( ) _____

D. Date of Request: _____

E. Site Name: _____

Please provide below description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in a delay in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. General description of analytical service requested: _____

2. Definition and number of work units involved (specify whether whole samples or fractions; whether organics or inorganics; whether aqueous or soil and sediments; and whether low, medium or high concentration):

3. Purpose of analysis (specify whether Superfund (enforcement or remedial action), RCRA, NPDES, etc.): _____

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4. Estimated date(s) of collection: _____

5. Estimated date(s) and method of shipment: _____

6. Number of days analysis and data required after laboratory receipt of samples:

_____

7. Analytical protocol required (attach copy if other than a protocol currently used in this program): _____

8. Special technical instructions (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.): _____

9. Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain-of-Custody documentation, etc.) If not completed, format of results will be left to program discretion. _____

10. Other (use additional sheets or attach supplementary information, as needed):

_____

11. Name of sampling/shipping contact: _____

Phone: ( ) _____

12. Data Requirements

Parameter	Detection Limit	Precision Desired (±% or Concentration)

13. QC Requirements

Audits Required	Frequency of Audits	Limits (Percent or Concentration)

14. Action Required if Limits are Exceeded

Please return this request to the Sample Management Office as soon as possible to expedite processing of your request for special analytical services. Should you have any questions or need any assistance, please contact your Regional representative at the Sample Management Office.

HIGH CONCENTRATION SAS REQUEST
REGION II

Site Name: _____ Site Spill ID No. _____

Site Location (city/state): _____

Sampler: _____ Sampler Contact: _____

Sampler Phone No. _____

INORGANIC SAS NO. 6361-I Set No. _____ *(Will be completed by SMO Coordinator)*

SAMPLE DESCRIPTION		SPECIFY METHODS (If necessary)
Number:	_____	_____
Matrix:	_____	_____
No. of Phases: (If applicable)	_____	_____

INORGANIC ANALYSIS

____ Total Metals
____ Total Metals & Cyanide
____ Total Metals, Cyanide & Sulfide

Shipping Dates: _____

Please confirm receipt of request by SMO with next phone communication.

COMMENTS: _____

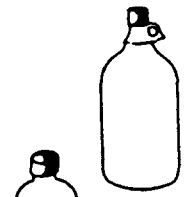
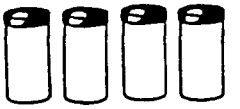
_____

_____

_____

Date Request Mailed to SMO: _____ EPA Region III Contact: _____

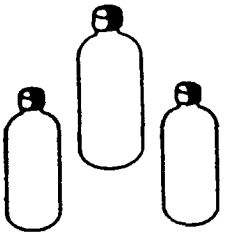
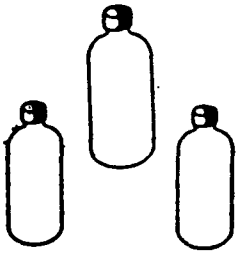
ORGANIC SAMPLE COLLECTION REQUIREMENTS

WATER SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
EXTRACTABLE ANALYSIS (LOW LEVEL)	1 GALLON		1 x 4-LITER AMBER GLASS BOTTLES OR 2 x 80-OZ. AMBER GLASS BOTTLES OR 4 x 1-LITER AMBER GLASS BOTTLES
EXTRACTABLE ANALYSIS (MEDIUM LEVEL*)	1 GALLON		4 x 32-OZ. WIDE-MOUTH GLASS JARS
VOLATILE ANALYSIS (LOW OR MEDIUM LEVEL*)	80 ML		2 x 40-ML GLASS VIALS

SOIL/SEDIMENT SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
EXTRACTABLE ANALYSIS (LOW OR MEDIUM LEVEL*)	6 OZ.		1 x 8-OZ. WIDE-MOUTH GLASS JAR OR 2 x 4-OZ. WIDE-MOUTH GLASS JARS
VOLATILE ANALYSIS (LOW OR MEDIUM LEVEL*)	240 ML		2 x 120-ML WIDE-MOUTH GLASS VIALS

*ALL MEDIUM LEVEL SAMPLES TO BE SEALED IN METAL PAINT CAN FOR SHIPMENT

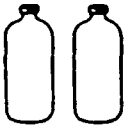
INORGANIC SAMPLE COLLECTION REQUIREMENTS

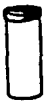
WATER SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
METALS ANALYSIS (LOW LEVEL)	1 LITER		1 x 1-LITER POLYETHYLENE BOTTLE OR 2 x 500 ML POLYETHYLENE BOTTLE
METALS ANALYSIS (MEDIUM LEVEL*)	16 OZ.		1 x 16-OZ. WIDE-MOUTH GLASS JAR
CYANIDE (CN^-) ANALYSIS (LOW LEVEL)	1 LITER		1 x 1-LITER POLYETHYLENE BOTTLE OR 2 x 500 ML POLYETHYLENE BOTTLE
CYANIDE (CN^-) ANALYSIS (MEDIUM LEVEL*)	16 OZ.		1 x 16-OZ. WIDE-MOUTH GLASS JAR

SOIL/SEDIMENT SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
METALS AND CYANIDE (CN^-) ANALYSIS (LOW OR MEDIUM LEVEL*)	6 OZ.		1 x 8-OZ. WIDE-MOUTH GLASS JAR OR
			2 x 4-OZ. WIDE-MOUTH GLASS JARS

