Superfund Records Center
SITE: Centredale Manor
BREAK: 22
OTHER: 18427

Final
Quality Assurance Project Plan

The Centredale Manor Site
North Providence, Rhode Island

Submitted to:
United States Environmental Protection Agency
Region I

Contract No. 68-R1-98-01
IT Project No. 782893

Prepared by:

IT Corporation
88C Elm Street
Hopkinton, MA 01748

July 14, 1999

SDMS DocID 18427

QAPP Distribution List

Name/Title	Address
Ted Bazenas, USEPA On-Scene Coordinator	USEPA Region I JFK Federal Building Boston, MA 02203-2211
Renata Wynnyk, Technical Assistance	Weston START 217 Middlesex Turnpike Burlington, MA 01803
Management Action Team	See Approval Sheet
Mike Blodgett, Response Manager	IT Corporation 88C Elm St., Hopkinton, MA 01748
Mike Quinlan, QA Officer	IT Corporation 88C Elm St., Hopkinton, MA 01748
Andy Schkuta, Project Chemist	IT Corporation 88C Elm St., Hopkinton, MA 01748
Robert Hrabak, Primary Laboratory	Quanterra, Inc. 880 Riverside Parkway West Sacramento, CA 95605
Mike Larkins, QA Laboratory	Paradigm Analytical Laboratories, Inc. 2627 Northchase Laboratories, Inc. Wilmington, NC 28405
Data Validator *	**Environmental Data Services, Inc.** **5 South State Street** **Concord, NH**

*** Meridian Science & Technology, Inc. of Annapolis, MD may also be used for Data Validation.**

QAPP APPROVAL

CENTREDALE MANOR SITE

Taylor Treat IT, Deputy Program Manager	Date	Ted Bazenas USEPA Region I, On-Scene Coordinator	Date
Mike Quinlan IT, Quality Assurance Officer	Date	Andy Beliveau USEPA Region I, QA Chemist	Date
Mayor A. Ralph Mollis Town of North Providence Co-Chairman, Management Action Team	Date	Richard Boynton USEPA Region I Co-Chairman Management Action Team	Date
Senator John A. Celona District 36 – North Providence Management Action Team	Date	Geri Guardino Deputy Chief of Staff Governor of Rhode Island Management Action Team	Date
Louise House ATSDR, Region I Management Action Team	Date	Robert Vanderslice, Ph.D Rhode Island Department of Health Management Action Team	Date
Eugina S. Marks, Director for Policy Audubon Society of Rhode Island Management Action Team	Date	Mayor William R. Macera City of Johnston Management Action Team	Date
Terrence Gray, Chief Office of Waste Management RI Department of Environmental Management	Date		

TABLE OF CONTENTS

GLOSSARY OF ACRONYMS ..... 3 PAGES

1.0 INTRODUCTION ..... 1 PAGES

2.0 PROJECT /TASK ORGANIZATION ..... 4 PAGES

2.1 COMMUNICATION PATHWAYS 1
2.2 MODIFICATIONS TO APPROVED QAPP 1
2.3 PERSONNEL RESPONSIBILITIES & QUALIFICATIONS 1
2.4 TRAINING & CERTIFICATIONS 2

3.0 PROJECT PLANNING/PROBLEM DEFINITION ..... 8 PAGES

3.1 PROJECT PLANNING 1
3.2 SITE BACKGROUND & PROBLEM DEFINITION 1
3.2.1 Site Background 1
3.2.2 Previous Investigations 2
3.3 PROJECT OBJECTIVES 3

4.0 PROJECT/TASK DESCRIPTION AND SCHEDULE ..... 6 PAGES

4.1 PROJECT OVERVIEW 1
4.1.1 Identification of Measurement Parameters 1
4.1.2 Action Levels 2
4.1.3 Sampling & Analytical Method Requirements 2
4.2 SCHEDULE 6

5.0 PROJECT QUALITY OBJECTIVES & CRITERIA FOR MEASUREMENT DATA.. ..... 3 PAGES

5.1 MEASUREMENT PERFORMANCE CRITERIA 2

6.0 SAMPLING PROCESS DESIGN ..... 2 PAGES

6.1 GRID SAMPLING 1
6.2 JUDGEMENTAL SAMPLING 1
6.3 NUMBER OF SAMPLES 2

7.0 SAMPLING PROCEDURES ..... 5 PAGES

7.1 SAMPLE COLLECTION PROCEDURES 1
7.1.1 Health and Safety Monitoring 2
7.1.2 Containerized Waste Sampling 2
7.1.2.1 Containerized Liquid Wastes 2
7.1.2.1 Containerized Solids and Semi-Solids 2
7.1.3 Surface Soil Sampling 3
7.1.4 Subsurface Soil Sampling (Geoprobe) 3
7.1.5 Rinse Water Sampling 3

7.1.6 Wipe Sampling 4
7.2 EQUIPMENT DECONTAMINATION 4
7.3 FIELD EQUIPMENT CALIBRATION & MAINTENANCE 5

8.0 SAMPLE HANDLING AND CUSTODY REQUIREMENTS ..... 9 PAGES

8.1 SAMPLE DOCUMENTATION 1
8.1.1 Sample Numbering 1
8.1.2 Sample Labels 1
8.1.3 Custody Seals 2
8.1.4 Field Sampling Logbooks 2
8.1.5 Chain-Of-Custody Records 3
8.2 SAMPLE CONTAINERS, PRESERVATION AND HOLDING TIMES 4
8.3 SAMPLE PACKAGING AND SHIPMENT 6

9.0 FIELD ANALYTICAL METHOD REQUIREMENTS ..... 2 PAGES

9.1 FIELD SCREENING 1
9.1.1 Hazardous Categorization Testing 1
9.1.2 Real-Time Portable Organic Vapor Analyzers 2
9.2 INSTRUMENT CALIBRATION AND FREQUENCY 2
9.3 FIELD ANALYTICAL INSPECTION AND REQUIREMENTS FOR SUPPLIES 2

10.0 FIXED LABORATORY ANALYTICAL METHODS REQUIREMENTS ..... 4 PAGES

10.1 ANALYTICAL METHODS 1
10.2 DETECTION LIMITS 1
10.3 CORRECTIVE ACTION REPORT 3
10.4 CORRECTIVE ACTION SYSTEM 3
10.5 INSTRUMENT CALIBRATION AND FREQUENCY 4

11.0 QUALITY CONTROL REQUIREMENTS ..... 2 PAGES

11.1 QC REQUIREMENTS FOR FIELD SAMPLING 1
11.2 QC REQUIREMENTS FOR DEFINITIVE DATA ANALYTICAL METHODS 2

12.0 DATA ACQUISITION REQUIREMENTS (NON-DIRECT MEASUREMENTS) ..... 1 PAGE

13.0 DOCUMENTATION, RECORDS AND DATA MANAGEMENT ..... 8 PAGES

13.1 DOCUMENTATION AND RECORDS 1
13.1.1 Information Included in the Reporting Packages 1
13.1.2 Field Operation Records 1
13.1.3 Laboratory Records 1
13.1.3.1 IT Minimum Deliverables Package 2
13.1.3.2 IT Standard Deliverables Package 2
13.1.3.3 IT Maximum Deliverables Package 2
13.2 DATA MANAGEMENT 6

13.2.1 Data Reduction 6
13.2.1.1 Field Instrumentation Data Reduction 6
13.2.1.2 Laboratory Data Reduction 6
13.2.2 Laboratory Data Validation 7
13.2.3 Project Data Review 7
13.2.3.1 Field Instrumentation Validation 7
13.2.3.2 Laboratory Data Validation 7
13.2.4 Data Reporting 8
13.3 DATA TRACKING AND CONTROL 8
13.3.1 Data Tracking 8
13.3.2 Data Storage and Archive 8

14.0 ASSESSMENTS AND RESPONSE ACTIONS ..... 4 PAGES

14.1 TECHNICAL SYSTEMS AUDITS 1
14.1.1 Field Sampling TSA 1
14.1.2 Field Analytical TSA 1
14.1.3 Laboratory TSA 1
14.1.4 Performance Evaluation Sample Tracking and Analysis 1
14.1.5 Split Sample Audit 2
14.1.6 Data Validation TSA 2
14.2 CORRECTIVE ACTIONS 3

15.0 QUALITY ASSURANCE REPORT TO MANAGEMENT ..... 1 PAGE

16.0 VERIFICATION AND VALIDATION REQUIREMENTS ..... 2 PAGES

16.1 DATA REVIEW BY PROJECT CHEMIST 1
16.2 EPA TIERED VAILIDATION APPROACH 1
16.2.1 Tier I Requirement 2
16.2.2 Tier II Requirement 2
16.2.3 Tier III Requirement 2

17.0 VERIFICATION AND VALIDATION PROCEDURES ..... 4 PAGES

17.1 INTERNAL VERIFICATION 1
17.1.1 Sampling and Field Analytical Data 1
17.1.2 Laboratory Data 1
17.2 EXTERNAL VERIFICATION 1
17.2.1 Sampling and Field Analytical Data 1
17.2.2 Laboratory Data 1
17.3 VALIDATION OF FINAL RESULTS 2

18.0 DATA USABILITY/RECONCILIATION WITH PROJECT QUALITY OBJECTIVES ..... 3 PAGES

18.1 ASSESSMENT OF DATA QUALITY INDICATORS 1
18.1.1 Precision Assessment 1
18.1.2 Overall Accuracy 1

18.1.3 Sample Representativeness 2
18.1.4 Overall Sensitivity 2
18.1.5 Overall Completeness 2
18.1.6 Overall Comparability 2
18.2 RECONCILIATION WITH INTENDED DATA USERS 3

APPENDIX A **Project Planning Documentation**
APPENDIX B **Laboratory Standard Operating Procedures**
APPENDIX C **Laboratory Quality Assurance Management Plan**
APPENDIX D **Additional Information Regarding Dioxin Methods**
APPENDIX E **Method Specific Reporting Limits and QC Acceptance Criteria**

LIST OF TABLES

Table 4-1 Contaminants of Concern and Other Targeted Compounds 4-1
Table 4-2 Summary of Sampling Requirements 4-3

Table 5-1 Project DQO Process 5-1
Table 5-2 Measurement Performance Criteria 5-2

Table 7-1 Field Sampling & Monitoring SOPs 7-1
Table 7-2 Equipment Decontamination Procedures 7-3

Table 8-1 Sample Containers, Preservatives and Hold Times 8-5

Table 9-1 HazCat Screening Summary 9-1

Table 10-1 Analytical Procedures 10-1
Table 10-2 Reporting Limits for Method 8280A and 8290 10-2

Table 11-1 Field Quality Control 11-1
Table 11-2 Accuracy and Precision QC Acceptance Criteria for Methods 8280A and 8290 11-2

Table 13-1 Field Data Records Included With Deliverable Package 13-1
Table 13-2 Laboratory Data Deliverable Package Requirements 13-3
Table 13-3 Reporting Parameters for Direct Reading Field Instruments 13-6

LIST OF FIGURES

Figure 2-1 QA/QC Organization Chart 2-3
Figure 2-2 Placement, Authority and Duties of Quality Assurance and Quality Control Personnel 2-4
Figure 2-3 QAPP Revision Form 2-5
Figure 2-4 QAPP Revision Tracking Log 2-6

Figure 3-1 Site Location Map 3-4
Figure 3-2 Area of Concern 3-5
Figure 3-3 Specific Area of Concern 3-6
Figure 3-4 Grid Location Map 3-7
Figure 3-5 Location of Soil Samples (Previous Investigation) 3-8

Figure 8-1 Drum Log 8-8
Figure 8-2 Chain-of-Custody Record 8-9

Figure 14-1 Corrective Action Request Form 14-3
Figure 14-2 Corrective Action Request Tracking Log 14-4

Figure 17-1 Data Evaluation/Verification Checklist 17-3

GLOSSARY OF ACRONYMS

%R	-	Percent Recovery
AA	-	Atomic Absorption
APO	-	EPA Alternate Project Officer
ARAR	-	Applicable Relevant and Appropriate Requirements
ASTM	-	American Society of Testing and Materials
ATSDR	-	Agency for Toxic Substances and Disease Registry
BDL	-	Below Detection Limit
BFB	-	Bromofluorobenzene
CAR	-	Corrective Action Request
CCC	-	Calibration Check Compound
CERCLA	-	Comprehensive Environmental Response, Compensation and Liability Act
CFR	-	Code of Federal Regulations
CO	-	EPA Contracting Officer
COC	-	Chain of Custody
COE	-	Corps of Engineers
CPR	-	Cardio Pulmonary Resuscitation
CS	-	EPA Contract Specialist
CVA	-	Cold Vapor Atomic Absorption
CWA	-	Clean Water Act
DCM	-	Dichloromethane
DFTPP	-	Decafluorotriphenylphosphine
DO	-	Delivery Order
DPM	-	Deputy Program Manager
DQA	-	Data Quality Assessment
DQI	-	Data Quality Indicator
DQO	-	Data Quality Objective
ECD	-	Electron Capture Detector
EPA	-	United States Environmental Protection Agency
EPA-NE QAPP COMPENDIUM	-	Region I, EPA-New England Compendium of Quality Assurance Project Plan Guidance, Draft Final September 1998
EPA-QA/G4	-	Guidance For The Data Quality Objectives Process, EPA QA/G-4
ERRS I	-	Emergency and Rapid Response Services Region I
ERT	-	Emergency Response Team
FID	-	Flame Ionization Detector
FLAA	-	Flame Atomic Absorption

GLOSSARY OF ACRONYMS

GC	-	Gas Chromatograph
GFAA	-	Graphite Furnace Atomic Absorption Spectroscopy
HASP	-	Health and Safety Plan
HazCat	-	Hazardous Categorization
HAZWOPER	-	Hazardous Waste Operations and Emergency Response
HPLC	-	High Performance Liquid Chromatography
ICP	-	Inductively Coupled Plasma
ICP-MS	-	Inductively Coupled Plasma Mass Spectroscopy
ICPES	-	Inductively Coupled Plasma Emission Spectroscopy
ICS	-	Interference Check Sample
ID	-	Identification
IS	-	Internal Standard
IT	-	IT Corporation
I TEF	-	International Toxic Equivalency Factor
LCS	-	Laboratory Control Sample
LEL	-	Lower Explosion Limit
LFB	-	Laboratory Fortified Blank
LIMS	-	Laboratory Information Management System
MDL	-	Method Detection Limit
mg/kg	-	Milligrams per Kilogram
mg/L	-	Milligrams per Liter
MIS	-	Management Information Systems
MS	-	Matrix Spike
MSD	-	Matrix Spike Duplicate
MW CMPDS	-	Molecular Weight Compounds
NCP	-	National Contingency Plan
ng/kg	-	Nanograms per Kilogram
ng/L	-	Nanograms per Liter
NIST	-	National Institute of Standards and Technology
NPL	-	National Priorities List
OPA	-	Oil Pollution Act of 1990
OSC	-	EPA On Scene Coordinator
PAH	-	Polynuclear Aromatic Hydrocarbons
PBMS	-	Performance Based Measurement System
PCB	-	Polychlorinated Biphenyls
PCDD	-	Polychlorinated Dibenzo-p-Dioxin
PCDF	-	Polychlorinated Dibenzofurans
PE	-	Performance Evaluation

GLOSSARY OF ACRONYMS

PID	-	Photoionization Detector
PM	-	Program Manager
PO	-	EPA Project Officer
ppb	-	Parts per Billion
ppm	-	Parts per Million
ppmv	-	Parts per Million by Volume
PQL	-	Practical Quantitation Limit
PQO	-	Project Quality Objective
QA/QC	-	Quality Assurance/Quality Control
QAPP	-	Quality Assurance Project Plan
QL	-	Quantitation Limit
QAMP	-	Quality Assurance Management Plan
RCA	-	Recommendations for Corrective Acction
RF	-	Response Factor
RFQ	-	Request For Quotation
RIDOH	-	Rhode Island Department of Health
RL	-	Reporting Limit
RM	-	Response Manager
RPD	-	Relative Percent Difference
RSD	-	Relative Standard Deviation
SARA	-	Superfund Amendments and Reauthorization Act of 1986
SDG	-	Sample Delivery Group
SOP	-	Standard Operating Procedure
SPCC	-	System Performance Check Compound
START	-	Superfund Technical Assessment and Response Team
SVOC	-	Semi Volatile Organic Compounds
T&D	-	Transportation and Disposal
TAT	-	Turn Around Time
TCDD	-	Tetrachlorinated Dibenzo-p-Dioxin
TCLP	-	Toxic Characteristic Leaching Procedure
The Manor	-	The Centredale Manor Residential Building
TSA	-	Technical Systems Audit
ug/L	-	Micrograms per Liter
USACE	-	United States Army Corps of Engineers
USGS	-	United States Geological Survey
VOC	-	Volatile Organic Compound
WP	-	**Work Plan**

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was developed by IT Corporation (IT) in support of Task Order 18 under the United States Environmental Protection Agency's (EPA's) Emergency and Rapid Response Services Region I (ERRS I) contract (No. 68-R1-98-01). Task Order 18 outlines the work to be conducted at the Centredale Manor Site located in North Providence, Rhode Island. This document is designed to ensure that all data generated under this project are of known quality and suitable for their intended use. A project-specific Work Plan **(WP)** has also been developed **that describes** IT's general approach to the project, resources to be utilized, and projected schedule.

This project-specific QAPP has been prepared in support of the Draft Final IT ERRS I Program QAPP dated April, 1999 (ERRS I QAPP). The Program QAPP was prepared in accordance with the Region I, EPA-New England Compendium of Quality Assurance Project Plan Guidance, Draft Final, September 1998 (EPA-NE QAPP Compendium), and more specifically, Attachment A of the EPA-NE QAPP Compendium, the Region I, EPA-New England Quality Assurance Project Plan Manual, Draft Final, September 1998 (EPA-NE QAPP Manual). The Program QAPP is a generic document **providing basic** QA/QC guidance document for all projects under the ERRS I contract. This project-specific QAPP contains all the elements **of** the Program QAPP, but does not duplicate the generic information (including copies of IT Standard Operating Procedures) contained therein.

2.0 PROJECT /TASK ORGANIZATION

IT will furnish the necessary personnel, materials, equipment, services and facilities to perform the work specified in Task Order 18 under contract 68-R1-98-01. IT will provide a team of fully trained personnel to ensure that work is conducted in accordance with the technical direction outlined in Task Order 18 and as provided by the EPA On-Scene Coordinator (OSC). The team will include a response manager, and a multi-disciplinary technical staff (engineers, chemists, geologists, toxicologists, technicians), skilled tradesmen, and administrative support personnel. Figure 2-1 illustrates the IT QA/QC organization.

2.1 COMMUNICATION PATHWAYS

IT's Deputy Program Manager will serve as the single point of contact for coordination with the EPA Contracting Officer (CO), Contract Specialist (CS), Project Officer (PO), or Alternate Project Officer (APO).

IT's Response Manager (RM) will be responsible for maintaining communication and coordination with the OSC including reporting any and all problems encountered in executing cleanup activities. All project personnel will notify the RM of schedule changes, data deficiencies, and corrective actions for which they have lead responsibility.

2.2 MODIFICATIONS TO APPROVED QAPP

Modifications to this QAPP will be accomplished using a form that can be signed off on by the EPA OSC in the field. The QAPP Revision Form will be used to document the necessary change to the approved QAPP and will include pertinent information, such as the date of revision and the section of the QAPP that the revision will supersede. A log of all revisions will be maintained at the project site. Refer to figure 2-4.

2.3 PERSONNEL RESPONSIBILITIES & QUALIFICATIONS

The key IT personnel involved in the execution of project QA/QC include:

- QA Officer (Michael Quinlan)
- Response Manager (Michael Blodgett)
- Transportation and Disposal Coordinator (Barry Taggart)
- Project Chemist (Andy Schkuta)
- **Project Hydrogeologist (Steve McGinn)**
- Sampling (Cleanup) Technicians (TBD)

Figure 2-2 depicts the associated responsibility matrix. The laboratory project manager and QA Officer will also play an important role in project QA. Additional information regarding personnel responsibilities is provided in the ERRS I QAPP. Resumes and training records for key personnel are on-file at IT's Hopkinton, Massachusetts office. Personnel assigned to this project will be qualified in accordance with contract specifications.

2.4 TRAINING & CERTIFICATIONS

IT personnel performing specific tasks or functions related to data collection and data quality shall have the requisite education, training and/or experience to perform their job. Special training will be conducted by the EPA's Emergency Response Team (ERT) on their (Scribe®) database software system. Scribe® will be used to generate labels and COCs, and to track samples. Specific training may also be provided by the EPA QA Division for validation of the dioxin data that will be generated during this project. Region I has developed new dioxin validation guidelines that will be used for these data.