*ALL MEDIUM LEVEL SAMPLES TO BE SEALED IN METAL PAINT CAN FOR SHIPMENT

DIOXIN SAMPLE COLLECTION REQUIREMENTS

WATER SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
2,3,7,8-TCDD ANALYSIS (MULTI-CONCENTRATION)	2 LITERS		2 x 1-LITER AMBER GLASS BOTTLES

SOIL/SEDIMENT SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
2,3,7,8-TCDD ANALYSIS (MULTI-CONCENTRATION)	4 OZ.		1 x 4-OZ. WIDE-MOUTH GLASS JAR
			OR
			1 x 8-OZ. WIDE-MOUTH GLASS JAR

HIGH HAZARD SAMPLE COLLECTION REQUIREMENTS

LIQUID OR SOLID SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
ORGANIC AND INORGANIC ANALYSIS	6 OZ.		1 x 8-OZ. WIDE-MOUTH GLASS JAR

*ALL MEDIUM LEVEL SAMPLES TO BE SEALED IN METAL PAINT CAN FOR SHIPMENT

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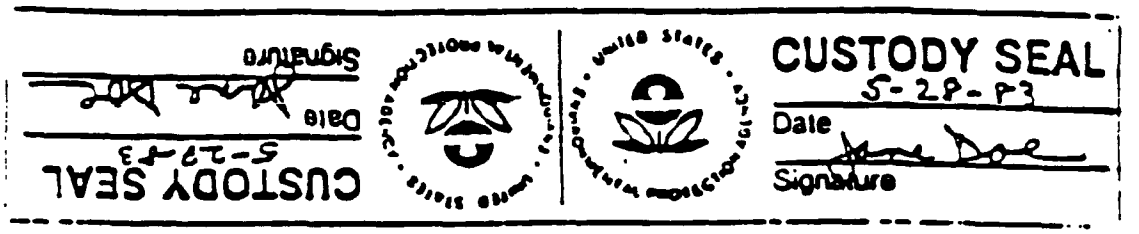
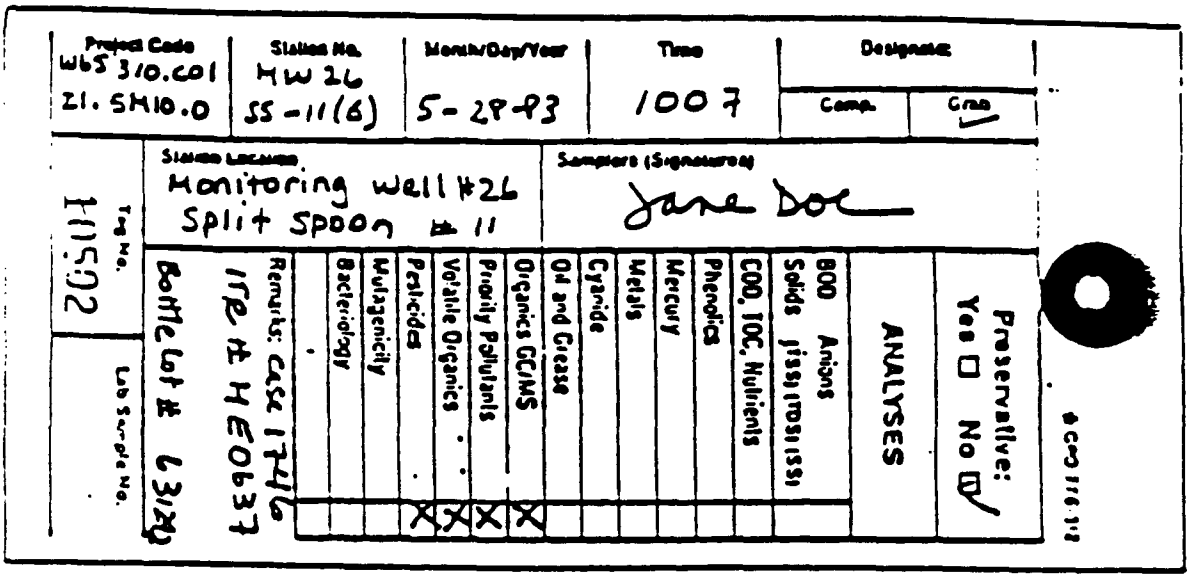


Custody Seal



Sample Tag

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EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

O nic Traffic Report & Chain of Custody Record

(For Organic CLP Analysis)

SAS No. (if applicable)	Case No.

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier

Regional Information	Sampler (Name)	Airbill Number

Non-Superfund Program	Sampler Signature	5. Ship To

Site Name	3. Type of Activity	Lead	Pre-Remedial	Remedial	Removal
	SF	☐		RIFS ☐	CLEM ☐
	PRP	☐	PA ☐	RD ☐	REMA ☐
	ST	☐	SSI ☐	RA ☐	REM ☐
	FED	☐	LSI ☐	O&M ☐	OIL ☐
				NPLD ☐	UST ☐

City, State	Site Spill ID

ATTN:

6. Preservative (Enter in Column D)
1. HCl
2. HNO_3
3. $NaHSO_4$
4. H_2SO_4
5. Other (Specify)
6. Ice only
N. Not preserved

7. Sample Description (Enter In Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E RAS Analysis VOA	E BNA	E Pest/ PCB	E High only ARO/ TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Inorg. Samp. No.	K Enter Appropriate Qualifier for Designated Field QC (B = Blank S = Spike D = Duplicate PE = Perform. Eval. — = Not a QC Sample)

Shipment for Case complete? (Y/N)	Page 1 of ____	Sample used for a spike and/or duplicate	Additional Sampler Signatures	Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature)
☐ Declined

EPA Form 9110-2 (Rev. 5-91) Replaces EPA Form (2075-7), previous edition which may be used

DISTRIBUTION:
Blue - Region Copy Pink - SMO Copy White - Lab Copy for Return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

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Organic Sample Collection Requirements

"This form replaces both the individual Traffic Report and EPA Chain of Custody Record. If the sampling team elects to use an alternative chain-of-custody form, cross out the bottom portion of this record and indicate that chain-of-custody information is recorded on an alternative form."

Water Samples	Required Volume	Container Type
Extractable Analysis (Low Level)	1 Gallon	1 X 4-Liter Amber Glass Bottle OR 2 X 80-oz. Amber Glass Bottle OR 4 X 1-Liter Amber Glass Bottles
Extractable Analysis (Medium Level*)	1 Gallon	32-oz. Wide-Mouth Glass Jars
Volatile Analysis (Low or Medium Level*)	80 ml.	2 X 40-ml. Glass Vials

*All Medium and High Level Samples to be Sealed in Metal Can for Shipment

Soil/Sediment Samples	Required Volume	Container Type
Extractable Analysis (Low or Medium Level*)	6 oz	1 X 8-oz. Wide-Mouth Glass Jar OR
	240 ml	2 X 4-oz. Wide-Mouth Glass Jars
Volatile Analysis (Low or Medium Level*)		2 X 120 ml Wide-Mouth Glass Vials†

†Soil VOA Vials under study, subject to change, check to ensure proper sealing

HIGH CONCENTRATION SAMPLE COLLECTION REQUIREMENTS

Liquid or Solid Samples	Required Volume	Container Type
Extractable and Volatile Analysis	6 oz.	1 X 8-oz. Wide-Mouth Glass Jar

1. **Organic Sample Collection Requirements**
   - Please indicate sample to spike and/or duplicate.
   - Ship medium and high concentration samples in paint cans.
   - Aqueous samples require one triple-volume sample per twenty for Matrix Spike/Matrix Spike Duplicate.
   - Oily samples must be analyzed under the Special Analytical Services (SAS) program.
   - Confirmatory analysis and Special Analytical Services (SAS) parameters may require extra volume; for SAS consult specified SAS methods for requirements.
   - Additional sample volume not required for method OLC01.

2. **Cooler and Sample Documentation**
   - Complete all sections of the Traffic Report/Chain of Custody Form - Press firmly with a ball point pen to ensure that carbon copies are legible. Check the information and correct any errors.
   - Please remember to complete the Chain of Custody information on the form.
   - Seal the two sets of laboratory Traffic Report/Chain of Custody form copies in a plastic bag. Include a return address for the cooler. Tape bag under cooler lid.
   - Overlap the lid and bottle of each sample container with custody seals.
   - Seal each container in a plastic bag.
   - Pack medium and high concentration samples in metal cans.
   - Cool low waters to 4° C. Cooling of low soils is optional. Do not cool medium or high concentration waters and soils.
   - Separate and surround cooler contents with vermiculite or equivalent packaging.
   - Seal the cooler, overlapping the lid and body with custody seals.
   - FAX SMO a copy of the Traffic Report/Chain of Custody Form as soon as possible. Send SMO the pink copy of the Traffic Report within 5 days.
   - In column E RAS analysis indicate number of sample bottles sent for analysis.

3. **Sample Shipment Reporting**
   - PHONE IN ALL SHIPMENTS IMMEDIATELY TO SMO (or to RSCC, if instructed)
     Required information:
     - Case (and/or SAS) Number
     - Date shipped
     - Number of samples by concentration and matrix
     - Carrier and airbill number
     - Next planned shipment
   - Leave your name and a number where you can be reached.
   - Information for SATURDAY DELIVERIES must be phoned in by 3:00 PM (Eastern) the preceding FRIDAY.
   - Report any delays or changes of scope (i.e., changes in number of samples to be collected, matrix changes, etc.)
   - CALL IF YOU HAVE ANY QUESTIONS

USEPA Contract Laboratory Program
Sample Management Office
P.O. Box 818
Alexandria, VA 22313
Phone: (703) 557-2490
(703) 684-5678
FAX: (703) 683-0378

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EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable)

Case No.

1. Project Code | Account Code

2. Region No. | Sampling Co.

4. Date Shipped | Carrier

Regional Information

Sampler *(Name)*

Airbill Number

Non-Superfund Program

Sampler Signature

5. Ship To

Site Name

3. Type of Activity

	Lead	Pre-Remedial	Remedial		Removal	
SF	☐		RIFS	☐	CLEM	☐
PRP	☐	PA	☐	RD ☐	REMA	☐
ST	☐	SSI	☐	RA ☐	REM	☐
FED	☐	LSI	☐	O&M ☐	OIL	☐
				NPLD ☐	UST	☐

City, State | Site Spill ID

ATTN:

6. Preservative *(Enter in Column D)*
1. HCl
2. HNO_3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other *(Specify)*
N. Not preserved

7. Sample Description *(Enter In Column A)*
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other *(Specify)*

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only Nitrate/ Nitrite	Low Conc. only Fluoride	High only pH	High only Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Enter Appropriate Qualifier for Designated Field QC

B = Blank S = Spike D = Duplicate PE = Perform. Eval. — = Not a QC Sample

C-28

Shipment for Case complete? (Y/N)

Page 1 of ____

Sample used for a spike and/or duplicate

Additional Sampler Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted *(Signature)*

☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION:
Green - Region Copy Pink - SMO Copy White - Lab Copy for return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

300948

347901

Inorganic Sample Collection Requirements

"This form replaces both the individual Traffic Report and EPA Chain of Custody Record. If the sampling team elects to use an alternative chain-of-custody form, cross out the bottom portion of this record and indicate that chain-of-custody information is recorded on an alternative form."