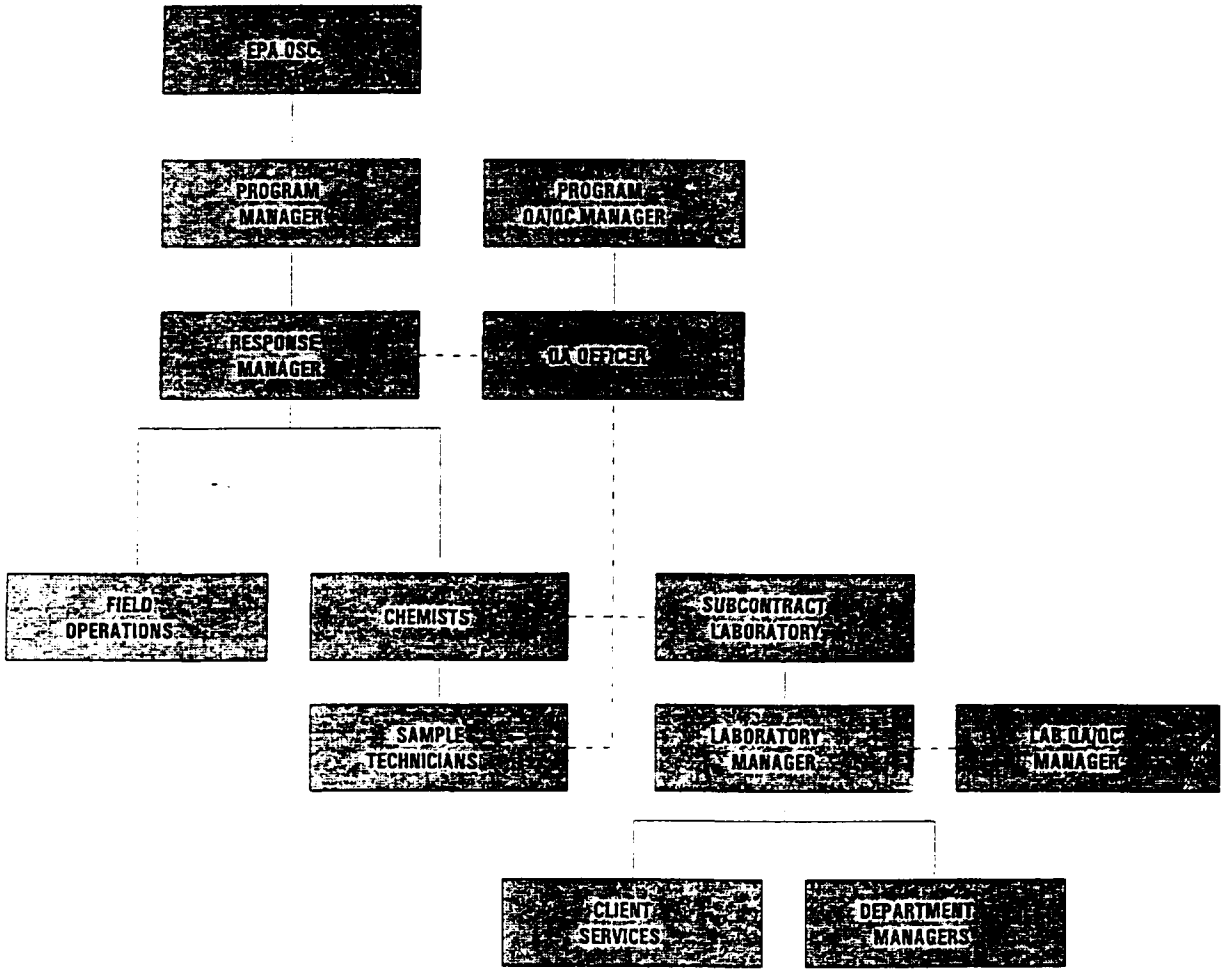


Figure 2-1 QA/QC Organization Chart

Notes:

1) **Operations personnel include T&D Coordinators, foremen, laborers and equipment operators.**
2) **Solid lines indicate reporting and dashed lines indicate communication.**

Position	Authority	Duties
Quality Assurance Manager (Peter Hunter)	• Develop, maintain, and enforce quality management system	• Identify, develop and provide oversight for company-wide QA/QC training • Corporate QA/QC Policies/Procedures • Coordinates assimilation of regulatory requirements • Project QA/QC Support
Program Manager (Ken Kukkonen) or Deputy Program Manager (Taylor Treat)	• Administer and manage all delivery orders • Subcontractor selection/evaluation • Approve payables for materials, equipment, and subcontractors • Stop unsafe operations • Approve invoices • Approve and issue project baseline schedule and budget	• Prepare, review and approve QAPP • Monitor and control project cost, schedule, and quality • Perform project per contract requirements • Understand/enforce regulatory requirements • Oversee procurement of subcontractors • Perform as IT Team Chief representative
Response Manager (Mike Blodgett)	• Stop work not in compliance with QAPP or Work Plan • Take immediate corrective action when performance is not acceptable	• Perform project per contract requirements • Oversight of day to day operations • Point of contact with OSC
Quality Assurance Officer (Michael Quinlan)	• Conduct audits for Field and Laboratories • Approve/disapprove all Field and Lab Operations • Immediately stop Field and Lab Operations which are not in compliance with QAPP • Communicate project personnel regarding matters of data validation and other data issues	• Monitor/audit all laboratory operations to ensure compliance with QAPP procedures • Review all projects/field and laboratory data • Ensure that adequate QA documentation is provided • Ensure that QA problems are resolved in an expeditious manner and identified to RM and Program Manager • Develops quality assurance plan and inspection system (QAPP) • Update regulatory requirements to perform quality assessments
Project Chemist (Andrew Schkuta)	• Stop work not in compliance with QAPP • Conduct routine field audits • Oversight of all sampling activities • Approve changes in QAPP requirements	• Maintain communication with laboratory • Ensures all field sampling is performed • Implements QA documentation procedures • Implements all corrective action required • Assist in the writing of the QAPP

Figure 2-2 Placement, Authority and Duties of Quality Assurance and Quality Control Personnel

Figure 2.3
QAPP Revision Form
Centredale Manor Site
IT Project 782893

Date: _____ Revision #: _____

Revision to Project Specific QAPP: _____

_____

_____

_____

_____

QAPP Requirement being superseded: _____

_____

_____

_____

_____

Original QAPP Section/Paragraph/Table: _____

Justification/Reason for Revision: _____

_____

_____

_____

_____

Requested by (Print Name): _____
Andrew Schkuta (Project Chemist)

Approved by: _____
Ted Bazenas (EPA – OSC)

Figure 2.4
QAPP Revision Tracking Log

Revision #	QAPP Section Superseded	Date Implemented	Date Approved

3.0 PROJECT PLANNING/PROBLEM DEFINITION

3.1 PROJECT PLANNING

IT conducted an on-site survey in order to gain sufficient familiarity with the Task Order statement of work. A detailed **site specific WP** has been prepared to ensure that the project is completed in the most effective, efficient, and safe manner. The **WP is based on** the project objectives and **describes the** tasks, types and **number** of cleanup personnel, equipment, and materials that **will** be needed. **The** proposed project schedule **includes all proposed tasks.**

Project scoping meetings were held on **the 17th and 25th of May 1999** to discuss project objectives, approach and schedule. Scoping meeting attendance sheets and notes are provided in Appendix A to this QAPP. In general, the Case Team for this project consists of the following individuals:

- EPA On-Scene Coordinator (Ted Bazenas)
- EPA QA Chemist (Andy Belliveau)
- IT **RM** (Michael Blodgett)
- **IT Technical Lead (Steve McGinn)**
- IT QA Officer (Michael Quinlan)
- IT Project Chemist (Andy Schkuta)
- IT T&D Coordinator (Barry Taggart)
- START Health & Safety (TBD)
- START Technical Lead (Renata Wynnyk)
- START QA - (George Mavris)
- Primary Laboratory (Quanterra) Project Manager (**Robert Hrabak**)
- **QA Laboratory (Paradigm) Project Manager (Mike Larkins)**
- **Data Validator (Environmental Data Services, Inc.) (Doug Weaver)**

3.2 SITE BACKGROUND & PROBLEM DEFINITION

3.2.1 Site Background

The Centredale Manor site is located in North Providence, Rhode Island just south of Route 44 on the eastern bank of the Woonasquatucket River (Figure 3.1). The site is currently occupied by two high rise residential buildings. Brookside Village **is** on the northern part of the property and Centredale Manor (the Manor) **is located** to the south (Figure 3.3). The site was previously occupied by a chemical company located in the area of Brookside Village and a drum reclamation company formerly located in the vicinity of Brookside Village and Centredale

Manor. Much of the property is currently covered by roadways, parking lots, and the two residential buildings. On the eastern portion of this property is a drainage swale that begins in the northern section of the property, extends south behind the Manor building, then curves to the west and discharges into a wooded wetland south of the Manor and eventually into the Woonasquatucket River. Allendale Pond is located several hundred yards south of the site and was formed by the Allendale dam **which is** located **approximately ½ mile** downstream of the site (Figure 3.2). The middle section of the wooden dam is breached and in need of repair.

The primary **contaminant of concern** at the site is dioxin in soil and sediments, however, buried drums **are also** present at the site. The presence of the dioxin is assumed to be the result, in part, of a fire that took place in 1971, destroying the chemical and drum reclamation facilities located on the property. Buried drums are also assumed to be from one or both of these facilities. Aerial photographs from the 1950's and 1960's indicate the presence of drums stored throughout the property.

3.2.2 Previous Investigations

Dioxin was first discovered in fish and eel taken from the Woonasquatucket River. The term "Dioxin" is commonly used to refer to 2,3,7,8-Tetrachlordibenzo-p-dioxin (2,3,7,8-TCDD) which is a bio-accumulator and a potent toxin that has been linked to human pathology. However, dioxins are a family of polychlorinated dibenzodioxin (PCDD) compounds of which 2,3,7,8-TCDD is the most toxic. Related compounds that are closely associated with dioxins in structure and biological activity are the furans or polychlorinated dibenzofurans (PCDFs). Each of the PCDD and PCDF congeners has been assigned an International Toxicity Equivalency Factor (I TEF) relating to 2,3,7,8-TCDD. Most of the PCDD and PCDFs are ten to more than a thousand times less biologically active than 2,3,7,8-TCDD which is given an ITEF of 1.

A study conducted by the USEPA (July, 1998), found elevated concentrations of dioxin in **Woonasquatucket River** sediments. As a result, USEPA Region I conducted soil and sediment sampling on and around the Centredale Manor property in September, 1998. **The sampling** results indicate the presence of dioxin at concentrations above **the action level of** 1 part per billion (ppb) in some areas. Additional samples were collected from around the Manor, **and off site at** the Lee Ramano ballfield, and the Boys and Girls Club. This sampling confirmed the presence of dioxin at concentrations up to 14 ppb on the southern portion of the property, including the drainage swale and in the wooded area south of the Manor.

Since the public has access to some of these areas, Region I made it a priority to further define the extent of dioxin contamination at the site. Another sampling event was conducted by the EPA in February 1999. Surface samples were collected on a grid across the property between Route 44 and Allendale Pond (see Figures 3.4 and 3.5). The grid spacing varied based on the findings of the previous investigations. A 50-foot square grid was **established** in the area of Brook Village, Centredale Manor and the drainage swale to the east. A 100-foot square grid was

established in the area of the drainage area south of Centredale Manor. A transect was established along the western bank of the River and samples were collected at 100 foot intervals along this transect. Judgemental samples were also collected as follows:

- 2 samples from sandy, depositional areas upriver from the site to verify that the contamination is not from an upriver source,
- 3 samples from previous sample locations to verify past results,
- 5 residential sampling locations identified by the Agency for Toxic Substances and Disease Registry (ATSDR) and the Rhode Island Department of Health (RIDOH), and
- 3 locations chosen based on information provided to Region I from the public concern hotline.

The validated results of the February, 1999 investigation were not available at the time this QAPP was prepared, however, the results will be used as the basis for further investigation **as directed by the OSC**.

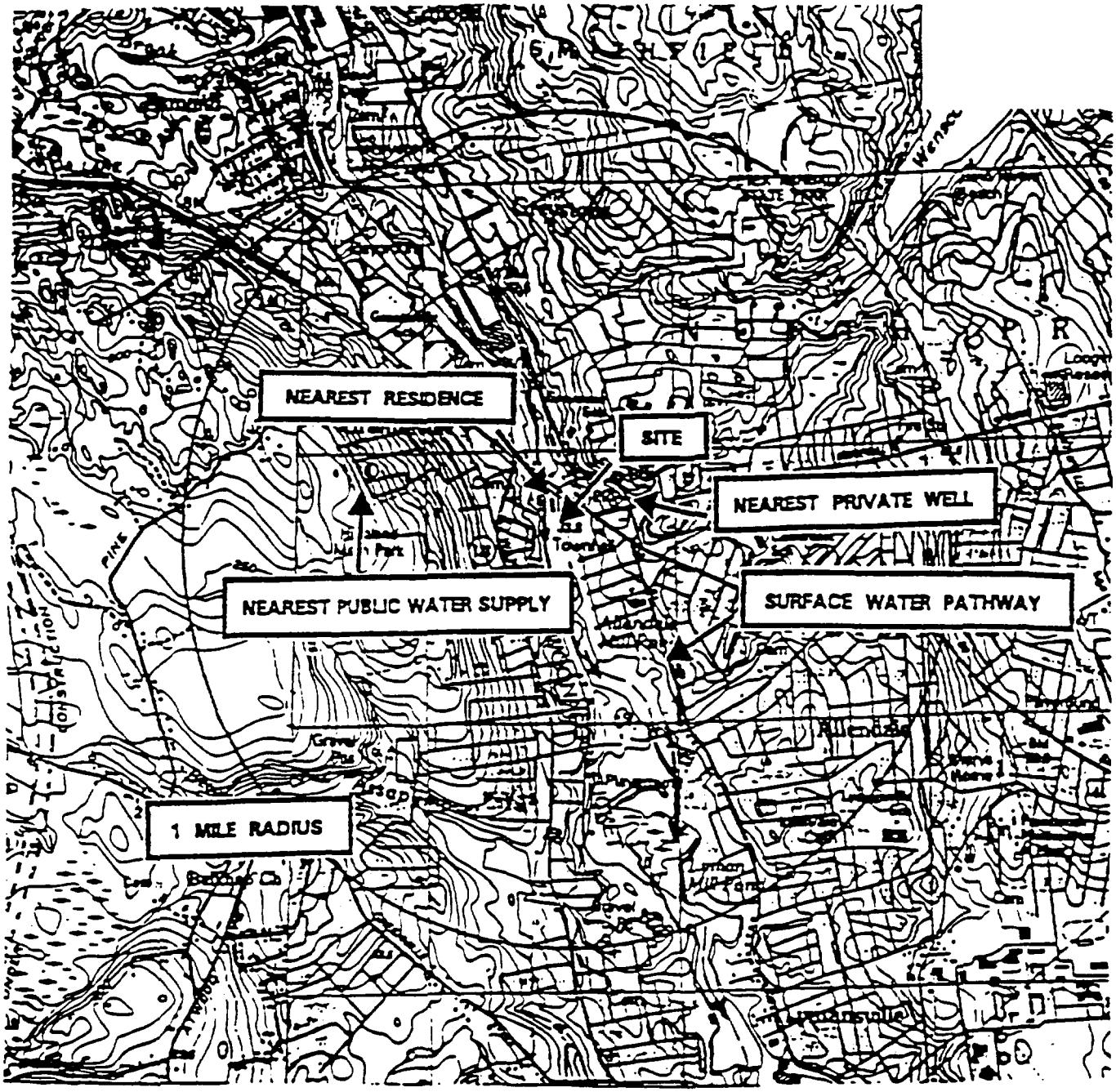
A geophysical survey was also conducted in February 1999 to **assess the presence and extent of subsurface debris**. The results of the survey indicate the presence of large metallic anomalies in the southern section of the parking lot located to the west of Centredale Manor. The anomalies which may be indicative of buried drums or construction debris.

3.3 PROJECT OBJECTIVES

The objectives for this project are summarized in the following bullets:

- Investigate, characterize, remove and dispose of any buried drums and associated contaminated soil,
- Further delineate the **vertical** extent of dioxin contamination at the Centredale Manor site,
- Assess the presence of other organic and/or inorganic contaminants in areas impacted by dioxin,
- Assess the presence of dioxin in surface soils on residential properties surrounding Allendale Pond,
- Assess the presence and extent of dioxin contamination at Allendale Dam,
- Address dioxin hotspots through excavation, capping or restricting access to these areas (i.e. fence installation).

The sampling and analysis approach and quality control procedures described in this QAPP will ensure the collection of data of known quality to meet the objectives summarized above.



BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15' MINUTE U.S.G.S. QUADRANGLE(S):
PROVIDENCE, R.I. 1987 - 1:25,000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

QUADRANGLE LOCATION

FIGURE 3-1
SITE LOCATION MAP
CENTREDALE MANOR
PROVIDENCE R.I.
FEBRUARY 1999

U.S. ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-002
W.O. #03347-143-001-3428-01

N

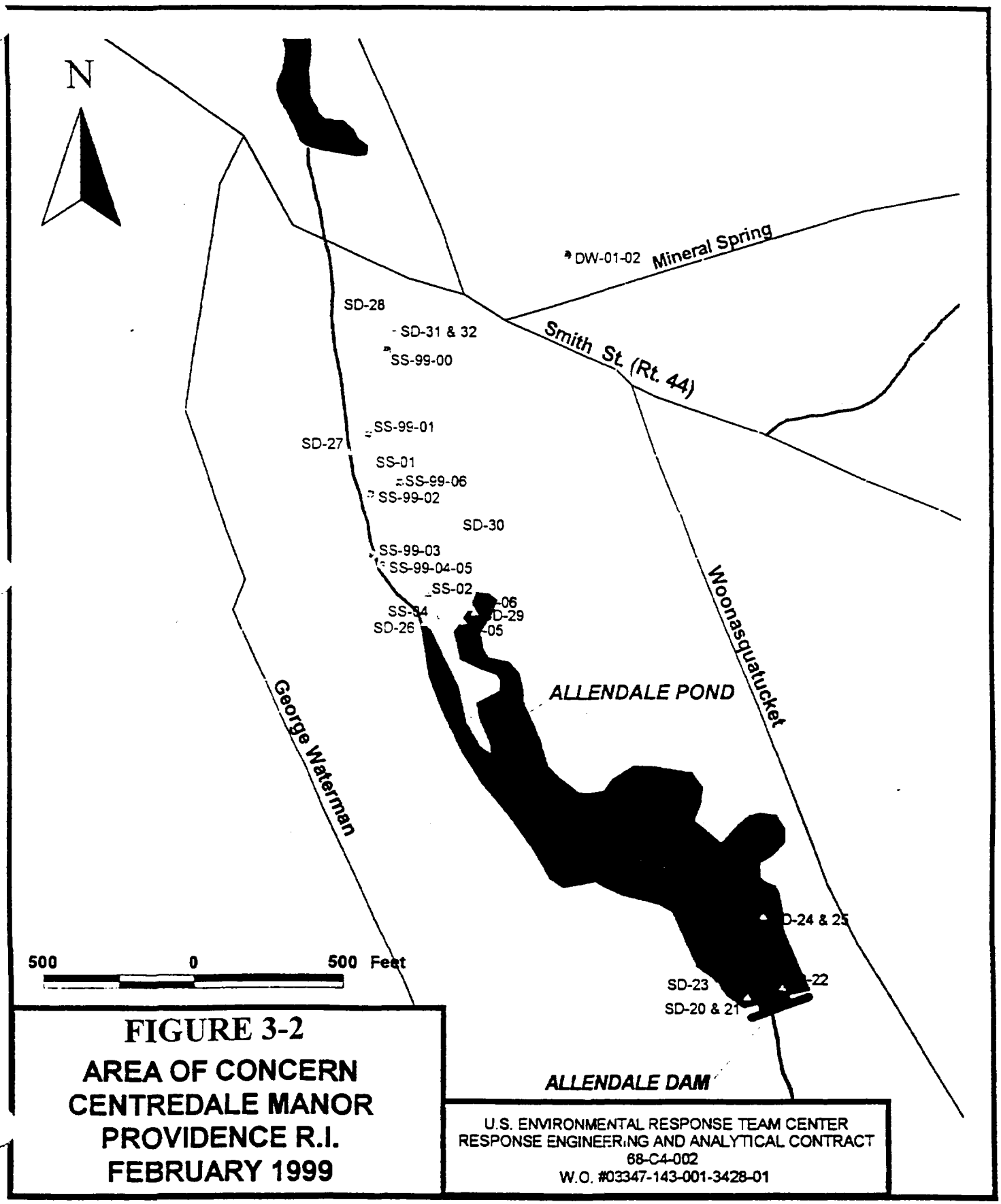
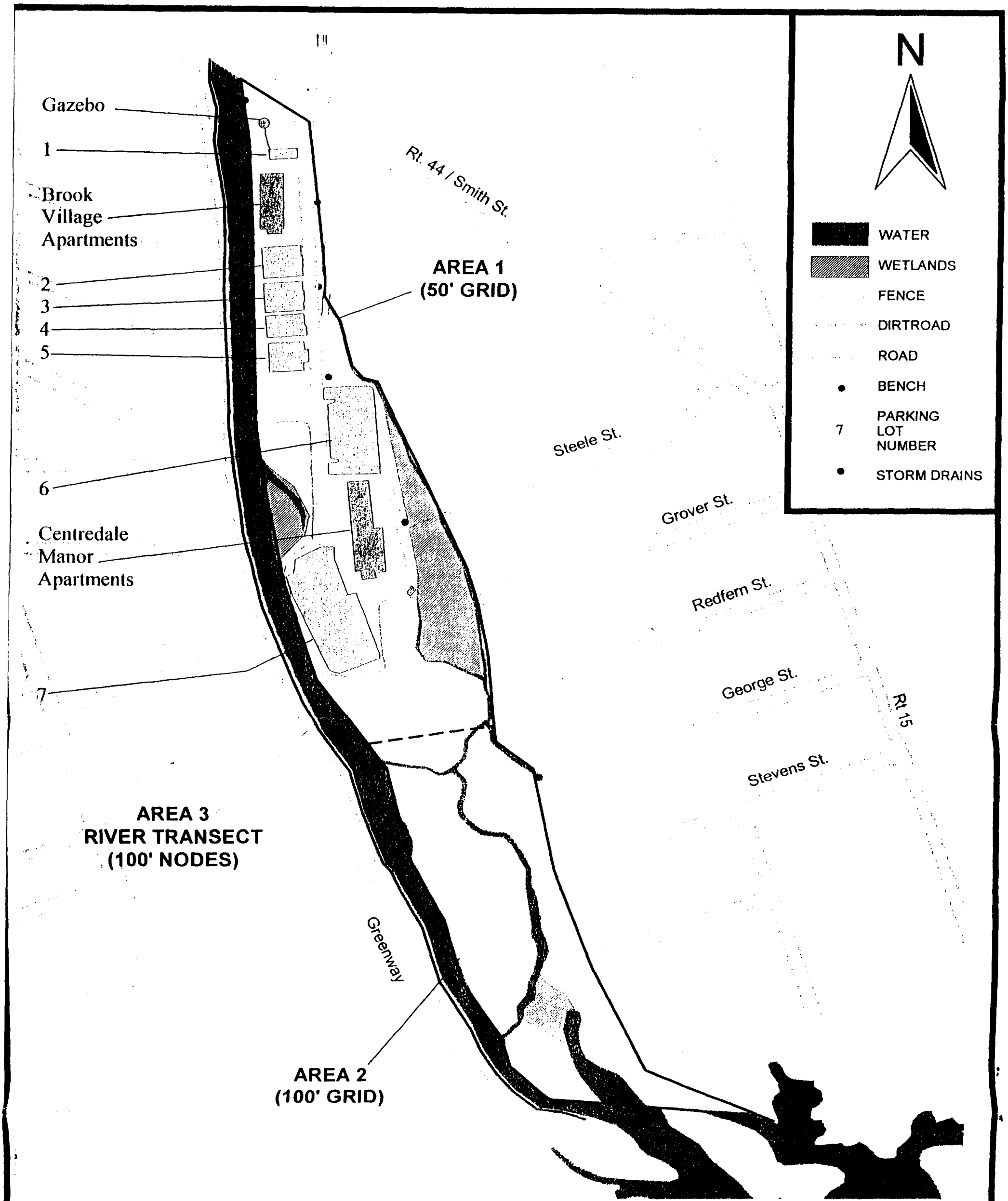


FIGURE 3-2

AREA OF CONCERN
CENTREDALE MANOR
PROVIDENCE R.I.
FEBRUARY 1999

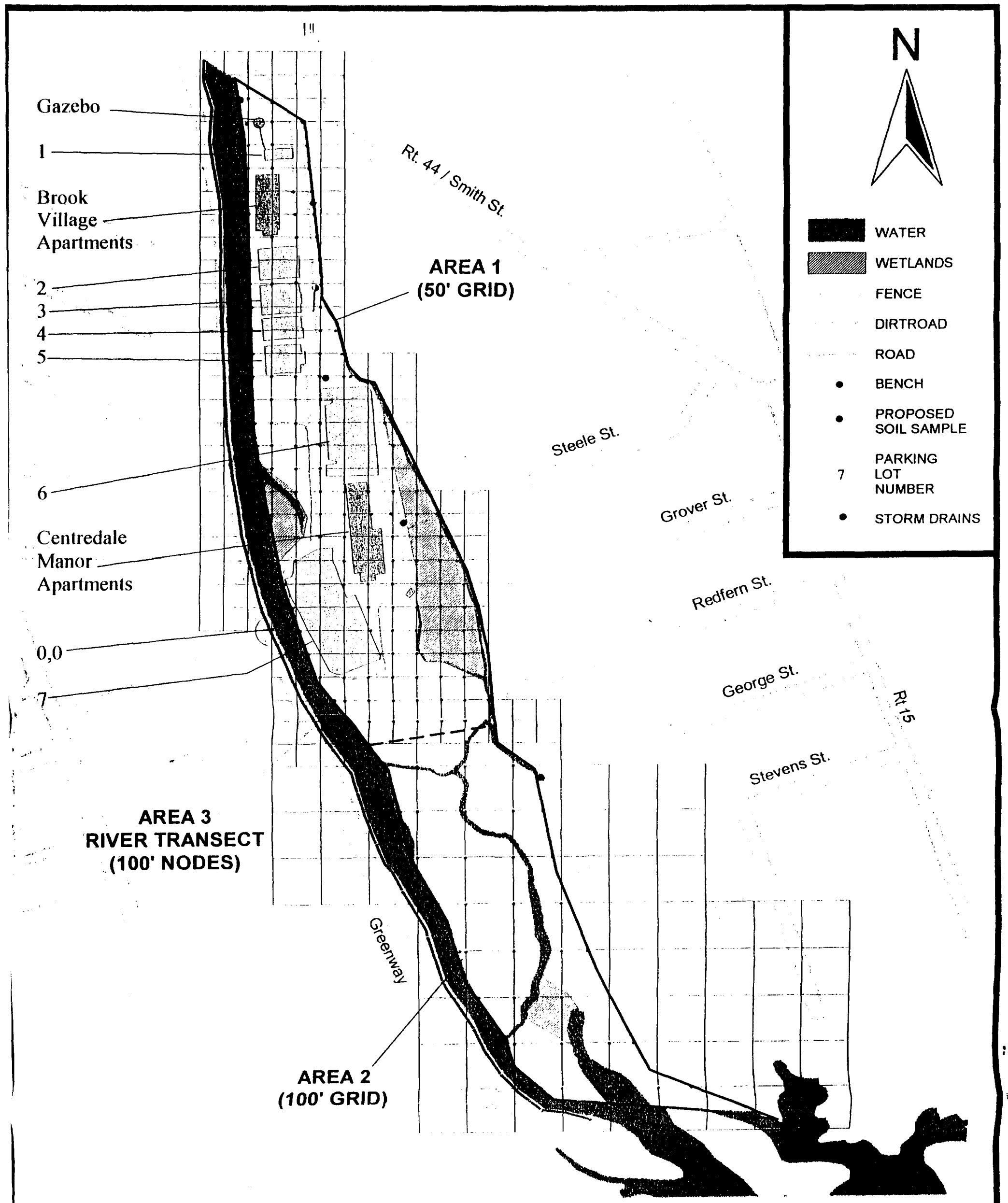
U.S. ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-002
W.O. #03347-143-001-3428-01



U.S. ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-002
W.O. #03347-143-001-3428-01

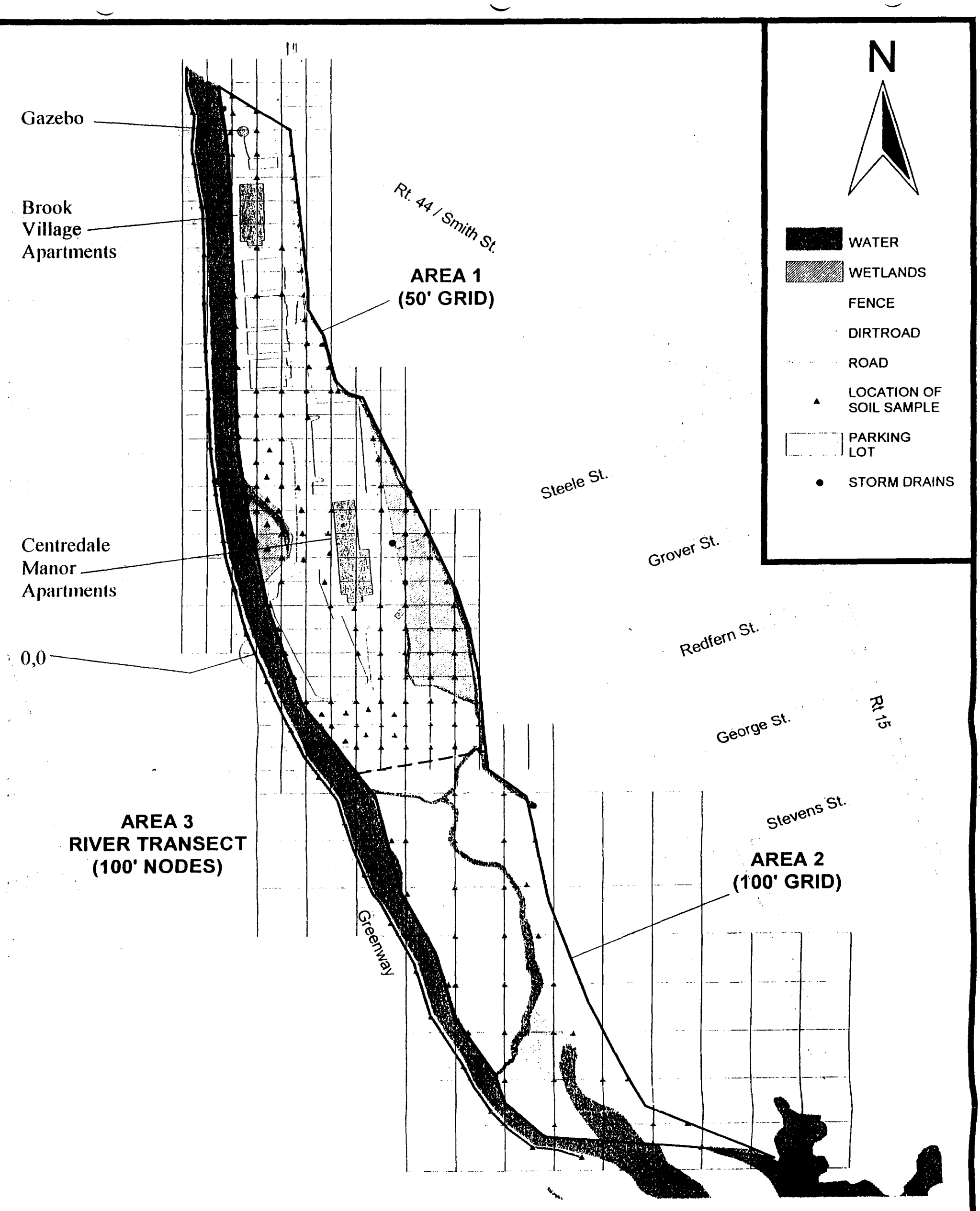
FIGURE 3-3

SPECIFIC AREAS OF CONCERN
CENTREDALE MANOR SITE
PROVIDENCE R.I.
FEBRUARY 1999



U.S. ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-002
W.O. #03347-143-001-3428-01

FIGURE 3-4
GRID LOCATION MAP
CENTREDALE MANOR SITE
PROVIDENCE R.I.
FEBRUARY 1999



U.S. ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-002
W.O. #03347-143-001-3428-01

FIGURE 3-5
LOCATION OF SOIL SAMPLES
CENTREDALE MANOR SITE
PROVIDENCE R.I.
MARCH 1999

4.0 PROJECT/TASK DESCRIPTION AND SCHEDULE

This section provides a project overview based on the project scoping activities and **also includes** a brief discussion of the anticipated schedule.

4.1 PROJECT OVERVIEW

Based on **discussions held during** the scoping meetings, IT and the EPA reached agreement **concerning the project objectives** (Refer to the objectives listed in Section 3.3). Specific questions that will need to be answered and decisions that will need to be made during the course of the project are summarized in the following bullets:

- Are buried drums present at the site? If so, what impact, if any, have these drums had on the surrounding soils? What is the nature and extent of contamination? What are the disposal options if contamination is encountered?
- Is dioxin contamination present at depth where previous results indicate surface contamination?
- What other contaminants are present in areas of dioxin contamination and how do these contaminants impact cleanup and disposal decisions?
- Are dioxins present on the property of local residences surrounding Allendale Pond? If so, do the concentrations and locations of contamination warrant remediation?
- What is the best method of addressing dioxin hotspot contamination?

4.1.1 Identification of Measurement Parameters

Selection of sample analytes has been based on site observations, previous site data, historical site usage, and anticipated disposal requirements. The contaminants of concern and other target analytes (or set of analytes) are summarized in Table 4-1. The table also provides the rationale for the selection of each parameter and the analytical methodology to be used.

Table 4-1 Contaminant of Concern and Other Targeted Analytes

Targeted Analytes	Analytical Method	Rationale for Selection of Analytes & Method
Dioxins	EPA SW-846 8290	Dioxins present based on previous site data; 8290 chosen over 1613B to be consistent with past investigations at the site and because the spiking procedures used for 8290 allow for better monitoring of cleanup procedures common for soil samples.
2,3,7,8-TCDD	EPA SW-846 **8280**	Parameter appropriate based on previous site data

Table 4-1 Contaminant of Concern and Other Targeted Analytes		
Targeted Analytes	**Analytical Method**	**Rationale for Selection of Analytes & Method**
		(i.e. 2,3,7,8-TCDD comprises 90-95% of the Dioxin TEQ). Method allows for quicker TAT in order to maintain an aggressive project schedule.
Full TAL Inorganics/ TCL Organics analyses	EPA SW-846 6010/7XXX, 8260, 8270, 8081, 8082, 8151	Analyses selected based on need to assess the presence of other contaminants at the site. SW-846 methods selected over CLP due to potential subcontract laboratory considerations. Also may be necessary to use these methods to help characterize waste for disposal .
Full TCLP	SW-846 methods on TCLP extract	Parameters necessary to characterize material for disposal.
TSS, TOC	EPA Methods 160.1 & 9060	Characterize liquid rinse water for disposal.

4.1.2 Action Levels

The "action level" for dioxin in site soil and sediment which **will** trigger further investigation is 1 ppb. There is currently no established action level for dioxin that will automatically trigger excavation or capping of contaminated soils. **Locations with dioxin concentrations above the** 1 ppb guideline **may** be **remediated** or **have** some type of engineering controls **installed** to minimize public exposure.

The Rhode Island General Laws - Rules and Regulations for the Investigation and Remediation of Hazardous Waste Sites - Sections 8.02 through 8.03 and 8.07 provides guidance on the remediation of non-dioxin contaminated soils and sediments.

The TCLP Regulatory Limits specified in 40 CFR 261.24 and the Universal Treatment Standards specified in 40 CFR 268, provide guidance for disposal of contaminated waste. Exclusion permit discharge limits under the National Pollutant Discharge Elimination System will be considered if it becomes necessary to treat and discharge rinse waters to the river. However, due to the small volume of investigation/remediation derived liquids anticipated, IT plans to dispose of rinse waters off site.

4.1.3 Sampling & Analytical Method Requirements

Table 4-2 provides an estimate on the number of field and QC samples to be collected during the course of the project. Sample quantities and analytical methods were discussed during the initial scoping meeting.

Table 4-2 – Summary of Sampling Requirements

Sampling Activity	Sample Matrix	Parameter	Analytical Method	Est. Sample Qty.	# of Dups	# of MS/ MSD Pairs	# of Equip. Blanks	# of Trip Blanks	# of PEs	# of Splits	Total # Samples	TAT[2] (days)
1) Surface Delineation (residential locations)	Soil/ Sediment	Dioxins[1]	EPA 8290	26	2	2	2	0	2	2	36	20
2) Delineation at depth (existing grid locations > 1ppb & during Remediation)	Soil/ Sediment	2,3,7,8-TCDD	SW-846 8280	300	15	15	15	0	15	15	375	5 or 10
	Soil/ Sediment	TAL Metals	SW-846 6010/7000	35	2	2	2	0	2	0	43	5 or 10
	Soil/ Sediment	Cyanide	EPA 9012	35	2	2	2	0	2	0	43	5 or 10
	Soil/ Sediment	TCL Volatiles	SW-846 8260	35	2	2	2	8	2	0	43	5 or 10
	Soil/ Sediment	TCL Semi volatiles	SW-846 8270	35	2	2	2	0	2	0	43	5 or 10
	Soil/ Sediment	TCL Pesticides	SW-846 8081	35	2	2	2	0	2	0	43	5 or 10
	Soil/ Sediment	PCBs	SW-846 8082	35	2	2	2	0	2	0	43	5 or 10
	Soil/ Sediment	Herbicides	SW-846 8150	35	2	2	2	0	2	0	43	5 or 10
3) Drum Delineation Area	Soil	2,3,7,8-TCDD	SW-846 8280	125	7	7	7	0	7	7	160	5 or 10
	Soil	PCBs	SW-846 8082	125	7	7	7	0	7	0	153	5 or 10
4) Drum Content/Remediated Soil	Solid or Liquid or	2,3,7,8-TCDD	SW-846 8280	15	0	0	0	0	0	1	154	5 or 10
	Solid or Liquid	TCLP Metals	1311 6010/7000	15	0	0	0	0	0	0	15	5 or 10

Table 4-2 – Summary of Sampling Requirements

Sampling Activity	Sample Matrix	Parameter	Analytical Method	Est. Sample Qty.	# of Dups	# of MS/ MSD Pairs	# of Equip. Blanks	# of Trip Blanks	# of PEs	# of Splits	Total # Samples	TAT[2] (days)
	Solid or Liquid	TCLP Organics	1311 8260/ 8270/ 8081/8150	15	0	0	0	0	0	0	15	5 or 10
	Solid or Liquid	Ignitability	EPA 1010	15	0	0	0	0	0	0	15	5 or 10
	Solid or Liquid	Reactivity	EPA 7.3.3.2/ 7.3.4.2	15	0	0	0	0	0	0	15	5 or 10
	Solid or Liquid	Corrosivity	EPA 9045	15	0	0	0	0	0	0	15	5 or 10
5) Confirmation Sampling	Soil/ Sediment	Dioxins	EPA 8290	30	2	2	2	0	2	0	38	20
6) Delineation at Allendale Dam	Sediment	Dioxins	EPA 8290	13	1	1	1	0	1	0	17	20
	Sediment	RCRA Metals	SW-846 6010/7000	13	1	1	1	0	1	0	17	20
	Sediment	Pesticides	SW-846 8081	13	1	1	1	0	1	0	17	20
	Sediment	PCBs	SW-846 8082	13	1	1	1	0	1	0	17	20
	Sediment	PCBs congeners	EPA 1668	4	0	0	0	0	0	0	4	20
	Sediment	PAHs	SW-846 8270B	13	1	1	1	0	1	0	17	20
7) Equipment Wipes	**Wipes**	**2,3,7,8-TCDD**	**SW-846 8280**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**5 or 10**

Table 4-2 – Summary of Sampling Requirements

Sampling Activity	Sample Matrix	Parameter	Analytical Method	Est. Sample Qty.	# of Dups	# of MS/ MSD Pairs	# of Equip. Blanks	# of Trip Blanks	# of PEs	# of Splits	Total # Samples	TAT[2] (days)
8) Investigative Derived Waste	Rinse water	2,3,7,8-TCDD	SW-846 8280	5	0	0	0	0	0	0	5	5 or 10
	Rinse water	TAL metals	SW-846 6010/7000	5	0	0	0	0	0	0	5	5 or 10
	Rinse water	TCL Volatiles	SW-846 8260	5	0	0	0	0	0	0	5	5 or 10
	Rinse water	TCL Semi volatiles	SW-846 8270B	5	0	0	0	0	0	0	5	5 or 10
	Rinse water	PCBs	SW-846 8082	5	0	0	0	0	0	0	5	5 or 10
	Rinse water	TOC	EPA 9060	5	0	0	0	0	0	0	5	5 or 10
	Rinse water	TSS	EPA 160.1	5	0	0	0	0	0	0	5	5 or 10

[1] Dioxin refers to polychlorinated dibenzo-dioxins and polychlorinated dibenzo-furans.

[2] Turnaround time is measured in business days from the time of sample receipt. Hardcopy packages will be due in 10 days for 5 day TAT items, 15 days for 10 day TAT items, and 20 days for 20 day TAT items. TATs may vary based on field conditions as well as schedule and cost considerations

4.2 SCHEDULE

The schedule for **all tasks** is provided in the **WP**. The schedule shows that investigative activities will **begin** in the area of suspected buried drums. Work will continue in this area in a stepwise approach until it is determined that the buried material does not constitute a threat to human health and the environment, or until drums and associated material are properly disposed of off-site. Investigative activities will be conducted concurrently throughout the rest of the site and at the residences surrounding Allendale Pond. **Sampling of** investigative borings in the Allendale Dam **area** is a non-critical-path task. Hotspots will be addressed **following** review of the validated data.

Rapid turnaround of analytical results will be required for samples collected at grid locations on and adjacent to the property where Brookside and the Manor are located. Maintaining an aggressive schedule in these areas is desireable in order to identify hotspots that may require remediation and disposal of wastes. Refer to Table 4-2 for a summary of scheduled turnaround times (TATs). Field screening will be utilized to the extent possible to help in non-critical decision making.

5.0 PROJECT QUALITY OBJECTIVES & CRITERIA FOR MEASUREMENT DATA

Data will be used **during the** project decision-making processes to address the project objectives identified in Section 3.3. Table 5-1 summarizes the data quality objective process followed by IT in development of this QAPP.