Water Samples	Required Volume	Container Type
Metals Analysis (Low Level)	1 Liter	1 X 1-Liter Polyethylene Bottle OR 2 X 500-ml. Polyethylene Bottle
Metals Analysis (Medium Level*)	16 oz.	1 X 16-oz Wide-Mouth Glass Jar
Extractable Analysis (Medium Level*)	1 Liter	1 X 1-Liter Polyethylene Bottle OR 2 X 500-ml. Polyethylene Bottle
Volatile Analysis (Low or Medium Level*)	16 oz.	1 X 16-oz. Wide-Mouth Glass Jar

Soil/Sediment Samples	Required Volume	Container Type
Metals and Cyanide (CN*) Analysis (Low or Medium Level*)	6 oz.	1 X 8-oz.Wide-Mouth Glass Jar OR 2 X 4-oz. Wide-Mouth Glass Jars

HIGH CONCENTRATION SAMPLE COLLECTION REQUIREMENTS

Liquid or Solid Samples	Required Volume	Container Type
Metals and Cyanide* Analysis	6 oz.	1 X 8-oz.Wide-Mouth Glass Jar

*All Medium and High Level Samples to be Sealed in Metal Can for Shipment

1. Inorganic Sample Collection Requirements

- Aqueous samples require one double-volume sample per twenty for Matrix Spike/Matrix Spike Duplicate.
- Preserve low level water samples:
  - Total metals — Preserve with HNO_3 to pH ≤ 2.
  - Dissolved metals — Preserve with HNO_3 to pH ≤ 2. No further digestion required.
  - Cyanide — Preserve with 10 NaOH to pH ≥12.
- Oily samples must be analyzed under the Special Analytical Services (SAS) program.
- Ship medium and high concentration samples in paint cans.

2. Cooler and Sample Documentation

- Complete all sections of the Traffic Report/Chain of Custody Form - Press firmly with a ball point pen to ensure that carbon copies are legible. Check the information and correct any errors.
- Please remember to complete the Chain of Custody information on the form.
- Seal the two sets of laboratory Traffic Report/Chain of Custody form copies in a plastic bag. Include a return address for the cooler. Tape bag under cooler lid.
- Overlap the lid and bottle of each sample container with custody seals.
- Seal each container in a plastic bag.
- Pack medium and high concentration samples in metal cans.
- Separate and surround cooler contents with vermiculite or equivalent packaging.
- Seal the cooler, overlapping the lid and body with custody seals.
- Send SMO the pink copy of the Traffic Report within 5 days.
- In column E RAS analysis indicate number of sample bottles sent for analysis.

3. Sample Shipment Reporting

- PHONE IN ALL SHIPMENTS IMMEDIATELY TO SMO (or to RSCC, if instructed)

  Required information:
  - Case (and/or SAS) Number
  - Date shipped
  - Number of samples by concentration and matrix
  - Carrier and airbill number
  - Next planned shipment

  Leave your name and a number where you can be reached.
- Information for SATURDAY DELIVERIES must be phoned in by 3:00 PM. (Eastern) the preceding FRIDAY.
- Report any delays or changes of scope (i.e., changes in number of samples to be collected, matrix changes, etc.)
- CALL IF YOU HAVE ANY QUESTIONS

USEPA Contract Laboratory Program
Sample Management Office
P.O. Box 818
Alexandria, VA 22313
Phone: (703) 557-2490
(703) 684-5678
FAX: (703) 683-0378

300949

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Special Analytical Service

Packing List/Chain of Custody

SAS No.

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
Regional Information		Sampler *(Name)*		Airbill Number	
Non-Superfund Program		Sampler Signature		5. Ship To	
Site Name		3. Type of Activity	Lead / Pre-Remedial / Remedial / Removal		
City, State	Site Spill ID	SF / PRP / ST / FED	PA / SSI / LSI	RIFS / RD / RA / O&M / NPLD	CLEM / REMA / REM / OIL / UST

6. Sample Description *(Enter in Column A)*
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil
7. Waste
8. Other *(Specify)*

7. Preservative *(Enter in Column C)*
1. HCl
2. HNO_3
3. $NAHSO_4$
4. H_2SO_4
5. NaOH
6. Other *(Specify)*
7. Ice only
N. Not preserved

Sample Numbers	A Matrix Enter from Box 6	B Conc Low Med High	C Preserv-ative Used from Box 7	D Analysis	E Regional Specific Tracking Number or Tag Number	F Station Location Identifier	G Mo/Day/ Year/Time Sample Collection	H Sampler Initials	I Designated Field QC
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									

Shipment for SAS complete? (Y/N)	Page 1 of __	Sample Used for Spike and/or Duplicate	Additional Sampler Signatures	Chain of Custody Seal Number

C-30

CHAIN OF CUSTODY RECORD

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted *(Signature)*
☐ Declined

300950

EPA Form: 9110-3 (7/91)

DISTRIBUTION: White - Region Copy Yellow - SMO Copy Gold - Lab Copy for Return to Region
Pink - Lab Copy for Return to SMO

See Reverse Side for Additional Standard Instructions

S 0021101

1. Sample Collection Requirements

   Note: Comfirmatory analysis and Special Analytical Services (SAS) parameters may require extra volume.