Table 5-1 Project Data Quality Objective Process

Problem Identification	Decision Statement	Data Type Needed	Data Acquisition Method	Level of Confidence Needed
1) Determine presence & extent of contamination in area of suspected buried drums	Are there signs of contamination?	Screening	Organic vapor monitoring during Geoprobe activities	Low
	Is 2,3,7,8-TCDD (above 1 ppb) and PCBs present in the surrounding soils?	Definitive	Collect samples for off site analysis	High
2) Characterize drum contents	Are drum contents hazardous?	Screening	HazCat Testing	Low
	Are contaminated soils hazardous?	Definitive	Collect samples for TCLP & totals analysis per disposal facility	Low
3) Delineate nature and extent of contamination at previous sample locations above 1 ppb dioxin.	Is 2,3,7,8-TCDD present above 1ppb at depth?	Definitive	Collect samples for off site analysis.	High
	Are other organic or inorganic contaminants present at concentrations above state cleanup criteria?	Definitive	Collect samples for off site analyses of TAL metals and TCL Organics	High
4) Assess the presence of dioxin at residences around Allendale Pond	Are dioxins present at concentrations above 1 ppb in surface soils?	Definitive	Collect samples for off site analysis	High
5) Determine when removal of hotspot contamination is complete?	Are dioxins present in the excavation above 1 ppb?	Definitive	Collect samples from excavation bottom and sidewalls for dioxin analyses	High
6) Characterize contaminated soils for disposal	Are contaminated soils hazardous?	Definitive	Collect samples for TCLP & totals analysis per disposal facility	Low

Table 5-1 Project Data Quality Objective Process				
Problem Identification	**Decision Statement**	**Data Type Needed**	**Data Acquisition Method**	**Level of Confidence Needed**
7) Determine presence and nature of contamination in area of Allendale Dam	Are contaminants present in the sediments that would impact the dam reclamation work?	Definitive	Collect sample for metals and organics, including dioxin	High

The data requiring a "high" level of confidence will be validated in accordance with EPA Region I Validation Guidelines and will be assessed to determine if the Method Performance Criteria is met. Data not requiring a high level ("low") of confidence (i.e. waste characterization) will not require validation.

5.1 MEASUREMENT PERFORMANCE CRITERIA

Data Quality Indicators (DQIs) are used to monitor and assure measurement performance criteria are adequate for the intended use of the data. Typical DQIs assessed consist of precision, accuracy, representativeness, completeness, comparability and sensitivity. Quality control (QC) checks and samples will be utilized to isolate different sources of error throughout the measurement system, including contamination, poor precision, poor accuracy/bias, and poor sensitivity. Table 5-2 provides some general measurement performance criteria for specific DQIs. Laboratory-specific precision and accuracy criteria for each method being used on this project is contained in, or attached to, specific laboratory SOPs. Laboratory SOPs are included as Appendix B to this QAPP. **Specific precision and accuracy acceptance criteria for methods 8280 and 8290 have been provided in Section 11 for easy reference. The Laboratory QA Management Plan in Appendix C discusses the necessary corrective actions to be taken for out of control measurements.**

Table 5-2 Measurement Performance Criteria			
Matrix	**DQIs**	**Measurement Performance Criteria**	**QC Sample/or activity used to assess Measurement Performance**
Soil/Sediments	Overall Precision	50% for analytes detected above PQL	Field duplicates
Soil/Sediments	Lab Precision	Refer to Laboratory specific limits	Matrix Spike/ Matrix Spike Duplicates
Soil/Sediments	Accuracy/bias	Refer to Laboratory specific limits	Matrix Spike/ Matrix Spike Duplicates
Soil/Sediments	Accuracy/bias	No false negatives, no false positive, quantitation w/in warning limits (+/- 2	Single Blind PE Sample

Table 5-2 Measurement Performance Criteria			
Matrix	**DQIs**	**Measurement Performance Criteria**	**QC Sample/or activity used to assess Measurement Performance**
		Std. Dev.)	
Soil/Sediments	Accuracy/bias-contamination	No target compounds above PQL	Equipment Blanks, Trip Blanks, Method Blanks, Instrument Blanks
Soil/Sediments	Completeness	90% Overall	Data Completeness check
Soil/Sediments	Comparability	50% for results above PQL	Evaluate split sample results

6.0 SAMPLING PROCESS DESIGN

This section describes the sampling designs that will be used on this project and the rationale **for each**.

6.1 GRID SAMPLING

Sampling will be conducted on the square grid **established** to assess dioxin contamination in surface soil at the site by EPA in February 1999. The grid was originally located based on a randomly selected starting coordinate. The grid spacing varied based on the findings of previous investigations. A 50-foot square grid was **established** in the area of Brook Village, Centredale Manor and the drainage swale to the east. A 100-foot square grid was **established** in the area of the drainage area south of the Manor. A transect was established along the western bank of the River and samples were collected at 100-foot intervals along this transect. See Section 3.2.2 and associated Figures 3.4 and 3.5.

IT will collect continuous soil samples to groundwater at previous grid sample locations where dioxin was present at concentrations above 1 ppb. The samples will be collected at 1 foot depth intervals to assess the vertical extent of contamination.

In the area of the suspected buried drums IT **may, at the direction of the OSC,** tighten the square grid to a 25-foot spacing. Continuous sampling in this area will also be performed at 1 foot depth intervals.

6.2 JUDGEMENTAL SAMPLING

Judgemental sampling will be conducted at the residences surrounding Allendale Pond. The locations will be biased to depositional areas within the flood plain due to the increased probability that dioxin has migrated to these areas as a result of flooding. Judgemental samples will also be collected during test pitting activities in the **buried drum area** and will be biased toward visually contaminated soils. Judgemental samples may also be collected during Geoprobing in this area based on the **screening results and** geophysical survey **results**. The borings conducted in the area of the Allendale Dam will be located based on the USACE letter dated 2 April 1999, which is included in Appendix A for reference purposes.

6.3 NUMBER OF SAMPLES

The number of samples required for this project has been **established** for IT by the EPA and is based primarily on previous site data. The number of samples required to characterize a waste for disposal is dependent on the amount of waste to be characterized, the homogeneity of the waste, and specific requirements of the disposal facility. The number of confirmation samples needed will depend **on** the size of the excavation, but in general, a minimum of one sample will be collected from the excavation bottom and **from each of the** sidewalls.

7.0 SAMPLING PROCEDURES

This section provides a listing of IT Field Sampling SOPs, which will be followed by IT personnel on this project to ensure that representative samples are collected in a consistent manner. Equipment decontamination and field instrumentation calibration procedures are also briefly discussed.

7.1 SAMPLE COLLECTION PROCEDURES

This subsection briefly describes the procedures that will be used to collect samples during this project. Table 7-1 provides a listing of the IT Field Sampling Standard Operating Procedures (SOPs) that will be used for guidance during sample collection activities. The IT Sampling SOPs were developed in accordance with EPA guidance for collection of samples. Copies of these SOPs are attached to the ERRS I QAPP and will be on site during sampling for reference purposes.

Table 7-1 Field Sampling & Monitoring SOPs

SOP Reference	Title
QP-601	Soil Sampling with Hollow Stem Auger (1)
QP-607	Tank Sampling
QP-608	Drum Sampling
QP-609	Surface Soil Sampling (1)
QP-610	Sample Preservation and Holding Times
QP-613	Pile Sampling (1)
QP-617	Split Spoon Sampler (1)
QP-626	Pond/Tank Sampler
QP-627	Portable Organic Vapor Analyzer (1)
QP-628	Augers
QP-629	Photoionization Detector (1)
QP-632	**Wipe Sampling**
QP-636	**Hand Corer**
QP-670	Using The Disposable EnCore Sampler

(1) Note that the use of the Encore Sampler for sampling of volatiles in soil supersedes the requirements of the other soil sampling SOPs. In addition, surface soils will be collected from a depth of 0-2" in accordance with ATSDR requirements.

Matrices to be sampled on this project can be classified as either environmental (e.g. soils and sediments) or non-environmental (e.g. drums, waste materials). The drum sampling SOP has a very specific protocol for the identification and handling of drums that potentially contain (1) biohazards, (2) explosive or shock sensitive wastes, (3) radioactive waste, (4) lab packs, or (5) air reactive wastes.

7.1.1 Health and Safety Monitoring

Airborne emissions of potential site contaminants will be monitored to ensure the health and safety of IT personnel, subcontractors and area residents. Continuous dust monitoring will be required during excavation activities. Organic vapor and explosive atmosphere monitoring will be conducted during test pitting and or excavation of buried drums. Monitoring will be performed in accordance with **Section 5.2 of** the site-specific Health and Safety Plan (HASP).

7.1.2 Containerized Waste Sampling

Sampling of containerized waste (drums) will occur only after the container has been evaluated from a health and safety standpoint. Refer to IT SOP QP-608. Container labels and any other available records will be reviewed prior to opening. Closed containers which appear bulged or under pressure will be remotely opened. Initial container condition and physical waste descriptions will be recorded by the IT Sampling (Cleanup) Technicians and the container will be assigned a unique identification number.

7.1.2.1 Containerized Liquid Wastes

Liquids in a drum will be sampled using 4-foot sections of glass tubing or pipette (8 to 12 mm ID). Larger containers such as tanks (storing rinsewater) may be sampled using a bailer, bacon bomb, or a long-handled dip sampler. Drum samples will be obtained by slowly lowering the pipette into the drum until contact is made with the drum bottom. The sampler then places his/her thumb over the end of the pipette and retrieves it. Any liquid or sludge layering in the container should be apparent as the tube is brought up. The contents of the tube are then released into an 8-ounce sample bottle. This process is repeated until sufficient sample has been collected. Sludge or soil beneath the liquid layer may be sampled by forcing the pipette into it. If the sludge does not drain into the jar, shaking the pipette or tapping it against the side of the bottle may loosen the sample.

7.1.2.2 Containerized Solids and Semi-Solids

Solid and semi-solid wastes in a container will be sampled using a disposable inert sample scoop, when practicable. The sample will then be transferred to an 8-ounce wide mouth sample container. Wood borers are an alternate method that may be used for solid sample collection.

7.1.3 Surface Soil Sampling

Surface soil samples will usually be collected from a depth of 0-2 inches (per ATSDR) using a hand auger or stainless steel scoop or trowel. EnCore disposable samplers will be used to collect and store samples for VOC analysis. Any debris or vegetation will be removed prior to sample collection. Typically, the soil within a 1-foot by 1-foot area will be collected to a depth of 2 inches. A larger area may be sampled if additional sample material is required for analysis.

Post-excavation soil samples are typically collected from the excavation sidewalls and bottom after removal of contaminated soil. Samples for volatiles analysis will be collected using an EnCore sampler. Samples for non-VOC analysis will be thoroughly mixed using a stainless steel bowl.

7.1.4 Subsurface Soil/**Sediment** Sampling

Subsurface soil/**sediment** samples will be collected by hand augering or using a Geoprobe® depending on the sample location. IT SOPs QP-601 and QP-617 will be used to guide subsurface soil sampling. In general, hand augering will be conducted in wetland areas. **A sediment hand corer will be used at locations where there is standing water. Hand coring will be conducted in accordance with SOP QP-636.** The Geoprobe® will be used to conduct the borings at the grid locations located on the parking lots and grassy areas around Brookside Village and the Manor.

Soil samples will be collected continuously at 1-foot intervals until groundwater is encountered. Samples for lithologic description and chemical analyses will be collected by driving a 24 or 48 inch steel sampler, equipped with a dedicated polyethylene liner and catcher tip. The sampler will **then be retrieved** and the insert will be cut into 1 foot sections. Samples for volatiles analysis will be collected using an EnCore sampler. Once the VOC sample is collected, the remaining soil will be emptied into a stainless steel bowl and thoroughly homogenized before **placing in the sample**.

7.1.5 Rinse Water Sampling

Rinsed waters generated during site activities will be stored in a holding tank and sampled for disposal purposes. Grab sampling directly from a valve or sample port on the holding tank is the preferred method of sample collection. If this is not feasible, or phased contents are discovered in the holding tank, sampling will occur using a stainless steel bacon bomb sampler or chemically inert bottom filling bailer.

7.1.6 Wipe Sampling

Wipe samples will be collected from the surfaces of heavy equipment used for remediation work at the site. The samples will be collected and analyzed prior to the equipment

leaving the site to verify that the equipment has been properly decontaminated for 2,3,7,8-TCDD. Wipe sampling will be conducted in accordance with SOP QP-632.

7.2 EQUIPMENT DECONTAMINATION

All reusable sampling equipment (hand augers, spoons, stainless steel mixing bowls, etc.) will be decontaminated before sampling commences, between each discreet sample location, and prior to leaving the site. The procedures for decontamination of equipment are described in IT SOP QP-602, "Decontamination Procedures". A summary of the required decontamination procedures from SOP QP-602 is presented in Table 7-2. **Note that due to waste disposal considerations, a methanol rinse will not be used during the equipment decontamination procedure.**

Table 7-2 Equipment Decontamination Procedures

Analytes	Detergent Wash	Tap Water Rinse	Acid Rinse	Tap Water Rinse	Solvent Rinse[1]	Analyte Free Water Rinse	Air Dry
VOA Low MW Compounds[2]	✓				**Hexane**	✓	✓
BNA, Dioxin PEST/ PCBs High MW Compounds[2]	✓				Hexane	✓	✓
Organic Bases[3]	✓		1% Dilute Acid	✓	Isopropyl Alcohol	✓	✓
Organic Acids[4]	✓	Dilute Base			Isopropyl Alcohol	✓	✓
Trace Metals	✓	✓	10% Solution	✓		✓	✓
Salts	✓	✓				✓	✓
Acidic Compounds	✓	Dilute Base				✓	✓
Basic Compounds	✓	✓	1% Dilute Acid	✓		✓	✓
Caustic	✓	✓				✓	✓

[1] Solvent rinses vary in polarity, which leads to varying solubilizing properties. In deciding appropriate solvent rinses

Table 7-2 Equipment Decontamination Procedures

Analytes	Detergent Wash	Tap Water Rinse	Acid Rinse	Tap Water Rinse	Solvent Rinse[1]	Analyte Free Water Rinse	Air Dry

one should first identify whether a known or suspect contaminant requires removal from sampling equipment. Optimum solvents for contaminants are noted above. Secondly, one should identify potential impact on the subsequent analytical protocol by an impurity or by the solvent being used. For instance, residual acetone present in isopropyl alcohol would be measured with certain volatile organics analysis.
[2] MW CMPDS = molecular weight compounds
[3] Organic bases include Amines, Hydrazines.
[4] Organic acids include Phenols, Thiols, Nitro and Sulfonic compounds.

Disposable sampling equipment will be used whenever practical to minimize the need for decontamination.

7.3 FIELD EQUIPMENT CALIBRATION & MAINTENANCE

IT typically rents monitoring equipment and instrumentation for project work. Field equipment required for this project include a photoionization detector (PID), Lower Explosive Limit (LEL)/oxygen (O_2) meter, and a dust monitor. Instruction manuals will be provided by the rental company and will be followed with regards to daily calibration and maintenance. IT will receive paperwork from the rental company specifying that the instrumentation has been completely cleaned, calibrated and tested prior to being sent to the project site. Upon receipt of the instrumentation IT performs a check on the instrumentation to ensure that it is received in good working order and that all the parts listed on the packing slip were in fact sent with the instrument. Extras of critical parts or items are generally requested in case of a problem in the field (i.e. extra PID lamp for Hnu detector). Additional calibration information for field instrumentation is provided in Section 9.0 of the ERRS I QAPP and in SOP QP-629 (PID).

8.0 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

This Section provides project-specific requirements for sample handling and custody. Additional details are provided in the ERRS I QAPP.

8.1 SAMPLE DOCUMENTATION

IT SOPs QP-605 and associated SOPs (included in the ERRS I QAPP) will serve as guidance for sample documentation activities. It is necessary for the sampling crew to maintain daily field notes. Items that must be included are sampling protocol, and any changes to the procedures, meetings, instructions, safety precautions, personal protection, and activities pertaining to the samples. The person taking notes must be knowledgeable enough about these activities to know which details are important.

Repetition of information recorded in other permanent logs should be avoided, but enough information should be recorded to present a clear and accurate picture of technical activities. At a later date, should a question arise concerning a specific event or a procedure used, it will be answered from these notes.

IT drum logs will be used to document sample collection if drummed materials are encountered. Refer to Figure 8-1 for a copy of IT's Drum Inventory Log.

8.1.1 Sample Numbering

Sample numbering will be consistent will sample numbers from the previous investigation conducted in February 1999. Previous numbers incorporated a three letter project identification code "CMS" followed by sequential numbers. IT will continue the numbering sequence for new sample locations but will use former numbers when resampling a specific location a depth. A suffix will be applied (i.e. "-A") to samples collected at depth from existing sampling stations. Quality control codes will be appended to sample numbers as was previously done (i.e. "dup" or "MS/MSD") in such a way as to identify the type of quality control sample. Quality control sample IDs should include the date of collection attached to a code (i.e. TB for trip blank) which signifies the type QC blank.

8.1.2 Sample Labels

Sample labels are required for properly identifying samples and evidence. The completed label shall be affixed to the sample container and covered with clear tape. Sample labels will be generated electronically using the EPA software packages titled (Scribe®). All sample labels shall include, at a minimum, the following information:

- IT project number
- Unique sample number
- Sample collection date and time (military)
- Sample matrix and physical description
- Composite/grab designation
- Number of containers
- Preservatives used
- Sampler's initials
- Witness' initials

8.1.3 Custody Seals

A custody seal is an adhesive seal placed in areas such that, if a sealed container were opened, the seal would be broken. The custody seal ensures that no sample tampering occurred between the field and the laboratory analysis. A minimum of two custody seals shall be affixed to each sample cooler before shipment.

8.1.4 Field Sampling Logbooks

Field logbooks 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 facility could reconstruct a particular situation without reliance on memory.

Field logbooks will be bound, field survey books or notebooks. Logbooks will be assigned to field personnel, but will be stored in the document control center when not in use. Each logbook will be identified by the project-specific document number. 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.

At the beginning of each daily entry, 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.

Measurements made and samples collected will be recorded. All entries will be made in ink, signed, and dated and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark, which is signed and dated by the sampler. Whenever a sample is collected, or a measurement is made, a detailed description of the location

of the station, which includes compass and distance measurements, shall be recorded. 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.

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. Sample site-specific identification number will be assigned before sample collection. In addition, soil boring samples will be examined for:

1) percent recovery (Geoprobe®),
2) soil type,
3) color,
4) moisture content,
5) texture, and
6) visible evidence of staining.

8.1.5 Chain-Of-Custody Records

The COC record documents the transfer of custody from the sampler to field laboratory personnel or off-site laboratory personnel. COCs will be generated electronically using Scribe®. All sample transfers will be accompanied by a COC record. Chain-of-custody shall be maintained for all samples collected during this project. The sample specific information on the chain-of-custody document shall exactly match the corresponding information on the sample label for each container. COC shall be maintained in accordance with USEPA procedures. The COC forms will be completed (see Figure 8-2), enclosed in a plastic Ziploc bag, and taped to the underside of the lid of the shipping container (cooler).

The COC record includes the following information:

- IT lab coordinator's name, telephone and fax numbers
- Project name, project number, and project location
- Name of IT's on-site contact
- Name of the ERRS I OSC
- Project telephone and fax numbers
- Project address
- IT project manager's name, telephone and fax numbers
- Name of the laboratory and principle contact
- Laboratory's telephone and fax numbers
- Laboratory's address
- Recipient of the laboratory report
- Recipient's address
- Unique sample number
- Sample matrix

- Sample collection date and time (military)
- Sample preservatives
- Number of containers
- Grab sample or composite sample designation
- Required analysis
- Required turnaround time for laboratory analysis
- Comments
- Items being transferred with date/time
- Courier/airbill number
- Individual relinquishing sample custody
- Individual accepting sample custody
- Cooler temperature upon receipt
- Sampler's signature

The on-site COC record includes the following information:

- **Sample collection date and time**
- **Number and type of container**

The COC record shall not identify field duplicate QC samples to the laboratory. Each sample shipping cooler shall have a separate chain-of-custody which specifically identifies each sample in the cooler. Immediately before shipment, the transfer of custody shall be documented by identifying the overnight carrier and the airbill number. The original (white) copy of the COC shall accompany the sample shipment.

8.2 SAMPLE CONTAINERS, PRESERVATION AND HOLDING TIMES

The holding time begins from the date and time of collection in the field. All environmental samples, as well as QA/QC samples, will be preserved in the field according to method requirements. In general, all samples will be preserved at a temperature of 4°C ± 2°C prior to shipment to the analytical laboratory, using ice or refrigeration. Temperature control shall be maintained during shipment by placing ice in leakproof containers above, around, and below the sample containers.

Additional samples may also be collected for waste profiling purposes and submitted to the disposal facility. These samples will also be preserved as appropriate including pH adjustment for liquid samples, if applicable.

Requirements for sample containers, preservatives, and hold-times are presented in Table 8-1.

Table 8-1 Sample Containers, Preservatives and Hold Times

Parameter	Preservative[1]		Holding Time		Containers[2]	
	Liquid	Solid	Liquid	Solid	Liquid	Solid
Volatile Organics	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present) No headspace, HCl to pH < 2	**EnCore Sampler** Cool 4°C	14 days	**EnCore Sampler** 48 hours till put in solvent, 14 days till analysis	2 40-ml Glass vials, PRFE septa cap	**EnCore Sampler** EnCore Sampling Device
Acrolein & Acrylonitrile	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present) No headspace, HCl to pH < 2	**Methanol Method** 10ml Methanol, Cool 4°C	14 days	**Methanol Method** 14 days	2 40-ml Glass vials, PRFE septa cap	**Methanol Method** 40-ml Glass vials, PRFE septa cap
Purgeable Aromatic Hydrocarbons Including GRO	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present) No headspace, HCl to pH < 2	**Low Level Method**	14 days		2 40-ml Glass vials, PRFE septa cap	**Low Level Method**
Purgeable Halocarbons	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present) No headspace, HCl to pH < 2	1gm $NaHSO_4$ and 5 ml of water	14 days	**Low Level Method** 14 days	2 40-ml Glass vials, PRFE septa cap	40-ml Glass vials, PRFE septa cap with stir bar
Semivolatile Organics	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present)	Cool 4°C	7 days to extract, 40 days to analysis	14 days to extract, 40 days to analysis	2 1-Liter Amber Glass Bottles	1 8-oz Clear Wide Mouth Glass Bottle[4]
Chlorinated Herbicides	Cool 4°C	Cool 4°C	7 days to extract, 40 days to analysis	14 days to extract, 40 days to analysis	2 1-Liter Amber Glass Bottles	1 8-oz Clear Wide Mouth Glass Bottle
Chlorinated Pesticides	Cool 4°C, H_2SO_4 or NaOH to 5 < pH < 9	Cool 4°C	7 days to extract, 40 days to analysis	14 days to extract, 40 days to analysis	2 1-Liter Amber Glass Bottles	1 8-oz Clear Wide Mouth Glass Bottle[4]
Dioxins & Furans	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present)	Cool 4°C	30 days to extract, 45 days to analysis	30 days to extract, 45 days to analysis	2 1-Liter Amber Glass Bottles	1 8-oz Clear Wide Mouth Glass Bottle
PCBs / Pesticides	Cool 4°C	Cool 4°C	7 days to extract, 40 days to analysis	14 days to extract, 40 days to analysis	2 1-Liter Amber Glass Bottles	1 8-oz Clear Wide Mouth Glass Bottle[4]
Polynuclear Aromatic Hydrocarbons	Cool 4°C, (.008% $Na_2S_2O_3$ if residual Cl_2 present)	Cool 4°C	7 days to extract, 40 days to analysis	14 days to extract, 40 days to analysis	2 1-Liter Amber Glass Bottles	1 8-oz Clear Wide Mouth Glass Bottle
Metals (Except Chromium (VI) & Mercury	Cool 4°C, HNO_3 to pH < 2	Cool 4°C	6 months	6 months	1 1-Liter HDPE[3] Bottle	1 8-oz Clear Wide Mouth Glass Bottle[5]
Cyanide (Total & Amenble)	Cool 4°C, NaOH to pH > 12	Cool 4°C	14 days	14 days	1 1-Liter HDPE[3] Bottle	1 8-oz Clear Wide Mouth Glass Bottle[5]
Mercury	Cool 4°C, HNO_3 to pH < 2	Cool 4°C	28 days	28 days	1 250-ml HDPE[3] or Glass Bottle	1 8-oz Clear Wide Mouth Glass Bottle
Miscellaneous						
Hydrogen Ion (pH)	None Required	Cool 4°C	A.S.A.P.	A.S.A.P.	1 60-ml HDPE[3] Bottle	1 8-oz Clear Wide Mouth Glass Bottle
Organic Carbon	Cool 4°C, HCl or H_2SO_4 to pH < 2	Cool 4°C	28 days	28 days	1 125-ml HDPE[3] Bottle	1 8-oz Clear Wide Mouth Glass Bottle

Table 8-1 Sample Containers, Preservatives and Hold Times

Parameter	Preservative[1]		Holding Time		Containers[2]	
	Liquid	Solid	Liquid	Solid	Liquid	Solid
Residue (Filterable)	Cool 4°C	Not applicable	7 days	Not applicable	1 250-ml HDPE[3] Bottle	Not applicable
Residue (Non-Filterable)	Cool 4°C	Not applicable	7 days	Not applicable	1 250-ml HDPE[3] Bottle	Not applicable
TCLP Semivolatile Fraction	Cool 4°C	Cool 4°C	TCLP not applicable. 7 days to extract, 40 days to analysis	14 days to TCLP, 7 days to extract, 40 days to analysis	3 1-Liter Amber Glass Bottles	1 16-oz Clear Wide Mouth Glass Bottle
TCLP Volatile Fraction	Cool 4°C, no headspace	Cool 4°C, no headspace	TCLP not applicable. 14 days to analysis	14 days to TCLP, 14 days to analysis	1 500-ml Glass PTFE lined septa	1 4-oz Glass with PTFE lined septa
TCLP Inorganic Fraction (Hg)	Cool 4°C	Cool 4°C	TCLP not applicable. 28 days to analysis	28 days to TCLP, 28 days to analysis	1 1-Liter HDPE[3] Bottle	1 4-oz Clear Wide Mouth Glass Bottle
TCLP Inorganic Fraction (all other metals)	Cool 4°C	Cool 4°C	TCLP not applicable 180 days to analysis	180 days to TCLP, 180 days to analysis	1 1-Liter HDPE[3] Bottle	1 4-oz Clear Wide Mouth Glass Bottle

Notes:
1. High concentration samples require cooling to Cool 4°C only.
2. All soil samples must be collected in a encore type sampling device or
3. HDPE (high-density polyethylene bottles)
4. Semivolatiles, PCBs/pesticides may be collected in the same container.
5. Metals, TRPH, and cyanide may be collected in the same container.
6. Organic carbon content must be greater than 50 mg/L for valid results

8.3 SAMPLE PACKAGING AND SHIPMENT

When samples are collected for off-site analysis, they will be shipped within 24 hours of sample collection **whenever possible**. IT SOP QP-606 and associated SOPs will serve as guidance for packaging and shipment of samples. The field sampler is personally 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. **For this project, a sample management team, consisting of two individuals, will be responsible for the packaging and shipping of samples off-site. IT's technical point of contact for assistance in the proper packaging and shipment of samples is Linda Lawhorn located in the Knoxville office (423.694.7404).**

All bottles will be identified by **writing the** sample number, sampling location, date/time of collection, and type of analysis **on the jar cap using a waterproof marker**.

Samples **will be** accompanied by a properly completed **on-site** chain of custody form. The sample numbers will be listed on the chain of custody form. When transferring possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage area.

Samples will be properly packaged on ice at 4° C for shipment and dispatched to the appropriate laboratory for analysis, with **the signed offsite COC generated by Scribe®** enclosed in and

secured to the inside top of each sample box or cooler. Shipping containers will be **sealed** with strapping tape and custody seals for shipment to the laboratory. The preferred procedure includes use of a custody seal attached to the front right and back left of the cooler. The custody seals are covered with clear plastic tape. The cooler is strapped shut with strapping tape in at least two locations.

Whenever samples are co-located with a government agency, a separate sample receipt is prepared for those samples and marked to indicate with whom the samples are being co-located. The person relinquishing the samples to the facility or agency should request the representative's signature acknowledging sample receipt. If the representative is unavailable or refuses to sign, this is noted in the "Received By" space.

The Chain of Custody Record identifying the contents will accompany all shipments. The original record will accompany the shipment, and the pink and yellow copies will be retained by the sampler for returning to the sampling office.

Commercial carriers are not required to sign off on the custody form as long as the custody forms are sealed inside the sample cooler and the custody seals remain intact.

Figure 8-1 Drum Log

IT Corporation	DRUM INVENTORY LOG	Drum No : Project Number :

Project Location : Logger : Date:
Project Contact : Sampler : Time :
Phone : Weather :

Drum Type: ☐ Fiber ☐ Poly-Lined ☐ Steel ☐ Poly ☐ Stainless Steel ☐ Nickel

Lid Type: ☐ Ringtop ☐ Closed Top

Drum Condition: ☐ Meet DOT Spec. ☐ Good ☐ Fair ☐ Poor

Drum Size: ☐ 110 ☐ 85 ☐ 55 ☐ 42 ☐ 30 ☐ 16 ☐ 10 ☐ 5 Other Size :

Drum Contents: ☐ Full ☐ 3/4 ☐ 1/2 ☐ 1/4 ☐ < 1/4 ☐ Empty

Over Packed ☐ Yes ☐ No OverPack Type: ☐ Fiber ☐ Steel ☐ Poly OverPack Size: ☐ 110 ☐ 95 ☐ 80 ☐ 85 ☐ 55

LAYER	PHYS. STATE	COLOR	CLARITY	LAYER THICKNESS
TOP				
MIDDLE				
BOTTOM				

FIELD ANALYSIS
pH : PID : ppm
Dosimeter : Other :

DRUMS LABELS/MARKINGS
DOT HAZ : UN/NA :

MFG Name :

Chemical Name :

Additional Information :

DRUM COMPATABILITY DATA

☐ OK MARK IF THE PHYSICAL STATE AND COLOR MATCHES THE ABOVE INFORMATION. IF NOT, STOP ANALYSIS AND NOTIFY PROJECT CONTACT. FURTHER WORK WILL NOT BE PAID FOR.

DRUM CAT :
ANALYSTS :
DATE PERFORMED :

LAYER	PHYS. STATE	COLOR	CLAR	W SC_	DEN SITY	REACT	pH	HEX. SOL	PER	OXID	CN	SUL	BLSTN	FP	PCBs	LAYER CLASS
TOP																
MIDDLE																
BOTTOM																

COMMENTS :

PCB CONC. : FLASH PT. : COMPAT. COMP.BULK# : BULKED IN :

DATA REVIEWER : DATA REVIEW DATE :
FIELD REVIEWER : FIELD REVIEW DATE :

TRANSFER NUMBER	TRANSFERS RELINQUISHED BY	TRANSFER ACCEPTED BY	DATE	TIME
1				

CHAIN-OF-CUSTODY RECORD

Form 0019
Field Technical Services
Rev. 08/89

№ 112781

IT Corporation • 88C Elm Street • Hopkinton, MA 01748 • 508-435-9561

PROJECT NAME	PROJECT LOCATION
PROJ. NO. / PROJECT CONTACT	PROJECT TELEPHONE NO.
CLIENT'S REPRESENTATIVE	PROJECT MANAGER/SUPERVISOR

ITEM NO.	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS)								REMARKS
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME	REMARKS
1						
2						
3						
4						SAMPLER'S SIGNATURE

LAB COPY

Figure 8-2 Chain-of-Custody form

9.0 FIELD ANALYTICAL METHOD REQUIREMENTS

9.1 FIELD SCREENING

EPA Region I defines field analytical tasks as those analytical activities that are not performed in a fixed laboratory. The field testing planned for this project includes hazard categorization (HazCat) testing and organic vapor monitoring.

9.1.1 Hazardous Categorization Testing

A field chemist will perform HazCat testing and waste blending in accordance with the IT Compatibility Testing Manual. A listing of the IT HazCat procedures is provided in Table 9-1. A copy of the Manual will be kept on site for reference during HazCat testing of drums and is included in an Appendix to the ERRS I QAPP.

Table 9-1 HazCat Screening Summary
Containerized liquids and Solids

Parameter	Method Summary	Container	Holding Time	Required TAT	Data Deliverable
Sample Reactivity	Per IT Compatibility Testing Manual	8 oz. , glass, teflon cap[1]	N/A	< 24 hr	Positive or negative indication
Solubility, Density & pH	Per IT Compatibility Testing Manual	8 oz. , glass, teflon cap	N/A	< 24 hr	Positive or negative indication
Peroxide Test	Per IT Compatibility Testing Manual	8 oz. , glass, teflon cap	N/A	< 24 hr	Positive or negative indication
Oxidizer Test	Per IT Compatibility Testing Manual	8 oz. , glass, teflon cap	N/A	< 24 hr	Positive or negative indication
Halogen Test	Per IT Compatibility Testing Manual	8 oz. , glass, teflon cap	N/A	< 24 hr	Positive or negative indication
Sulfide Test	Per IT Compatibility Testing Manual	8 oz. , glass, teflon cap	N/A	< 24 hr	Positive or negative indication
Cyanide Test	Per IT Compatibility Testing Manual	8 oz. , glass, teflon cap	N/A	< 24 hr	Positive or negative indication
Flash Point Test	Per IT Compatibility Testing Manual	8 oz. , glass, teflon cap	N/A	< 24 hr	Positive or negative indication
PCB Screen	Per IT Compatibility Testing Manual	8 oz. , glass, teflon cap	N/A	< 24 hr	Positive or negative indication

8-oz. container is enough for all tests.

9.1.2 Real-Time Portable Organic Vapor Analyzers

A PID instrument will be used for screening of organic vapors and will be operated in accordance with IT SOP QP-629. The PID may be used as a screening tool to help determine the optimum locations for the collection of samples, especially during test pitting in the suspected area of buried drums. These PID measurements can also be recorded on the COC forms give the laboratory analysts an indication of the approximate concentration of contaminants and aid in calculating dilution factors before analysis. The PID will also be used to aid in selecting the proper level of personal protective equipment and monitoring air emissions during sampling activities.

9.2 INSTRUMENT CALIBRATION AND FREQUENCY

The PID will be calibrated in accordance with the manufacturer instructions and IT SOP QP-629. No calibration is required for HazCat testing since the testing procedures do not rely on instrumentation.

9.3 FIELD ANALYTICAL INSPECTION AND REQUIREMENTS FOR SUPPLIES

All field analytical supplies and reagents received at the site will be checked against the original order to make sure they match. Extra supplies are always on hand to minimize down time of project operations.

10.0 FIXED LABORATORY ANALYTICAL METHODS REQUIREMENTS

The primary subcontract laboratory for this project is Quanterra, Inc. located in West Sacramento, California. The Quality Assurance Management Plan (QAMP) for the laboratory is provided as Appendix C. The Quanterra QAMP is a generic document that covers the entire network of Quanterra Laboratories. Included is also a Facility Appendix, which is specific to the Sacramento Facility. The QA laboratory for the project will be selected prior to start up of sampling.

10.1 ANALYTICAL METHODS

Table 10-1 provides a list of the analytical methods and associated sample preparation procedures to be utilized on this project. Laboratory SOPs are included as Appendix B. Additional information for both dioxins methods are provided in Appendix D.

Table 10-1 Analytical Procedures

Analytical Method	Quanterra SOP	Parameter	Preparatory Methods
6010B	CORP-MT-0001SAC	Trace metals by ICP (water and soil)	3005A, 3010A, 3015, 3050A, 3051
7041	CORP-MT-0003SAC	Antimony (water and soil)	(see analytical method)
7060A	CORP-MT-0003SAC	Arsenic (water and soil)	(see analytical method), 3050A, 3051
7131A	CORP-MT-0003SAC	Cadmium (water and soil)	3015, 3020A, 3051
7191	CORP-MT-0003SAC	Chromium (water and soil)	3015, 3020A, 3051
7421	CORP-MT-0003SAC	Lead (water and soil)	3015, 3020A, 3051
7470A	CORP-MT-005	Mercury (water)	(see analytical method)
7471A	CORP-MT-007	Mercury (soil)	(see analytical method)
7740	CORP-MT-0003SAC	Selenium (water and soil)	(see analytical method), 3050A
7841	CORP-MT-0003SAC	Thallium (water and soil)	3015, 3020A, 3051

Table 10-1 Analytical Procedures			
Analytical Method	**Quanterra SOP**	**Parameter**	**Preparatory Methods**
7911	CORP-MT-0003SAC	Vanadium (water and soil)	3015, 3020A, 3051
9012	SAC-WC-0015	Cyanide	(see analytical method)
8081A	CORP-GC-0001SAC	Organochlorine pesticides and PCBs (water and soil)	3510B, 3520B, 3540B, 3541, 3550A
8082	CORP-GC-0001SAC	Polychlorinated Biphenyls (PCBs) (water and soil)	3510B, 3520B, 3540B, 3541, 3550A
8151A	CORP-GC-0001SAC	Chlorinated herbicides (water and soil)	3510B, 3520B, 3540B, 3541, 3550A
8260B	CORP-MS-0002SAC	Volatile organics (water and soil)	5030A, 5035
8270C	CORP-MS-0001SAC	Semivolatile organics (water and soil)	3510B, 3520B, 3540B, 3541, 3550A
8280	SAC-ID-0008	2,3,7,8-TCDD	(see analytical method)
8290	SAC-ID-0005	Dioxins and furans (water and soil)	(see analytical method)

10.2 DETECTION LIMITS

Reporting limits (RLs) and method detection limits (MDLs) for the analytes being tested during this project are provided in **Appendix E.** Reporting limits for 2,3,7,8-TCDD and dioxins by Methods 8280A and 8290 respectively, are provided in Table 10-2 for easy reference.

Table 10-2 Reporting Limits for Methods SW8280 & 8290					
		Water		**Soil**	
Parameter/Method	**Analyte**	**RL**	**Units**	**RL**	**Units**
SW-8280	2,3,7,8-TCDD	5	ng/L	0.5	ug/kg
Dioxins and Furans **By SW-8290**	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	10	pg/L	1	ng/kg
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	50	pg/L	5	ng/kg
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	50	pg/L	5	ng/kg
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	50	pg/L	5	ng/kg
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	50	pg/L	5	ng/kg
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	50	pg/L	5	ng/kg
	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	100	pg/L	10	ng/kg

Table 10-2 Reporting Limits for Methods SW8280 & 8290

Parameter/Method	Analyte	Water		Soil	
		RL	Units	RL	Units
	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	10	pg/L	1	ng/kg
	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	50	pg/L	5	ng/kg
	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	50	pg/L	5	ng/kg
	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	50	pg/L	5	ng/kg
	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	50	pg/L	5	ng/kg
	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	50	pg/L	5	ng/kg
	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	50	pg/L	5	ng/kg
	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	50	pg/L	5	ng/kg
	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	50	pg/L	5	ng/kg
	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	100	pg/L	10	ng/kg

10.3 CORRECTIVE ACTION REPORT

Problems requiring corrective action in the laboratory are documented by the use of a corrective action report. The QA coordinator or any other laboratory member can initiate the corrective action request in the event QC results exceed acceptability limits, or upon identification of some other laboratory problem. Corrective actions can include reanalysis of the sample or samples affected, resampling and analysis, or a change in procedures, depending upon the severity of the problem.

10.4 CORRECTIVE ACTION SYSTEM

A system for issuing, tracking, and documenting completion of formal Recommendations for Corrective Action (RCA) exists for addressing significant and systematic problems. Recommendations for corrective actions are issued only by a member of the QA group, or a designee in a specific QA role. Each RCA addresses a specific problem or deficiency, usually identified during QA audits of laboratory or project operations. An RCA requires a written response from the party to whom the RCA was issued. A summary of unresolved RCAs is included in the monthly QA report to management. The report lists all RCAs that have been issued, the manager responsible for the work area, and the current status of each RCA. An RCA requires verification by the QA group that the corrective action has been implemented before the RCA is considered to be resolved. In the event there is no response to an RCA within 30 days, or if the proposed corrective action is disputed, the recommendation and/or conflict is pursued to successively higher management levels until the issue is resolved.

10.5 INSTRUMENT CALIBRATION AND FREQUENCY

Laboratory instrumentation must be calibrated to ensure accurate results. Calibrations must be verified at defined times and performance criteria established. Refer to the Laboratory QAMP and specific SOPs for calibration information and corrective actions for situations where acceptance criteria are not met.

11.0 QUALITY CONTROL REQUIREMENTS

This section describes the QC procedures required for field sampling, field analytical screening and laboratory analytical methods described in Sections 7.0 through 10.0 of this document. The different QC checks and samples that are used to both prevent and identify specific sources of error in a particular project activity or part of a process were introduced in Section 5.0 of the ERRS I QAPP. Additional information on frequency of collection or analysis, acceptance criteria, and associated corrective actions for out of control measurements is provided in the Laboratory QAMP in Appendix C.

11.1 QC REQUIREMENTS FOR FIELD SAMPLING

Table 11-1 lists the field QC samples that will be collected during this project, and includes the required collection frequency, associated QC criteria and corrective action to be taken when criteria is not met. **The collection of these QC samples is required only when environmental samples are collected.**

Table 11-1 Field Quality Control

QC Type	Frequency	Criteria	Corrective Action
Temperature Blank	Each cooler ~~except~~ with samples for VOC analysis	2-10 degrees C	Resample and inform laboratory not to proceed
Trip Blank	Each cooler ~~except~~ with samples for VOC analysis	Less than 10% of action level	Accept data for any samples with values greater than 150% or less than 50% of action level. Reject and resample all others.
			Review sample segregation procedures
Equipment Blank (rinsate)	10% for required events	Less than 10% of action level	Accept data for highest sample and any samples with values greater than 150% or less than 80% of action level. Reject and resample all others.
			Review decontamination procedures
PE Sample	1 per SDG/per parameter/per matrix/per concentration level	In accordance with EPA scoring protocol	Review laboratory data and protocols
Split Sample	5% for 2,3,7,8-TCDD and Dioxin analysis in soil/sediments	RPD <50%	Review sampling and laboratory procedures
Duplicate Sample	5% per parameter/matrix /sampling procedure/ sampling team	Water RPD<30%	Review sampling procedures
		Soil RPD <50%	

11.2 QC REQUIREMENTS FOR DEFINITIVE DATA ANALYTICAL METHODS

QC requirements for the analytical methods used on this project **are** provided in the method specific SOPs **and in Appendix E.** Laboratory-specific quality control criteria will be used to measure the accuracy and precision of the analytical procedures used. Accuracy and precision criteria are also provided in the method-specific SOPs (Appendix B). Precision and accuracy goals for 2,3,7,8-TCDD and dioxins by methods **8280** and 8290 are provided in Table 11-2 for easy reference. Refer to Appendix D for additional QC information on the dioxin analyses.