2. Cooler and Sample Documentation

   - Complete all sections of the SAS Packing List/Chain of Custody Form - Press firmly with a ball point pen to ensure that carbon copies are legible. Check the information and correct any errors.
   - Please remember to complete the Chain of Custody information on the form.
   - Seal the two sets of laboratory SAS Packing List/Chain of Custody form copies in a plastic bag. Include a return address for the cooler. Tape bag under cooler lid.
   - Overlap the lid and bottle and bottle of each sample container with custody seals.
   - Seal each container in a plastic bag.
   - Pack medium and high concentration samples in metal cans.
   - Cool low waters to 4° C. Cooling of low soils is optional. Do not cool medium or high concentration waters and soils.
   - Separate and surround cooler contents with vermiculite or equivalent packaging.
   - Seal the cooler, overlapping the lid and body with custody seals.
   - Send SMO the yellow copy of the SAS Packing List/Chain of Custody Form within 3 days.

3. Sample Shipment Reporting

   - PHONE IN ALL SHIPMENTS IMMEDIATELY TO SMO (or to RSCC, if instructed)

     Required information:

     SAS (and/or Case) number
     Date shipped
     Number of samples by concentration, matrix, and analysis
     Carrier and airbill number
     Next planned shipment

     Leave your name and a number where you can be reached.
   - Information for SATURDAY DELIVERIES must be phoned in by 3:00 p.m. (Eastern) the preceding FRIDAY.
   - Report any delays or changes of scope (i.e., changes in number of samples to be collected, matrix changes, etc.)
   - CALL IF YOU HAVE ANY QUESTIONS

     USEPA Contract Laboratory Program
     Sample Management Office
     P.O. Box 818
     Alexandria, VA 22313
     Phone: (703) 557-2490
     (703) 684-5678
     FAX: (703) 683-0378

RECEIPT FOR SAMPLES AND DOCUMENTS

DATE OF SAMPLE COLLECTION			
NAME OF FACILITY			
FACILITY LOCATION			
RECEIPT OF THE DOCUMENT(S) AND/OR SAMPLE(S) DESCRIBED IS HEREBY ACKNOWLEDGED:			
NO.	DESCRIPTION		
TRANSFERRED BY (Signature)		RECIPIENT SIGNATURE	
NAME		NAME	
TITLE	DATE SIGNED	TITLE	DATE SIGNED

300952

NOTIFICATION OF SAMPLE SHIPMENT

Case No. _____ Caller's Name _____ Phone # _____

SAS No. _____ Date of Call ___/___/___ Region _____

Lab Name	No./Matrix Concentration of Samples (e.g. 10 LW)	Ship Date	Airbill No.	Shipping Complete?
				Y / N
				Y / N
				Y / N
				Y / N

Comments: _____

_____

_____

Message Taker: _____

NOTIFICATION OF SAMPLE SHIPMENT

Case No. _____ Caller's Name _____ Phone # _____

SAS No. _____ Date of Call ___/___/___ Region _____

Lab Name	No./Matrix Concentration of Samples (e.g. 10 LW)	Ship Date	Airbill No.	Shipping Complete?
				Y / N
				Y / N
				Y / N
				Y / N

Comments: _____

_____

_____

Message Taker: _____

APPENDIX D

FIELD AUDIT FORMS

1.0 OBJECTIVE

The objective of these guidelines is to provide general reference information on the aspects of performing a field audit.

2.0 LIMITATIONS

These limitations apply to all field audits during any sampling event excepting requirements of project-specific plans for field audits.

3.0 DISCUSSION

This field audit procedure is to be used for the auditing of field sampling events to verify adherence to the field sampling plan (FSP) and to document any deviations from prescribed procedures. A field audit is the verification of a sampling team's performance during a sampling episode.

A copy of the approved work plan should be reviewed by the auditor prior to going in the field. The auditor should be familiar with the number of samples, parameters, sampling methodology, etc. to be utilized at the site prior to performing the quality control field audit.

The auditor should be prepared for the level of personnel protection specified in the work plan. This means that the auditor should have the necessary equipment available for use in their vehicle prior to going in the field.

It is recommended that prior to performing a quality control field audit, the auditor contact the project manager and discuss the audit. This type of pre-sampling conference with the project manager has proven to be an effective tool to ensure proper preparation, for the sampling event, has in fact occurred. This will avoid project delays and time wasted by staff auditors.

If the sampling episode is going to occur over an extended period of time, the auditor should specify the dates they wish to be on-site to witness sample collection. In addition, directions to the sampling location should be obtained.

The auditor should verify the sample matrix and equipment that the sampling team plans to use. If necessary, discuss the sampling technique to be utilized with the project manager in the event that last minute substitutions might occur. If this situation arises, the auditor must evaluate if the changes proposed will compromise the objectives of the FSP and if necessary, advise the project management team of potential delays.

Review the decontamination procedures for the equipment that will be utilized during sampling.

Laboratory Coordination

- o Review requirements for trip and field blanks
- o When necessary, reiterate the sample analysis methodology and the reporting formation to be utilized.