Table 11-2 Accuracy and Precision QC Acceptance Criteria for Methods 8280 and 8290

Analyte	WATER		SOIL/SEDIMENTS	
	Accuracy	Precision	Accuracy	Precision
Method SW-846 8280				
2,3,7,8-TCDD	80-143	20	88-134	35
Method 8290				
2,3,7,8-TCDD	50-150	50	50-150	50
1,2,3,7,8-PeCDD	50-150	50	50-150	50
1,2,3,4,7,8-HxCDD	50-150	50	50-150	50
1,2,3,6,7,8-HxCDD	50-150	50	50-150	50
1,2,3,7,8,9-HxCDD	50-150	50	50-150	50
1,2,3,4,6,7,8-HpCDD	50-150	50	50-150	50
OCDD	50-150	50	50-150	50
2,3,7,8-TCDF	50-150	50	50-150	50
1,2,3,7,8-PeCDF	50-150	50	50-150	50
1,2,4,7,8-PeCDF	50-150	50	50-150	50
1,2,3,4,7,8-HxCDF	50-150	50	50-150	50
1,2,3,6,7,8-HxCDF	50-150	50	50-150	50
1,2,3,7,8,9-HxCDF	50-150	50	50-150	50
2,3,4,6,7,8-HxCDF	50-150	50	50-150	50
1,2,3,4,6,7,8-HpCDF	50-150	50	50-150	50
1,2,3,4,7,8,9-HpCDF	50-150	50	50-150	50
OCDF	50-150	50	50-150	50

12.0 DATA ACQUISITION REQUIREMENTS (NON-DIRECT MEASUREMENTS)

The EPA has obtained information from the following sources to guide them in their oversight of this removal action:

- Federal, state and local files
- Former facility employees.
- Local residents.
- Historical site data.

The primary source of information that will serve as guidance for IT's work at the site consists of data gathered through previous investigations. Specifically, the information gathered during the sampling conducted in September 1998 and again in February, 1999. The surveyed grid established for the February, 1999 sampling event will serve as the basis for much of the delineation sampling to be performed by IT Corporation. The data from the February investigation was not available at the time this QAPP was authored. However, upon receipt of the validated data IT will proceed to collect samples at locations where dioxins were present at a concentration above 1 ppb.

Data from the Geophysical survey conducted in February will be used to locate samples in the area where buried drums are suspected. The data indicate that the presence of strong anomolies in the south parking lot, which indicate the potential presence of buried bulk metallic materials (REAC 5/99). Weaker anomolies were discovered in the central parking lot which have only a moderate chance of being anthropogenic.

Historical aerial photographs were reviewed to **assess past** site conditions, **historical uses,** and waste management practices. Review of the photographs prior to the fire in 1971 indicate that drums were stored throughout the property. The phototgraphs also indicate a lagoon present at the location currently occupied by the Centredale Manor Residential Building.

Files from the local fire department indicate numerous chemical fires at the facility prior to the fire that destroyed the facility in 1971.

Current site conditions were evaluated by the OSC and RM during pre-work site reconnaissance visits. Several drum carcasses were seen in the area surrounding Centredale Manor.

13.0 DOCUMENTATION, RECORDS AND DATA MANAGEMENT

13.1 DOCUMENTATION AND RECORDS

This section defines which records are critical to the success of the project and what information must be included in analytical reports. This section also specifies the proper data reporting format and the document control procedures. This will facilitate clear, direct communication of the data and its conclusions and be a resource document for the design of future site activities.

13.1.1 Information Included in the Reporting Packages

The selection of which records are to be included in a data reporting package is determined based on how the data will be used. Data generated for waste profiling will require different supporting QA/QC documentation than data generated to delineate the extent of a release to the environment of a hazardous substance, including data that could potentially be used for litigation. When possible, field and laboratory records should be integrated to provide a continuous track of reporting.

13.1.2 Field Operation Records

Typical field records to be included with the analytical deliverables are summarized in below.

Table 13-1 Field Data Records Included With Deliverable Package

Deliverable Requirement
Sample Collection Record
Sample Maps or Diagrams
Chain-of-Custody Records
QC Sample Records.
General Field Procedures
Corrective Action Reports
Regulatory Compliance Reports

13.1.3 Laboratory Records

Table 13-2 lists the laboratory-specific records that must be included with the analytical deliverables for IT's minimum, standard, and maximum deliverables packages. IT only

anticipates using the minimum (waste characterization samples) and maximum (environmental samples) package requirements for this project. Refer to IT SOP QP-650 for additional information on data deliverable package requirements.

13.1.3.1 IT Minimum Deliverables Package

This format of deliverables will be requested for non-environmental samples where the intended data use is to characterize the material for disposal and no formal validation by USEPA Region I functional guidelines is necessary. Samples of bulked waste that are analyzed for disposal classification purposes do not demand the high level of QA/QC required for environmental samples taken to assess if a release of a hazardous substance to the environment has occurred. This data package format will meet the DQOs for waste analysis at a reduced cost and more timely fashion than more detailed data packages. Drum content samples, excavated soil samples, and rinse water samples will require the IT minimum deliverable package.

13.1.3.2 IT Standard Deliverables Package

This format of deliverables includes all the data elements necessary to perform a Tier II data validation. This data package format may meet DQOs for long-term monitoring that have only "minimal changes" in constituent concentrations from previous rounds **and/or** where data from a previous round has been subject to a Tier III validation. IT does not anticipate utilizing the IT Standard Deliverable Package for this project.

13.1.3.3 IT Maximum Deliverables Package

This **deliverables format** requires all CLP equivalent data elements presented in Table 5 and Table 6 of the EPA-NE QAPP Manual. **Deliverables for dioxin analyses will be consistent with the requirement specified in the DFLM01.0 Statement of Work (SOW).** This data package format contains all the necessary elements required to perform a Tier III data validation, and will be the most common format required for projects requiring the collection of environmental samples. All environmental samples collected during this project will require an IT Maximum Deliverable Package and any other documentation required by the new Region I dioxin data validation guidelines.

Table 13-2 Laboratory Data Deliverable Package Requirements

Method	Deliverable Requirement	IT Minimum	IT Standard	IT Maximum
Metals	Case Narrative	X	X	X
	Corrective Action Report	X	X	X
	Cross-reference of IT Sample Numbers, Lab IDs, and analytical QC batches	X	X	X
	Chain-of-Custody form, Cooler Receipt form	X	X	X
	Data Summary for Each Sample (See Note 1)	X	X	X
	Blank Spike or Lab Control Sample (LCS) results (including concentration spiked, percent recovered, percent recovery acceptance limits)	X	X	X
	Matrix Spike (MS) Report (including concentration spiked, percent recovered, percent recovery acceptance limits)	X	X	X
	Post-digestion Spike Recovery for ICP	X	X	X
	Duplicate Sample Report	X	X	X
	Blank Results	X	X	X
	Initial Calibration Data		X	X
	Continuing Calibration Data		X	X
	ICP Interference Check Sample Report		X	X
	Standard Addition Results		X	X
	ICP Serial Dilution Results			X
	Copies of Preparation Logs			X
	Copies of Analysis Run Logs		X	X
	Copies of Standard Preparation Logs			X
	Raw Data and Instrument Printouts			X
	Percent Moisture	X	X	X
	pH			X (Note 2)
Organics by GC or HPLC	Case Narrative	X	X	X
	Corrective Action Report	X	X	X
	Cross-reference of IT Sample Numbers, Lab IDs, and analytical QC batches	X	X	X
	Chain-of-Custody form, Cooler Receipt form	X	X	X
	Data Summary for each blank and sample (See Note 1)	X	X	X
	Blank Spike or Lab Control Sample (LCS) results (including concentration spiked, percent recovered, percent recovery acceptance limits)	X	X	X
	Surrogate Recovery Report (including concentration spiked, percent recovered, and percent recovery acceptance limits)	X	X	X

Table 13-2 Laboratory Data Deliverable Package Requirements

Method	Deliverable Requirement	IT Minimum	IT Standard	IT Maximum
	Matrix Spike/Matrix Spike Duplicate (MS/MSD) Report (including concentration spiked, percent recovered, percent recovery acceptance limits, relative percent difference (RPD), and RPD acceptance limits)	X	X	X
	Initial Calibration Data for each column (indicate which column was used for quantitation)		X	X
	Continuing Calibration Data (indicate which column was used for quantitation)		X	X
	Chromatograms for each sample (and reruns), confirmation runs, blank, spike, duplicate, and standards		X (Note 4)	X
	Raw Quantitation Report (area vs. retention time)			X
	Copies of Sample Preparation Bench Sheets		X	X
	Copies of Standard Preparation Logs			X
	Copies of Run Logs			X
Organics by GC/MS	Case Narrative	X	X	X
	Corrective Action Report	X	X	X
	Cross-reference of IT sample numbers, Lab IDs, and analytical QC batches		X	X
	Chain-of-Custody form, Cooler Receipt form	X	X	X
	Data Summary for each blank and sample (See Note 1)	X	X	X
	Tentatively Identified Compounds (TICs) for each sample (ten peaks)		X	X
	Blank Spike or Lab Control Sample (LCS) results (including concentration spiked, percent recovered, percent recovery acceptance limits)	X	X	X
	Surrogate Recovery Report (including concentration spiked, percent recovered, and percent recovery acceptance limits)	X	X	X
	Matrix Spike/Matrix Spike Duplicate (MS/MSD) Report (including concentration spiked, percent recovered, percent recovery acceptance limits, relative percent difference (RPD), and RPD acceptance limits)	X	X	X
	Instrument Performance Check (Tuning) Report		X	X
	Initial Calibration Data (including acceptance limits)		X	X
	Continuing Calibration Data (including acceptance limits)		X	X

Table 13-2 Laboratory Data Deliverable Package Requirements

Method	Deliverable Requirement	IT Minimum	IT Standard	IT Maximum
	Internal Standard Areas and Retention Times Reports (including acceptance limits and out-of-control flags)		X	X
	Reconstructed Ion Chromatogram for each sample and rerun, blank, spike, duplicate, and standard			X
	Raw Quantitation Report			X
	Raw and background subtracted mass spectra for each target analyte found			X
	Mass spectra of TICs with library spectra of 5 best-fit matches			X
	Copies of Sample Preparation Bench Sheets		X	X
	Copies of Standard Preparation Logs			X
	Copies of Run Logs			X
	Percent Moisture	X	X	X
	pH			X (Note 3)
Inorganic Chemistry (Note 2)	Corrective Action Report	X	X	X
	Cross-reference of IT sample numbers, Lab IDs, and analytical QC batches	X	X	X
	Chain-of-Custody Form, Cooler Receipt form	X	X	X
	Data Summary for each blank and sample (See Note 1)	X	X	X
	Blank Spike or Lab Control Sample (LCS) results (including concentration spiked, percent recovered, percent recovery acceptance limits)	X	X	X
	Matrix Spike/Matrix Spike Duplicate (MS/MSD) Report (including concentration spiked, percent recovered, percent recovery acceptance limits)	X	X	X
	Duplicate Sample Report	X	X	X
	Calibration Reports Initial and Continuing		X	X
	Copies of Sample Preparation logs			X
	Raw Data and Instrument Printouts			X
	Percent Moisture	X	X	X

Notes:
1) Must include: IT sample ID, Lab ID, date/time sampled, date received, extracted/analyzed, Practical Quantitation Limit, Method Detection Limit, Dilution Factor, comments, approval signature/date.
2) For water samples only.
3) Must include: IT sample ID, Lab ID, date/time sampled, date received, extracted/analyzed, Practical Quantitation Limit, Method Detection Limit, Dilution Factor, comments, approval signature/date.
4) For petroleum fuels analyses, chromatograms for samples with positive results only.
5) Deliverables depend on method's QC.

13.2 DATA MANAGEMENT

Data management is the system by which data is reduced, reviewed, validated, reported, distributed, and finally archived. This system is designed to meet the QA objectives for projects conducted under the ERRS I contract.

13.2.1 Data Reduction

Data reduction includes the identification and calculations necessary to convert the raw instrument reading to the final reported compounds and their respective concentrations.

13.2.1.1 Field Instrumentation Data Reduction

Table 13-3 lists the direct reading field instruments that will used by IT on this project, and the reporting parameters of the instrument. The on-site chemist or technician is responsible for the proper use and calibration of these instruments. All raw data collected from these instruments are logged into a field logbook. All instruments that must have temperature compensation such as pH meter and dissolved oxygen meter must record any dialed temperature compensation adjustments.

Table 13-3 Reporting Parameters for Direct Reading Field Instruments

Instrument	Reading
Explosimeter/Combustible Gas Meter	% O_2 / % LEL
Mini-Ram Particulate Monitor	mg/m^3
PID	ppm

13.2.1.2 Laboratory Data Reduction

Each analyst in the laboratory is responsible for converting raw data into reportable values. These specific duties include:

- Proper identification of the analyte
- Generation of calculations
- Checking all calibrations to ensure support of data
- Verification that all QA/QC checks are supportive of data

- Verification that all documentation is complete and accurate in respective logbooks
- Verification that all chromatograms and strip chart recordings are labeled with data, instrument number, run parameters and analyst

Data calculation and reduction will be performed as described in the individual approved methods. More detailed procedures for performing these duties are provided in the laboratory-specific QAMP provided as Appendix C.

13.2.2 Laboratory Data Validation

All data generated within the laboratory will be extensively checked for accuracy and completeness. The data validation process consists of data generation, **data** reduction, and three levels of review as described in the ERRS I QAPP and the Laboratory QAMP.

13.2.3 Project Data Review

The Project Chemist is responsible for review of all field and laboratory generated data. Review of project data will include:

- Review of sampling documentation to ensure that samples were collected in accordance with SOPs described in this QAPP.
- Review of field screening measurements and field analytical documentation to ensure that proper calibration of field instrumentation and that field analytical testing was performed in accordance with SOPs.
- Review of analytical data packages from the fixed based laboratories to verify that: samples are analyzed in accordance with specified methods; all requested data are reported; holding times are not exceeded; matrix spike, matrix spike duplicate, and surrogate recoveries fall within the laboratory's acceptable criteria; and QC blanks do not indicate cross-contamination.

13.2.3.1 Field Instrumentation Validation

All field-generated data will be checked by the Project Chemist or QA Officer to ensure that all field instrumentation is calibrated and QC checks are within established limits.

13.2.3.2 Laboratory Data Validation

The guidelines to be used for data validation are addressed in Section 16.0 of this document.

13.2.4 Data Reporting

The Project Chemist will review all analytical reports. **Copies** will also be sent to the Response Manager. **The residential sample results** will not be released until validation is complete.

Preliminary results of grid samples will be released prior to validation in order to help guide delineation activities. Any discrepancies or data issues will be brought to the attention of the RM and the QA Officer. The QA Officer will be responsible for making sure the notification and corrective action process is carried out. When QA issues have been satisfactorily settled, the RM may release the data to the OSC. The RM will not release the data until the Project Chemist has reviewed the data and authorized its release.

13.3 DATA TRACKING AND CONTROL

13.3.1 Data Tracking

Data will be tracked by the using the **Microsoft Access and the** Scribe® DataBase program developed **by** an EPA REAC subcontractor. The database is used to track all sample-related information such as dates of sample collection, receipt by laboratory, sample extraction, sample analysis, issuance of preliminary report, and issuance of final report. The Database is initiated upon sample collection and updated as results are received. The Database is also useful to track laboratory performance with respect to meeting requested turnaround times.

13.3.2 Data Storage and Archive

When all work is completed for this project, all documents generated from the project will be assembled in the project file. Individuals may retain clean, i.e., no handwritten comments, and copies of documents for their personal files but only after personally verifying that the original or similar copy is in the project files. Additional information on storage & archiving is provided in the ERRS I QAPP.

14.0 ASSESSMENT AND RESPONSE ACTIONS

This Section addresses the assessment and corrective action requirements for this project. The ERRS I QAPP provides more detailed information on these activities.

14.1 TECHNICAL SYSTEMS AUDITS

Technical systems audits (TSAs) will be **conducted** during this project to ensure compliance with **SOPs** and the generation of defensible data. The types of TSAs that will be performed during this project are discussed in the following subsections. TSAs will be performed by the QA Officer or his designee. IT's Quality Management Plan contains more information on procedures for conducting audit activities.

14.1.1 Field Sampling TSA

A minimum of one field sampling TSA will be conducted to ensure that environmental samples are collected in accordance with SOPs identified in this QAPP. Field sampling TSAs will be documented using the IT Project QA/QC Evaluation Checklist presented in Appendix A of the ERRS I QAPP.

14.1.2 Field Analytical TSA

The field analytical TSA will be conducted simultaneously with field sampling TSAs using the Project QA/QC Evaluation Checklist. This TSA will evaluate the operation of the hand held monitoring equipment.

14.1.3 Laboratory TSA

If approved by the OSC, a fixed base laboratory TSA will be performed using the IT Laboratory Audit Checklist, provided in Appendix A of the ERRS I QAPP. Due to the high number of sample being collected and the sensitivity of the project, a Laboratory TSA is recommended.

14.1.4 Performance Evaluation Sample Tracking and Analysis

PE samples will be sent to the laboratory with each SDG of environmental samples to evaluate specific parameters and provide information on a laboratory's ability to accurately identify and quantify analytes of interest during the period of sample preparation and analysis. These PE samples will be submitted at the same time field samples are submitted for analysis. One PE sample will be submitted per analysis, matrix, and concentration level. IT will follow the guidance given in **EPA Region I, Performance Evaluation Program Guidance, July 1996**.

PEs will be obtained through the Region I QA Unit or purchased from commercial vendors. PE samples will be spiked with the same compounds that are being investigated at the site. PE sample results will be statistically evaluated in accordance with EPA Region I scoring protocol.

14.1.5 Split Sample Audit

A split sample (also called a field replicate) is a single sample divided into two equal parts for analysis. One part of the sample is analyzed by the primary subcontracted laboratory as a routine sample and the other portion is analyzed by an audit laboratory to verify data generated by the primary laboratory. Split samples are used to assess interlaboratory precision and accuracy. Split samples are proposed for dioxin analysis only (8280A & 8290).

14.1.6 Data Validation TSA

At a minimum, the data validation TSA will include a review of the associated analytical data package deliverables to ensure that all required analytical data package deliverables are provided. When no formal validation is required, this TSA will be referred to as a data package TSA.

When appropriate, the data validation TSA also ensures that the data validation procedures specified in the most recent revision of the Region I EPA-NE Data Validation Guidelines are utilized in accordance with this QAPP.

14.2 CORRECTIVE ACTIONS

Conditions adverse to quality shall be documented and reported to the appropriate levels of management, requiring the condition to be investigated and acceptable corrective action taken in a specified time frame.

Documentation of the corrective action process will include the Corrective Action Request (CAR) (see Figure 14-1) and the the CAR Tracking Log, (Figure 14-2). The corrective action process is described in detail in the ERRS I QAPP.

Figure 14-1 Corrective Action Request Form

IT Corporation
CORRECTIVE ACTION REQUEST (CAR)

CAR Number:_____ Date of Discovery:_____ Activity:
Evaluated Org/Rep:_____ Location:_____ Project Number:

Requirement(s) Not Met:

Description of Condition:

Classification: Significant ? Yes____ No____ (If Yes, Corrective Actions 1, 2, 3 ,& 4 Below Apply)
Is Stop Work Warranted ? Yes____ No_____

Corrective Action Required:

1. Remedial Action Required and, (always)
2. Root Cause Determination Yes____ No_____
3. Action to Prevent Recurrence Yes____ No_____
4. Action Regarding Similar Work Yes____ No_____

Response Due Date:

Initiator:_____ Date:

Proposed Corrective Action:

Proposed Completion Date:

Responsible Individual:_____ Date:

Evaluated By:_____ Date: _____

Completed Corrective Action Verification & Closure:

Verification Method:

Verified By:_____ Date:

Figure 14-2 Corrective Action Request Tracking Log

CAR Number	Issue Date	Response Due Date	Response Accepted Date	Date of Verification & Closure

15.0 QUALITY ASSURANCE REPORT TO MANAGEMENT

The QA Management Reports ensure that management and stakeholders are periodically updated on the project status and the results of QA assessments. Efficient communication of project status allows management to implement timely, effective corrective actions so that project quality objectives can be met.

The RM, QA Officer and Project Chemist will converse on a regular basis to review possible and potential problem areas and to ensure that all QA/QC procedures are being carried out. It is important that all data abnormalities be investigated to ensure that they are not a result of operator or instrument deviation, but are a true reflection of the methodology or task function. A QA report will be prepared, at a minimum, of once per month during sampling operations. At a minimum, the following information will be included in the report:

- Assessment of measurement data precision, accuracy, and completeness
- Technical System Audit results
- Significant QA problems and corrective actions implemented
- Copies of documentation such as memos, reports, etc.

All reports will be made available to the OSC and regulating agencies at the OSC's request.

16.0 VERIFICATION AND VALIDATION REQUIREMENTS

Data verification is a process of evaluating the completeness, correctness, and conformance or contractual compliance of a data set against the method standard, SOP, or contract requirements documented in this QAPP. Data verification can be performed internally or by an entity external to the laboratory or group generating the data.

Data validation is an analyte- and sample-specific process that extends the qualification of data beyond method, procedural, or contractual compliance to determine the analytical quality of a specific data set. EPA-NE requires that data validation be performed by an organization independent of the group that generates the data.

Only analytical data generated for environmental samples will be validated in accordance with Region I Functional Guidelines. At a minimum, a data package TSA will be required for data from analysis of non-environmental samples.