Document References in the Field

The auditor should have the following documents available for reference in the field when performing quality control field audits:

- o Copy of the approved work plan and any relevant memos, correspondence or addenda.
- o Copy of the Field Sampling Procedures Manual and/or the USEPA Groundwater Monitoring Technical Enforcement Guidance Document.
- o Appropriate bound field log book (in an 8 x 11 format).
- o Appropriate field audit checklist
- o List of telephone numbers for project personnel and emergency numbers.
- o Camera (optional)

Note: The field audit checklist should be 100% complete prior to leaving the site where the sampling event has occurred.

Corrective Action in the Field

Besides observing and reporting, the auditor is responsible for initiating steps for the start-up of corrective action procedures.

If the auditor witnesses discrepancies in the field between the approved work plan and the performance of the sampling team, then the auditor has several options available for corrective action. These options are dependent upon the type of infraction observed.

Infractions observed and the corrective action taken must be documented in the auditor's log book.

o Minor Infractions

Minor infractions are problems that are observed by the auditor and immediately brought to the attention of the party conducting the investigation. The auditor and the party conducting the investigation should discuss the problem and agree upon what corrective action is necessary. This will allow for the infractions to be corrected immediately in the field.

Impact, if any, to the data generated can be easily eliminated and procedures can be corrected and/or repeated to achieve the desired result.

Examples of minor infractions would include: not wearing disposable gloves, insufficient well evacuation, and not filling volatile organic sample containers completely.

o Major Infraction

Major infractions are events or procedures that substantially deviate from approved work plans, administrative documents, the USEPA Groundwater Monitoring Technical Enforcement Guidance Document, or will otherwise result in increased project costs not previously approved.

Upon witnessing a major infraction which would cause work to cease, the auditor shall inform the party conducting the investigation of the problem. They should then discuss what steps are necessary for corrective action. During this time all work on site should stop until a resolution is agreed upon.

If the party conducting the investigations refuses to cease work or take the necessary steps for corrective action, then the auditor shall inform the party that samples obtained will potentially cause data critical to the environmental evaluation of a project to be qualified or become suspect. This type of infraction has the potential to cause total or partial rejection of samples submitted to the laboratory.

Examples of major infractions would include: no trip or field blanks, improper decontamination procedures, and change in sampling location and procedures.

When infractions are observed, the results of the audit should be immediately communicated in writing to the PMO QA Manager, Program Manager, Site Manager and the Work Assignment Manager.

Preparation of a Field Audit Report

The quality control field audit report provides a means of relaying the events of a sampling episode to key personnel. These events could possibly affect the sample integrity (QA/QC)

and therefore they are important to the decisions that are made in regards to analytical data.

A quality control field audit report will usually contain the following information.

- o Date and location of field audit
- o Sample matrices witnessed
- o Name of personnel conducting the sampling
- o Summary of sample methodology
- o Description of any infractions that occurred and the corrective actions taken.
- o Conclusions
- o Recommendations
- o Map of sample locations
- o Table of samples witnessed by the auditor
- o Quality control field audit checklist (refer to attachments)

4.0 REFERENCES

U.S. EPA Region II CERCLA Quality Assurance Manual. Part II, Quality Control Handbook for CERCLA Sampling and Analysis, Section XV. March 1988.

N.J. Department of Environmental Protection - Field Sampling Procedures Manual. Feb 1988.

QUALITY CONTROL FIELD AUDIT REPORT

SUMMARY INFORMATION

1. PROJECT NAME: _____

2. PROJECT ADDRESS: _____

_____

3. PRELIMINARY ASSESSMENT ___ RI/FS ___ RD ___ CONSTRUCTION ___

OTHER _____

4. *DATE(S) OF QC FIELD AUDIT* _____

5. AUDITOR'S NAME _____ PHONE _____

6. FACILITY CONTACT _____ PHONE _____

7. CONTRACTOR CONTACT _____ PHONE _____

8. PERSONNEL ON-SITE

NAME	REPRESENTING	PHONE

9. AUDITOR'S COMMENTS _____

_____

_____

10. WEATHER CONDITIONS

SUNNY PARTLY SUNNY PARTLY CLOUDY CLOUDY RAIN DRIZZLE SNOW SLEET

TEMPERATURE _____ WIND SPEED _____ WIND DIRECTION _____

11. LEVEL OF PERSONNEL PROTECTION REQUIRED IN WORK PLAN LEVEL OF PERSONNEL PROTECTION ACTUALLY DONNED:

A B C D A B C D

12. FIELD SURVEY EQUIPMENT

INSTRUMENT	MODEL	CALIBRATION CHECK	CALIBRATION STANDARD	SPAN SETTING
CONDUCTIVITY METER				
DISSOLVED OXYGEN METER				
pH METER				
COMBUSTIBLE GAS INDICATOR (LEL/O_2)				
FLAME IONIZATION DETECTOR (OVA)				
PHOTOIONIZATION DETECTOR (HNU)				
TOTAL GAS INDICATOR (CO, H_2S)				
OTHER				

OBSERVATIONS _____

_____

13. DID THE SAMPLING TEAM TAKE PERIODIC SURVEYS OF THE AMBIENT AIR CONDITIONS YES NO N/A

14. DID THE SAMPLING TEAM PROVIDE A DECON ZONE DESIGNATING CLEAN AND CONTAMINATED AREAS YES NO N/A

15. WERE PHOTOGRAPHS TAKEN YES NO

16. AUDITOR'S COMMENTS _____

_____

_____

MONITORING WELL SAMPLING SETUP AND EVACUATION

EVACUATION PROCEDURES

1. WELL CASING CONSTRUCTION STAINLESS STEEL TEFLON PVC OTHER _____

2. DIAMETER OF WELL CASING 2" 4" 6" OTHER _____

3. LOCKING CAPS ON THE WELLS YES NO N/A PROTECTIVE CASING YES NO N/A

4. METHOD UTILIZED TO DETERMINE THE STATIC WATER LEVEL WATER LEVEL INDICATOR OTHER _____

5. REFERENCE POINT THAT THE STATIC WATER LEVEL WAS MEASURED FROM:

SURVEY POINT	TOP OF INNER CASING	TOP OF PROTECTIVE CASING	HEIGHT OF CASING ABOVE GROUND SURFACE

6. WAS THE WATER LEVEL INDICATOR DECONTAMINATED ACCORDING TO STANDARD PROCEDURES BETWEEN EACH WELL:

YES NO N/A

IF NO, METHOD UTILIZED: _____

_____

7. EVACUATION METHOD:

BAILER CENTRIFUGAL PUMP PERISTALTIC PUMP BLADDER PUMP SUBMERSIBLE PUMP

GAS DISPLACEMENT PUMP GAS LIFT PUMP OTHER _____

8. TYPE OF HOSE UTILIZED:

POLYETHYLENE (ASTM DRINKING WATER GRADE 2239) TEFLON SILASTIC N/A

OTHER _____

9. WAS THE HOSE DEDICATED TO EACH WELL LOCATION: YES NO N/A

IF NO, METHOD OF DECONTAMINATION _____

10. WAS THE PUMP DEDICATED TO EACH WELL LOCATION: YES NO N/A

11. WAS THE PUMP: LABORATORY DECONTAMINATED FIELD DECONTAMINATED N/A

12. WAS THE PUMP DECONTAMINATED ACCORDING TO STANDARD CERCLA PROCEDURES: YES NO

IF NO, METHOD OF DECONTAMINATION _____

13. WAS THE PUMP HEAD OR END OF HOSE WITHIN 6 FEET OF THE DYNAMIC WATER LEVEL DURING EVACUATION:

YES NO N/A

14. WAS THE DECONTAMINATION AREA LOCATED AWAY FROM THE SOURCE OF CONTAMINATION YES NO N/A

15. AUDITOR'S COMMENTS _____

_____

_____

AQUEOUS SAMPLING PROCEDURES

1. AQUEOUS MATRIX SAMPLED:

POTABLE WELL GROUNDWATER SURFACE WATER LEACHATE RUNOFF STORM SEWER

SANITARY SEWER OTHER: _____

2. TYPE OF SAMPLE: GRAB COMPOSITE IF COMPOSITE, # SAMPLES/COMPOSITE _____

3. WAS THE VOA SAMPLE COLLECTED FIRST: YES NO N/A

4. TYPE OF SAMPLING EQUIPMENT:

	MATERIAL OF CONSTRUCTION			
	STAINLESS STEEL	TEFLON	GLASS	OTHER
BAILER				
BLADDER PUMP				
SAMPLER				
COLIWASA				
KEMMERER DEPTH SAMPLER				
WHEATON DIP SAMPLER				
TUB SAMPLER				
BACON BOMB				

5. TYPE OF LEADER LINE THAT COMES IN CONTACT WITH THE WELL WATER:

TEFLON TEFLON-COATED STAINLESS STEEL N/A OTHER _____

6. LENGTH OF THE LEADER LINE _____

7. WAS THE SAMPLING EQUIPMENT DEDICATED: YES _____ NO _____

8. WAS THE SAMPLING EQUIPMENT: LAB DECONTAMINATED FIELD DECONTAMINATED

9. WAS THE SAMPLING EQUIPMENT DECONTAMINATED ACCORDING TO STANDARD PROCEDURES: YES NO

IF NO, METHOD OF DECONTAMINATION: _____

10. WAS THE DECONTAMINATION AREA LOCATED AWAY FROM THE SOURCE OF CONTAMINATION YES NO N/A

11. *ARE DISPOSABLE GLOVES WORN AND CHANGED BETWEEN EACH SAMPLE LOCATION:* YES NO

12. AUDITOR'S COMMENTS _____

NON-AQUEOUS SAMPLE INFORMATION

1. NON-AQUEOUS MATRIX SAMPLED:

SOIL SEDIMENT SLUDGE CHEMICAL SOLIDS WASTE PILE

OTHER _____

2. TYPE OF SAMPLE: GRAB COMPOSITE IF COMPOSITE, # SAMPLES/COMPOSITE _____

3. WAS THE VOA SAMPLE COLLECTED FIRST FROM A DISCRETE LOCATION PRIOR TO HOMOGENIZATION: YES NO N/A

4. WAS THE SAMPLE HOMOGENIZED PRIOR TO ACQUISTION INTO THE SAMPLE CONTAINERS: YES NO

5. TYPE OF SAMPLING EQUIPMENT:

	MATERIAL OF CONSTRUCTION			
	STAINLESS STEEL	TEFLON	GLASS	OTHER
SPOON/SPATULA	_____	_____	_____	_____
TROWEL/SCOOP	_____	_____	_____	_____
BUCKET AUGER	_____	_____	_____	_____
SPLIT SPOON	_____	_____	_____	_____
SHELBY TUBE	_____	_____	_____	_____
TRIER	_____	_____	_____	_____
PONAR DREDGE	_____	_____	_____	_____

6. WAS THE DRILL RIG, AUGER FLIGHTS, RODS, ETC. DECONTAMINIATED ACCORDING TO STANDARD PROCEDURE BETWEEN EACH SAMPLE LOCATION.