16.1 DATA REVIEW BY PROJECT CHEMIST

Due to the time-critical nature of some of the activities being conducted on this project, decisions will need to be made prior to receiving fully validated results. As a result, all data packages will undergo a data review by the IT Project Chemist in an attempt to identify potential non-conformances or problems upon receipt of the data. This review will also allow for release of payment to the laboratory subcontractor. All preliminary data and final data packages will undergo a review by the Project Chemist before release to the RM and OSC for making project decisions. These review procedures are presented in section 17.0, and are designed to make a timely initial assessment of the data in terms of meeting project quality objectives.

16.2 EPA TIERED VALIDATION APPROACH

Data that is to be used for the historical documentation of a project's environmental status will be formally validated in accordance with the Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses. The EPA-NE data validation process serves to both verify and validate data. Data verification and validation can both result in accepted, qualified, or rejected data. The Region I Functional Guidelines specify a tiered system of data validation so that a graded validation approach is available to suit varying DQOs.

16.2.1 Tier I Requirement

Tier I requires that the data package be evaluated for completeness by completing and Inventory Sheet. PE samples are evaluated to assess potential data quality/usability issues. All environmental samples collected during this project will, at a minimum, undergo a Tier I Validation. A Tier I Validation Cover Letter is produced by the validator.

16.2.2 Tier II Requirement

Tier II requires that the results of the QC checks and samples, analytical procedures and PE sample results are assessed and applied to the data set. Tier II results in the proper qualifiers being applied to the data. All environmental data generated during this project will undergo a Tier II review except for the samples collected from the residences which will undergo a Tier III review. A Data Validation Report will be prepared by the validator for Tier II validations.

16.2.3 Tier III Requirement

Tier III requires that the raw data be examined in detail to check for calculation, compound identification, and/or transcription errors. A Data Validation Report is prepared by the validator for Tier III validations. Ten percent (10%) of data undergoing Tier II validation will be validated at a Tier III level. In addition, samples collected from the residences surrounding Allendale Pond will undergo Tier III validation.

17.0 VERIFICATION AND VALIDATION PROCEDURES

17.1 INTERNAL VERIFICATION

17.1.1 Sampling and Field Analytical Data

Sample collection, handling and field analysis will be verified internally through the use of field sampling and field analytical TSAs as indicated in Section 14.

17.1.2 Laboratory Data

The Project Chemist will review all HazCat and field laboratory data to verify usability. Data verification of fixed based laboratory data will be performed by the laboratory generating the data prior to reporting to IT as discussed in Section 13 of the ERRS I QAPP and as discussed in the laboratory QAMP.

17.2 EXTERNAL VERIFICATION

17.2.1 Sampling and Field Analytical Data

External verification may be done by EPA oversight for procedures conducted by IT, and vice versa, IT may perform external verification of sampling and analytical performed by EPA START.

17.2.2 Laboratory Data

As indicated in Section 16, all fixed based laboratory data will also undergo external verification by the Project Chemist. This verification will be documented using the IT Analytical Data Evaluation/Verification Checklist (Figure 17-1). Any errors, discrepancies, and non-conformance will be brought to the attention of the RM.

17.3 VALIDATION OF FINAL RESULTS

Data that is to be used for the historical documentation of a project site's environmental status will be formally validated in accordance with the Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses. This validation will be performed by IT or an independent subcontractor.

When QA issues have been satisfactorily settled and data validation has been completed, the RM may release the data to the OSC and other users of the data.

Chemical Analytical Data Evaluation/Verfication Checklist

Project Name: _____ **Project Number:** _____
Laboratory Name: _____ **Laboratory Project/Case Number:** _____

Evaluated By: _____ **Signature:** _____ **Date:** _____

Acceptability:

[ ] The data are acceptable as reported
[ ] The data, as qualified in the "Summary", are acceptable
[ ] The data are unacceptable

Summary _____

Deliverable Requirements [ ] IT Minimum (1) [ ] IT Standard (2) [ ] IT Maximum (3) [ ] EDDs _____
[ ] Other: _____

COC # and Sample Type: _____
IT Sample ID(s): _____
Lab Sample ID(s): _____
Date Sampled: _____
Date Lab Receipt: _____
Req. TAT (Fax/Final): _____
Prelim. Receipt Date(#days): _____
Final Receipt Date(#days): _____
Requested Analyses:

Quality Control Deliverables	Required	Received	Passed	Failed
A) Narrative, including issues and deviations from QC *Comment:*	1, 2, 3			
B) Cross reference of IT versus Lab Sample IDs *Comment:*	1, 2, 3			
C) Copy of Chain-Of-Custody *Comment:*	1, 2, 3			
D) Slipping Forms (e.g. Fedex Airbill) *Comment:*	1, 2, 3			
E) Data Summaries for each sample *Comment:*	1, 2, 3			
1) PQL, MDL, RL, etc. meets DQOs *Comment:*	1, 2, 3			
2) Holding Times Met *Comment:*	1, 2, 3			
3) Sample Condition (preservatives, containers, temp.) *Comment:*	1, 2, 3			
4) Initial Calibration *Comment:*	2, 3			
5) Continuing Calibration *Comment:*	2, 3			

Figure 17-1 Data Evaluation/Verification Checklist

Page 2
COC#:_____

Chemical Analytical Data Evaluation/Validation Checklist

Quality Control Deliverables	Required	Received	Passed	Failed
6) Laboratory Blanks *Comment:*	2, 3			
7) Lab Control Sample (LCS) / Blank Spike Recoveries *Comment:*	1, 2, 3			
8) Blank Spike Duplicate *Comment:*	1, 2, 3			
9) Blank Spike Duplicate RPD *Comment:*	1, 2, 3			
10) Matrix Spike Recoveries *Comment:*	1, 2, 3			
11) Matrix Spike Duplicate Recoveries *Comment:*	1, 2, 3			
12) Matrix Spike/ Spike Duplicate RPD *Comment:*	1, 2, 3			
13) Instrument Performance Checks (GC/MS) *Comment:*	2, 3			
14) Internal Standard Areas and Retention Time Shift (GC) *Comment:*	2, 3			
15) Surrogate Recoveries (GC) *Comment:*	1, 2, 3			
16) Tentatively Identified Compounds (TICs), if requested (GC) *Comment:*	2, 3			
17) Chromatogram(s) (GC) *Comment:*	3			
18) Laboratory Duplicate (Metals) *Comment:*	1, 2, 3			
19) ICP Interference Check Sample (Metals) *Comment:*	2, 3			
20) Post-Digestion Spike Recovery for ICP (Metals) *Comment:*	1, 2, 3			
21) ICP Serial Dilution (Metals) *Comment:*	2, 3			
22) Standard Addition Results (Metals), if necessary *Comment:*	2, 3			
23) Sample Preparation Worksheets *Comment:*	3			
24) Raw Data *Comment:*	3			
25) Field Blanks *Comment:*				
26) Field Duplicates *Comment:*				

General Comments:

Version 990423

Figure 17-1 Data Evaluation/Verification Checklist

18.0 DATA USEABILITY/RECONCILIATION WITH PROJECT QUALITY OBJECTIVES

IT will perform data quality assessments on all data sets to determine if the data collected is acceptable for its intended use. IT will initiate the data assessment process at the onset of data collection activities to facilitate the early detection and correction of problems. A Data Assessment Report will be prepared upon completion of the project. The report will describe the DQA process used and the conclusions drawn from that process.

18.1 ASSESSMENT OF DATA QUALITY INDICATORS

DQIs will be evaluated against the measurement performance criteria presented in Section 5 and the laboratory-specific, analyte-specific precision and accuracy goals. The following sections discuss overall assessment of each DQI in terms of the entire set of project data. If the project-required measurement performance criteria are not met for any of the DQIs, then the DQA Report will address how the problem will be resolved and discuss the potential need for resampling.

18.1.1 Precision Assessment

Poor overall precision may be the result of one or more of the following: field instrument variation, analytical measurement variation, poor sampling technique, sample transport problems, and/or heterogeneous sample matrices. To identify the cause of imprecision IT will evaluate the sampling design rationale, sampling techniques, and field and analytical duplicate/replicate results.

18.1.2 Overall Accuracy

Potential sample cross-contamination during the sample collection, **transportation**, extraction and analysis must be evaluated for potential bias. Sample cross-contamination may result in either a negative or positive bias. An example of negative bias is the use of improperly cleaned sample containers for metals analysis, which causes the metals to be retained on the interior walls of the container. An example of positive bias is a situation where a sample with a high level of VOC contamination is placed in a cooler with low level volatiles and causes cross-contamination of the low-level samples.

In addition to evaluating the results of laboratory calibrations and spike samples, PE sample results will also be evaluated to assess accuracy of the analytical process. Part of the evaluation of PE sample results must include a review of the data associated with the PE sample itself. PE

results will be evaluated using the EPA Region I scoring system. Typically, poor PE scores result in the need for resampling and analysis.

18.1.3 Sample Representativeness

Sample representativeness will be assessed by reviewing the sampling design, sampling SOPs, the results of field sampling TSAs, field duplicate results, split sample results and analytical TSAs. Poor precision for field duplicates may indicate sample heterogeneity resulting in the need to reevaluate the sampling design or a specific sampling SOP to determine how they should be modified to allow collection of a more representative sample.

18.1.4 Overall Sensitivity

Detection limits for all sampling will be assessed to determine if they are adequate to make decisions on whether action levels have been achieved. Quantitation limits, MDLs and sensitivity should be assessed to determine the level of confidence associated with a reported result and to evaluate the need for an alternative method.

18.1.5 Overall Completeness

Overall completeness will be assessed by calculating the number of valid measurements as a percentage of the total number of measurements taken during the course of the project. If overall completeness goals are not met then the data should be looked at more closely to determine which samples are impacted by the invalid result, and what impact those samples have in the decision making process.

18.1.6 Overall Comparability

Data comparability is extremely important in long-term monitoring projects and may not be applicable to most projects under the ERRS I contract. However, comparability will be very important for projects utilizing field laboratories. Split samples to fixed based laboratories will be critical in assessing whether the field laboratory data can be used for decision making.

18.2 RECONCILIATION WITH INTENDED DATA USERS

IT will consult with the EPA to determine action-levels, other available factors influencing the decision and criticality of the decision and the data's importance to the decision process. The purpose of the data validation is to communicate potential problems with data usability in the specific decision process. It is not to summarily reject data use. The intended users must participate in the data use decision. The IT Project Chemist, IT QA Officer, and EPA QA

Chemist will be responsible for reconciling the validated environmental data with DQOs to determine whether the data are the right type, quality and quantity to support environmental decision making for the project.

APPENDIX A
PROJECT PLANNING DOCUMENTATION

A.1 – USACE Letter dated 4/2/99
A.2 – 5/17/99 Scoping Meeting
A.3 – 5/25/99 Scoping Meeting
A.4 – 6/7/99 Telecon (Method 8290)

APPENDIX A1

USACE Letter dated 4/2/99

CONCORD MA.
RECEIVED ACB. 4/6/99

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF

April 2, 1999

Civil/Military Project
Management Branch

Mr. Richard C. Boyton
Environmental Protection Agency
Region I, JFK Federal Building
Boston, Massachusetts 02203-0001

Dear Mr. Boyton:

In response to the recent site visits and additional chemical information obtained by EPA, the Corps has identified a need for further site characterizations of dioxin contamination at the Allendale Dam in North Providence, Rhode Island. This data will provide decision makers with the characterization of the existing site conditions at the proposed construction area. We understand that as further basin-wide characterizations are being conducted by EPA, it would be desirable to maintain the impoundment above Allendale Dam to prevent further downstream movement of contaminated soils. The Corps has the authority to repair the dam, but there is an overriding concern at defining the extent of dioxin contamination at the site.

We propose deploying a vibra-coring team to take sediment samples within the footprint of the proposed dam repair. Since the defined work area is within 50 feet of the structure and soils will only be disturbed within 20 feet, taking 4 cores above the dam within the 20-foot distance and one core below the dam, immediately downstream seems best. The enclosed 1993 boring logs indicate two sediment horizons are generally present, with 8 to 10 feet of fill over silty sand. The structure has failed and erosion of the materials may provide different site conditions than the boring data suggests. The sampling plan will be based largely on field conditions and visible sediment horizons in the core. Therefore, we recommend 4 cores be taken above the dam, with three horizons sampled (surface, 1 foot above the soils transition and 1 foot above refusal in the underlying silty-sand). The downstream core will most likely meet refusal quickly

since it is representative of the natural scoured riverbed and not fill. All cores will be split and the chemical analyses in the attached tables (including dioxin) will be performed. Therefore, three samples each from 4 cores from the upstream project footprint (total of 12 samples) and one downstream are proposed to be analyzed, for a total of thirteen samples.

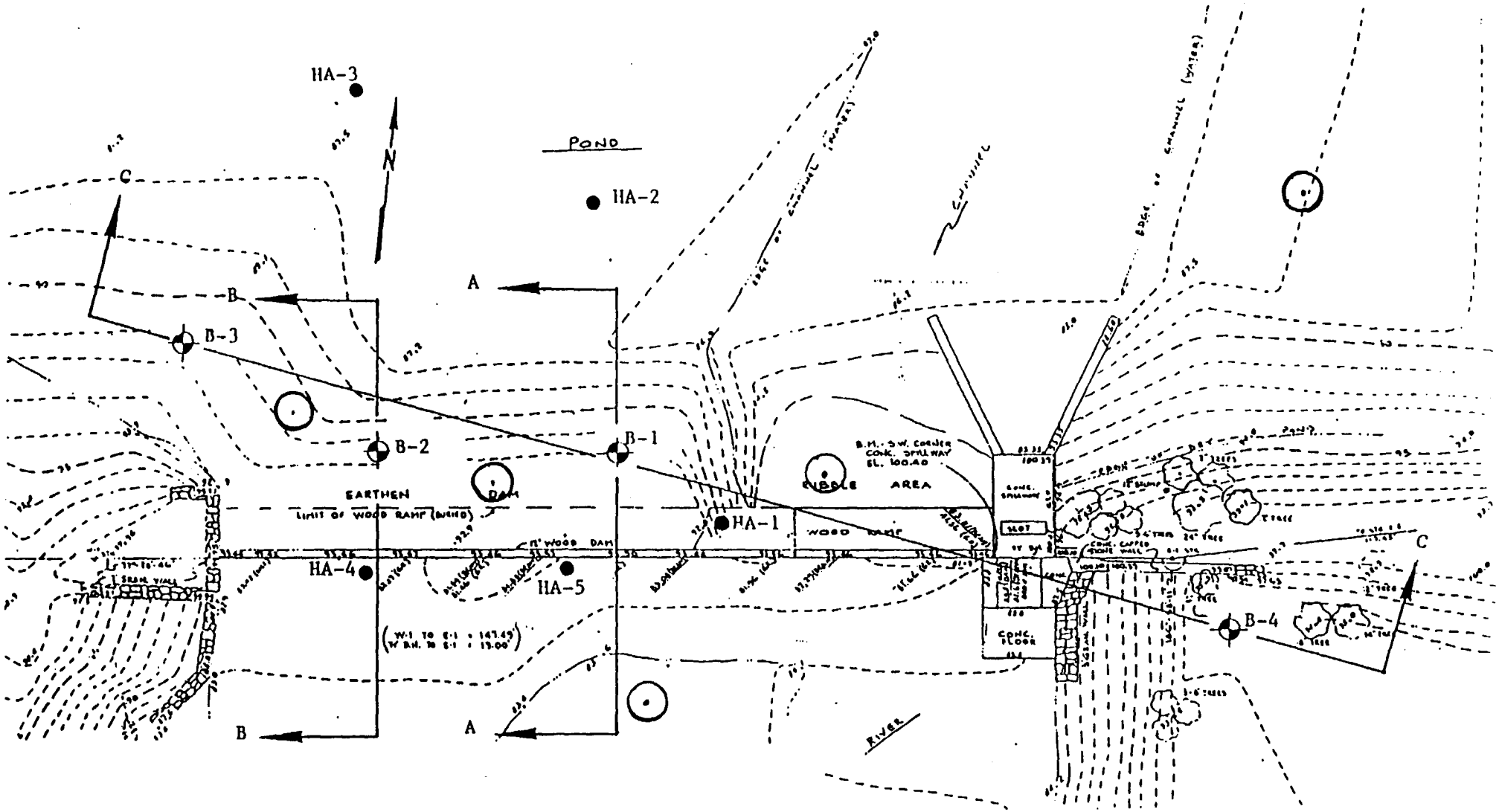
We request your review of this approach and recommendations for any modification to the sampling and analysis. Please contact me at (978) 318-8620, Fax 318-8891, or e-mail at joseph.a.bocchino@usace.army.mil for further information.

Sincerely,

Joe Bocchino
Project Manager

Copies Furnished:

Gary Waldeck, RIDEM
Ted Bazenas, EPA, NE
Bob Mendoza, EPA, NE
A. Ralph Mollis, Mayor, N. Providence
Janet Coit, Office of Sen. John Chafee, Providence, R.I.



LEGEND:

B-1 Test Boring Location

HA-1 Hand Augering Location

Proposed 1999 Dioxin Borings

B-5

FIGURE 1 BORING LOCATION PLAN
Scale 1" = 20'

FIGURE 1

TABLE 1A

US Army Corps of Engineers, New England District

List of Test Parameters in Sediment (Source: Table 1A and 1B 1989 CE/NED Protocol)

PARAMETER	SUGGESTED TEST METHOD (*)	METHOD DETECTION LIMIT, mg/kg (Dry Weight)
METALS		
Arsenic	3050A or 3051/7060A	0.5
Cadmium	3050A or 3051/7131A	0.1
Chromium	3050A or 3051/6010A	1.0
Copper	3050A or 3051/6010A	1.0
Lead	3050A or 3051/7421	1.0
Mercury	7471	0.02
Nickel	3050A or 3051/6010A	1.0
Zinc	3050A or 3051/6010A	1.0
ORGANICS		
TOTAL PCBs (Congeners)	3540A or 3550A/8082	0.001
PESTICIDES	3540A or 3550A/8081	0.02
Aldrin		
Chlordane (gamma and alpha)		
4,4-DDE, DDD, DDT		
Dieldrin		
Endosulfan I, II		
Endosulfan sulfate		
Endrin		
Endrin aldehyde		
Heptachlor		
Heptachlor epoxide		
Alpha-BHC		
Delta-BHC		
Beta-BHC		
Gamma-BHC (lindane)		
Methoxychlor		
Toxaphene		

PAH	3540A or 3550A/8270B	0.02
Naphthalene		
2-Methylnaphthalene		
1-Methylnaphthalene		
Biphenyl		
2,6-Dimethylnaphthalene		
Acenaphthylene		
Acenaphthene		
2,3,5-Trimethylnaphthalene		
Fluorene		
Phenanthrene		
Anthracene		
1-Methylphenanthrene		
Fluoranthene		
Pyrene		
Benzo(a)anthracene		
Chrysene		
Benzo(b)fluoranthene		
Benzo(k)fluoranthene		
Benzo(e)pyrene		
Benzo(a)pyrene		
Perylene		
Indeno(1,2,3-cd)pyrene		
Dibenzo(a,h)anthracene		
Benzo(g,h,i)perylene		

MISC

%Solids	2540B(Std.Methods)	0.1%
** TOC	9060	0.01%

QA/QC procedures per sample batch consist of: method blank, matrix spike, matrix spike duplicate, matrix duplicate, and LCS.

* - Selected test methods must meet listed MDLs.

** - Samples to be run in duplicate with a SRM analyzed in each batch in addition to regular QA/QC procedures

BLE 1. Organic contaminants of concern, analytical methods and target detection limits (dry weight) tinely analyzed in sediments (continued).

emical Constituent		Analytical Method[1]	Target Detection limit
CB CONGENERS[3]		NOAA (1989), 8080A	0.001
8*	2,4' diCB		
18*	2,2',5 triCB		
28*	2,4,4' triCB		
44*	2,2',3,5' tetraCB		
49	2,2',4',5 tetraCB		
52*	2,2',5,5' tetraCB		
66*	2,3',4,4' tetraCB		
87	2,2',3,4,5' pentaCB		
101*	2,2',4,5,5' pentaCB		
105*	2,3,3',4,4' pentaCB		
118*	2,3',4,4',5 pentaCB		
128*	2',3,3',4,4' pentaCB		
138*	2,2',3,4,4',5' hexaCB		
153*	2,2',4,4',5,5' hexaCB		
170*	2,2',3,3',4,4',5 heptaCB		
180*	2,2',3,4,4',5,5' heptaCB		
183	2,2',3,4,4',5'6 heptaCB		
184	2,2',3,4,4',6,6' heptaCB		
187*	2,2',3,4',5,5',6 heptaCB		
195*	2,2',3,3',4,4',5,6 octaCB		
206*	2,2',3,3',4,4',5,5',6 nonaCB		
209*	2,2',3,3',4,4',5,5',6,6' decaCB		

The specified methods are recommendations only. Other acceptable methodologies capable of meeting the TDLs can be used. Sample preparation methodology (i.e., extraction and cleanup) (EPA 1993; NOAA 1989) and sample size may need to be modified to achieve the required target detection limits.

Applies to each analyte listed below unless otherwise noted.

Total PCBs are to be estimated based on the following: Total = 2 X [sum of 18 summation congeners marked with *] (T.Wade, personal communication).