YES NO N/A

IF NO, METHOD OF DECONTAMINATION _____

7. IF MUD ROTARY DRILLING WAS UTILIZED WHAT WAS THE SOURCE OF THE WATER: _____

8. WAS THE SAMPLING EQUIPMENT DEDICATED: YES _____ NO _____

9. WAS THE SAMPLING EQUIPMENT: LAB DECONTAMINATED FIELD DECONTAMINATED

10. WAS THE SAMPLING EQUIPMENT DECONTAMINATED ACCORDING TO STANDARD PROCEDURES: YES NO

IF NO, METHOD OF DECONTAMINATION: _____

11. *WAS THE DECONTAMINATION AREA LOCATED AWAY FROM THE SOURCE OF CONTAMINATION* YES NO N/A

12. ARE DISPOSABLE GLOVES WORN AND CHANGED BETWEEN EACH SAMPLE LOCATION: YES NO

13. AUDITOR'S COMMENTS _____

_____

_____

_____

_____

QA/QC INFORMATION

1. LABORATORIES:

NAME _____ PHONE _____

NAME _____ PHONE _____

CONTACT PERSON _____

CLP CLP CAPABLE CERTIFIED OTHER _____

2. SAMPLE INFORMATION:

MATRIX	PARAMETER	PRESERVATIVE	CONTAINER DESCRIPTION

3. WHAT ORDER, BY ANALYTICAL PARAMETER, ARE SAMPLES COLLECTED: _____

4. FIELD BLANKS: YES NO N/A FREQUENCY _____

METHOD: _____

WAS IDENTICAL BOTTLE TO BOTTLE TRANSFER OF WATER UTILIZED: YES NO

5. TRIP BLANKS: YES NO N/A FREQUENCY _____

6. WHAT WAS THE SOURCE OF THE BLANK WATER: LABORATORY DEMONSTRATED ANALYTE-FREE OTHER _____

7. SAMPLE PACKAGING AND HANDLING:

SAMPLE CONTAINERS LABELED	YES	NO	N/A
COC FORMS COMPLETED	YES	NO	N/A
CUSTODY SEALS	YES	NO	N/A
SAMPLES PERSERVED TO 4°C:	YES	NO	N/A

8. AUDITOR'S COMMENTS

_____

_____

_____

SURFACE WATER AND SEDIMENT SAMPLES		
SAMPLE NUMBER	PARAMETERS	COMMENTS

GROUND WATER AND POTABLE WELL SAMPLES				
SAMPLE NUMBER	EVACUATION TIME	VOLUME PURGED	PARAMETERS	COMMENTS

APPENDIX E

VARIANCE REQUEST SOP AND FORMS

Malcolm Pirnie, Inc.
ARCS II QA Program
Standard Operating Procedure

Procedure MP-PMOQA-009 1/92
Date: July 12, 1993
Revisions No. 1
Revised by: Judith A. Bedard
Approved by: Alan Greenlaw

Title: Procedures for Requesting Modification in the Working Documents of a Remedial Investigation/Feasibility Study (RI/FS).

I. Introduction

Variances may become necessary during the course of field investigations as site conditions dictate. Therefore, modifications of the work plans are required to conduct work efficiently without jeopardizing data quality. The purpose of this SOP is to outline the procedures and documentation required for requesting work plan variances.

II. Methods and Procedures

The general steps in the variance process are as follows:

A. When the need for a modification of a project work plan arises, a Variance Request Form must be completed. This form should contain the date of the request, the document to be revised (with page reference), and a detailed description of necessary changes as well as the rationale supporting the modifications. Variance Request Forms are to be completed and signed by the Site Manager.

B. Completed Variance Request Forms must be forwarded to the USEPA Work Assignment Manager (WAM) for approval. A letter summarizing the proposed changes should accompany the request forms.

C. The WAM will review the request forms either approving or amending the proposal. Revisions made by the WAM to the variance request should be incorporated into the original request form, with updated copies being forwarded to the WAM for documentation purposes.

D. The finalized request form should be appended to the affected document and modifications implemented.

VARIANCE REQUEST FORM
(Example)

Date: January 8, 1991

Document: Field Sampling Plan, July 1991, (p. 5-23)

Activity: Well Development

Requested Modification: Delete well development for monitoring well MW-2S.

Rationale: A Non-Aqueous Phase Liquid (NAPL) has been detected in monitoring well MW-2S. The NAPL contains up to 6 percent PCB. In order to avoid generating waste from well development which may require off-site disposal, it is recommended that MW-2S not be developed or purged prior to sampling.

Malcolm Pirnie Field Operations Leader: _____

Malcolm Pirnie Site Manager: _____

Work Assignment Manager: _____

c: D. Stainken
K. Krishnaswami

VARIANCE REQUEST FORM

Date:

Document:

Activity:

Requested Modification:

Rationale:

Malcolm Pirnie Field Operations Leader: _____

Malcolm Pirnie Site Manager: _____

Work Assignment Manager: _____

c: D. Stainken
K. Krishnaswami