TABLE 7

List of Dioxin/Furan Congeners

2,3,7,8-TCDD

1,2,3,7,8-PeCDD

1,2,3,4,7,8-HxCDD

1,2,3,6,7,8-HxCDD

1,2,3,7,8,9-HxCDD

1,2,3,4,6,7,8-HpCDD

OCDD

2,3,7,8-TCDF

1,2,3,7,8-PeCDF

2,3,4,7,8-PeCDF

1,2,3,4,7,8-HxCDF

1,2,3,6,7,8-HxCDF

2,3,4,6,7,8-HxCDF

1,2,3,7,8,9-HxCDF

1,2,3,4,6,7,8-HpCDF

1,2,3,4,7,8,9-HpCDF

OCDF

Testing Procedure: SW846- Method 8290

MDL: 0.000001 ppm

LIAO ASSOCIA S, INC.		TEST BORING REPORT	
PROJECT:	Allendale Dam	BORING NO.	B-2
LOCATION:	N. Providence, RI	PAGE 1 OF	1
DRILLING CONTRACTOR:	Enviro-Tech Drilling	DATE STARTED:	1/27/93
DRILLED BY:	Dan Bilezekian, Richard Canaezo	DATE FINISHED:	1/28/93
INSPECTED BY:	Mark Liao	SURFACE ELEVATION:	91.60'

GROUNDWATER OBSERVATIONS

DEPTH	CASING AT	STABILIZATION
6.0'		20 min.

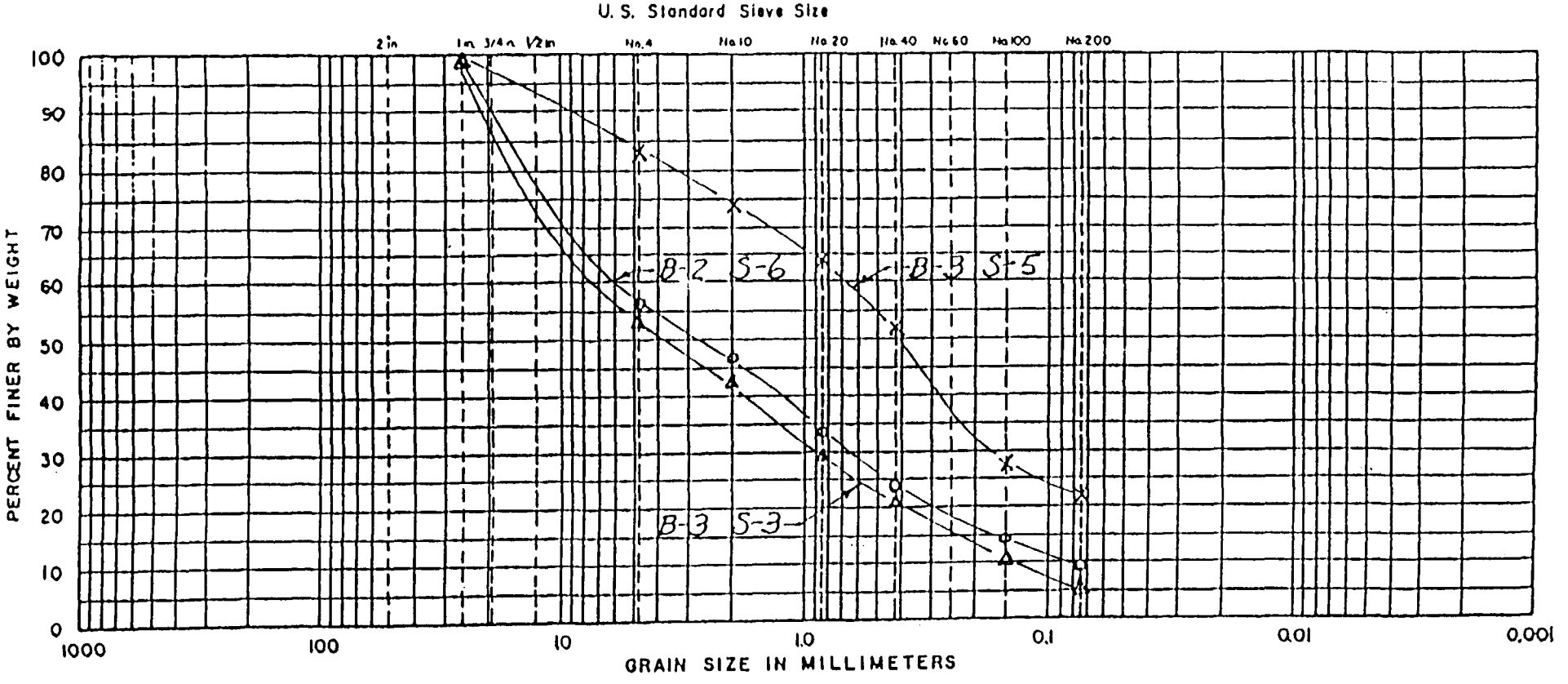
	CASING	SAMPLER	CORE BAR
TYPE:	HSA	split spoon	
SIZE I.D.:	3 3/4"	1 3/8"	
HAMMER WT.:		140 lbs	
HAMMER FALL:		30 in.	

CASING BLOWS PER FOOT	SAMPLING DEPTH FROM - TO	TYPE OF SAMPLE	HAMMER BLOWS ON SAMPLER 0-6"	6-12"	12-18"	18-24"	STRATA CHANGE	DESCRIPTION OF MATERIALS	SAMPLE NO.	PEN. (in.)	REC. (in.)
	0 - 2'	spoon	14	27	10	4		FILL: Silty fine to medium sand with some gravel, brown, medium dense to dense, moist. Color changed to gray at 4'.	S-1	24	6
	2' - 4'	spoon	15	16	19	10			S-2	24	12
	4' - 6'	spoon	13	13	15	9	6'		S-3	24	9
	6' - 8'	spoon	5	4	4	1		FILL: Silty fine to coarse sand with gravel, gray, loose, wet. Wood plank about 1" thick at about 10'.	S-4	24	2
	8' - 9'	spoon	1	1	4	15			S-5	12	1
	9' -11'	spoon	3	12	20	11			S-5a	24	1
							12'				
	11' - 13'	spoon	7	12	6	5	13'	SILTY SAND: Gray silty sand with gravel, medium dense, wet.	S-6	24	6
	13' - 13'	spoon	60/0"					ROCK FORMATION: Granite (a 16" boulder or thin rock layer) on schist.			
							17'-3"	13' to 15.5' Lr = 0.60, RQD = 0.52			
								15.5' to 17.25' Lr = 0.62, RQD=0.40			
								Loss of return water @ about 15'			
								End of test boring			

GENERAL REMARKS: Coring Rates: 13' to 14' 8 min., 14' to 15' 5 min., 15' to 15'-6" 2 min., 15'-6" to 16' -6" 5 min., 16'-6" to 17'-3" 6 min.

Note: The ground surface elevation is based on the plan prepared by Waterman Engineering Co. of E. Providence, RI dated on Dec. 1992.

GRAIN SIZE DISTRIBUTION



COBBLES	GRAVEL		SAND			SILT or CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

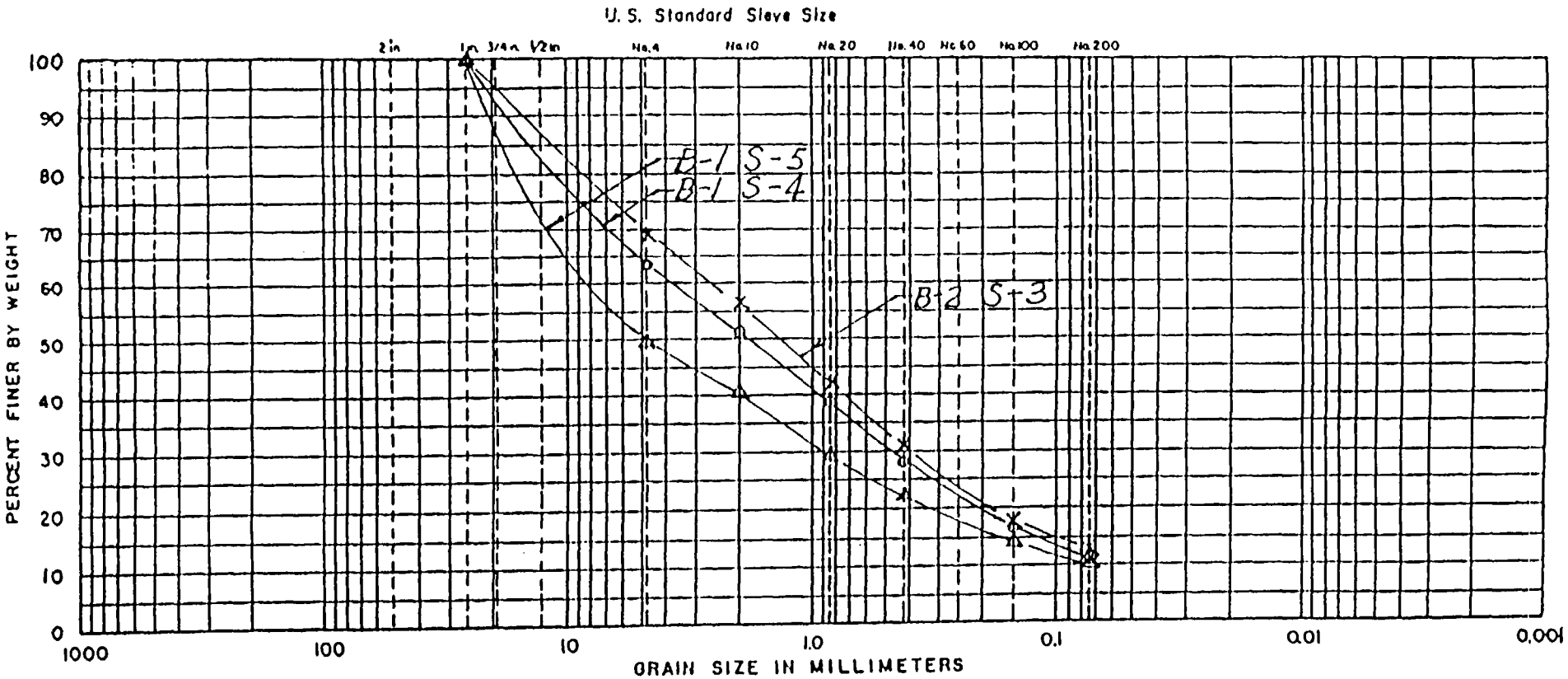
UNIFIED SOIL CLASSIFICATION SYSTEM, CORPS OF ENGINEERS, U.S. ARMY

SAMPLE I.D.	DEPTH	DESCRIPTION
B-2 S-6	11'-13'	Gravelly fine to coarse sand with some silt (SP-SM).
B-3 S-3	4'-6'	Gravelly fine to coarse sand with trace silt (SP)
B-3 S-5	8'-10'	Gravelly silty fine sand with some organics (SM).

PROJECT Allendale Dam
N. Providence, RI

FILE NO. 933-RI DATE 2/5/93

GRAIN SIZE DISTRIBUTION



COBBLES	GRAVEL		SAND			SILT or CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM, CORPS OF ENGINEERS, U.S. ARMY

SAMPLE I.D.	DEPTH	DESCRIPTION
B-1 S-4	6'-8'	Gravelly fine to coarse sand with some silt (SP-SM).
B-1 S-5	8'-10'	Sandy gravel with some silt (GP-GM).
B-2 S-3	4'-6'	Gravelly fine to coarse sand with some silt (SP-

PROJECT Allendale Dam
N. Providence, RI

FILE NO. 933-RI DATE 2/5/93

LIAO ASSOCI ES, INC.		TEST BORING REPORT	
PROJECT:	Allendale Dam	BORING NO.	B-3
LOCATION:	N. Providence, RI	PAGE 1 OF	1
DRILLING CONTRACTOR:	Enviro-Tech Drilling	DATE STARTED:	1/28/93
DRILLED BY:	Dan Bilezekian, Richard Canaczo	DATE FINISHED:	1/28/93
INSPECTED BY:	Mark Liao	SURFACE ELEVATION:	91.48'

GROUNDWATER OBSERVATIONS

DEPTH	CASING AT	STABILIZATION
1.5'		20 min.

	CASING	SAMPLER	CORE BAR
TYPE:	HSA	split spoon	
SIZE I.D.:	3 3/4"	1 3/8"	
HAMMER WT.:		140 lbs	
HAMMER FALL:		30 in.	

CASING BLOWS PER FOOT	SAMPLING DEPTH FROM - TO	TYPE OF SAMPLE	HAMMER BLOWS ON SAMPLER 0-6"	6-12"	12-18"	18-24"	STRATA CHANGE	DESCRIPTION OF MATERIALS	SAMPLE NO.	PEN. (in.)	REC. (in.)
	0 - 2'	spoon	2	14	8	9		FILL: Silty fine to medium sand with gravel and cobbles, gray, medium dense, wet. Soil with organics, loose, from about 6' to 9'.	S-1	24	6
	2' - 4'	spoon	10	12	13	10			S-2	24	8
	4' - 6'	spoon	11	11	25	15			S-3	24	7
	6' - 8'	spoon	8	4	2	1	8'		S-4	24	4
	8' - 10'	spoon	1	3	10	10		SILTY SAND: Silty fine to medium sand with organics, brown, loose to med. dense, wet.	S-5	24	15
	10' - 11'	spoon	5	130			11'		S-6	24	1
								Refusal encountered at 11'-6".			

GENERAL REMARKS:

Note: The ground surface elevation is based on the plan prepared by Waterman Engineering Co. of E. Providence, RI dated on Dec. 1992.

LIAO ASSOCIATES, INC.		TEST BORING REPORT	
PROJECT:	Allendale Dam	BORING NO.	B-4
LOCATION:	N. Providence, RI	PAGE 1 OF	1
DRILLING CONTRACTOR:	Enviro-Tech Drilling	DATE STARTED:	1/29/93
DRILLED BY:	Dan Bilezekian, Richard Canaezo	DATE FINISHED:	1/29/93
INSPECTED BY:	Mark Liao	SURFACE ELEVATION:	93.18'

GROUNDWATER OBSERVATIONS

DEPTH	CASING AT	STABILIZATION
11.0'		20 min.

	CASING	SAMPLER	CORE BAR
TYPE:	HSA	split spoon	
SIZE I.D.:	3 3/4"	1 3/8"	
HAMMER WT.:		140 lbs	
HAMMER FALL:		30 in.	

CASING BLOWS PER FOOT	SAMPLING DEPTH FROM - TO	TYPE OF SAMPLE	HAMMER BLOWS ON SAMPLER 0-6"	6-12"	12-18"	18-24"	STRATA CHANGE	DESCRIPTION OF MATERIALS	SAMPLE NO.	PEN. (in.)	REC. (in.)
	0 - 2'	spoon	2	2	2			FILL: Silty fine to coarse sand with gravel, construction debris, loose to medium dense, dry to moist.	S-1	18	7
	2' - 4'	spoon	1	3	5	7			S-2	24	1
	4' - 6'	spoon	7	6	8	4			S-3	24	1
	6' - 8'	spoon	4	5	5	13			S-4	24	6
	8' - 10'	spoon	9	18	10	5	10'		S-5	24	6
	10' - 12'	spoon	3	12	8	12		SILTY SAND: Brown silty sand, medium dense, changing to gray rock fragments and coarse sand at 12'-5".	S-6	24	10
	12'-13.4'	spoon	28	32	100/5"		13' - 5"		S-7	17	8
								Refusal encountered at 13' - 5".			

GENERAL REMARKS:

Note: The ground surface elevation is based on the plan prepared by Waterman Engineering Co. of E. Providence, RI dated on Dec. 1992.

LIAO ASSOCIA .S, INC.		T_ _ / BORING REPORT	
PROJECT:	Allendale Dam	BORING NO.	B-1
LOCATION:	N. Providence, RI	PAGE 1 OF	1
DRILLING CONTRACTOR:	Enviro-Tech Drilling	DATE STARTED:	1/27/93
DRILLED BY:	Dan Bilezekian, Richard Canaezo	DATE FINISHED:	1/27/93
INSPECTED BY:	Mark Liao	SURFACE ELEVATION:	92.44'

GROUNDWATER OBSERVATIONS

DEPTH	CASING AT	STABILIZATION
6.0'		20 min.

	CASING	SAMPLER	CORE BAR
TYPE:	HSA	split spoon	
SIZE I.D.:	3 3/4"	1 3/8"	
HAMMER WT.:		140 lbs	
HAMMER FALL:		30 in.	

CASING BLOWS PER FOOT	SAMPLING DEPTH FROM - TO	TYPE OF SAMPLE	HAMMER BLOWS ON SAMPLER 0-6"	6-12"	12-18"	18-24"	STRATA CHANGE	DESCRIPTION OF MATERIALS	SAMPLE NO.	PEN. (in.)	REC. (in.)
	0 - 2'	spoon	7	8	14	16		FILL: Fine to coarse sand with gravel and cobbles, gray, medium dense, moist.	S-1	24	6
	2' - 4'	spoon	8	10	15	22			S-2	24	7
	4' - 6'	spoon	15	19	10	10	6'		S-3	24	2
	6' - 8'	spoon	5	5	5	5		FILL: Silty fine to coarse sand with gravel, brown. medium dense, wet.	S-4	24	8
	8' - 10'	spoon	5	5	6	5			S-5	24	7
	10' - 12'	spoon	5	22	15	21	12'-4"	Wood plank about 1" thick at about 11'.	S-6	24	2
							16'-4"	ROCK FORMATION: Schist Recovery Ratio Lr = 0.96 Rock Quality Designation RQD = 0.75			
								End of test boring			

GENERAL REMARKS: Coring Rates: 12'-4" to 13'-4" 9 min., 13'-4" to 14'-4" 7 min., 14'-4" to 15'-4" 9 min., 15'-4" to 16'-4" 9 min.

Note: The ground surface elevation is based on the plan prepared by Waterman Engineering Co. of E. Providence, RI dated on Dec. 1992.

APPENDIX A2

5/17/99 Scoping Meeting

EPA-NE QAPP Worksheet #8a - Rev. 9/98
Complete this worksheet for each project scoping meeting held. Attach meeting agenda and notes. (Refer to *QAPP Manual* Section 5.1 for guidance.)

Title:
Revision Number:
Revision Date:
Page ____ of ____

Project Scoping Meeting Attendance Sheet

EPA Regulation Program: RCRA FIFRA TSCA CERCLA DW CWA CAA
Program: Brownfields, NPDES, etc.
Projected Date(s) of Sampling
Project Manager

Site Name Centredale Manor
Site Location North Providence, RI
CERCLA Site/Spill Identifier No. 01
Operable Unit
Other Site Number/Code
Phase: ERA SA/SI pre-RI RI (phase I, etc.) FS RD RA post-RA (circle one)
Other phase:

Date of Meeting: 5-17-99
Meeting Location: EPA Region I - Boston

Name	Title	Affiliation	Phone #	Project Role
Ted Berends	OSC	EPA	98-430	OSC
Mike Quinlan	QA Officer	IT	508 497-6130	QA Oversight
Michael Blodgett	RM.	IT	508 497-6154	Response Mgr.
Andy Beliveau	EPA QA	EPA	781-860-4667	EPA QA
Sara E. Conway	Environmental Scientist	Weston	(781) 229/643 x20	Site/H/S
George Mavris	START QAO	Weston	(781) 229-6430 x201	Project Leader

Meeting Purpose: Outline sampling and analytical requirements as well as roles and responsibilities of IT, START & EPA personnel.

Comments: See attached Meeting notes

Scoping Meeting Notes
Centredale Manor Project
5/17/99

Attendees: Ted Bazenas – EPA OSC
Mike Quinlan – IT QA
Mike Blodgett – IT RM
Andy Beliveau – EPA QA
Renata Wynnyk – START – ES
George Mavris – START – QA

New QAPP Guidance to be followed! IT will prepare QAPP for review by EPA and START. Beliveau want the where, when and why of sampling and analysis in the QAPP write up with SOPs attached to explain the How.

Will use Region VII dioxin screening method for some of the analyses – low resolution method provided to IT by Ted as well as 1613.

Reviewed Ted's five items with respect to sampling and analysis. See attached.

1) Judgemental surface samples to be collected from each of the 26 properties surrounding Allendale Pond. Method 1613 involves isotopic dilution and is otherwise very similar to 8290. Good method for wet sediments and soils. Samples to be collected from 0-2 inch depth interval at depositional areas below high water line. Andy Beliveau to provide surface sampling SOP used for previous sampling work.
2) Collect samples at depth for where the results of recent sampling exceed 1 ppb. Analyze for TCDD using Region VII screening method. 25 % of the samples to also be analyzed for TCL organics, TAL inorganics by SW846 Methods. Must think about sample volumes required. Co-locating samples OK if not VOC analysis. Encore and method 5035 must be used for VOC sampling. Ted thinks the quantity will exceed his estimate of 135 probably by 2-3X. Results from recent investigation is not yet available because it has not all been validated.

   Must warn labs of potential dioxin in all samples. Must figure out what kind of equipment makes the most sense. Geoprobe good for most of the work, but hand-augering may be more appropriate in wetland areas. Should have SOPs for methods used. EPA Region I will reject data with solids below 30%. We must ask laboratory to perform moisture content first for non-volatile and non-semivvolatile organics analyses.
3) Geoprobe in suspected drum area to assess potential contamination.
4) Drum content samples for disposal analysis, no trench samples built in.
5) The sampling requested by USACE will be built into the plan but may not be done.

Roles and Reponsibilities

a) IT will develop QAPP – Draft by 4 June 99
Final by 15 June 99
Mgt. Committee on 16 June 99

Mgt. Committee includes – public and RI representative.

b) START will prepare the H&S Plan
c) Field Mobe. – IT
d) Sampling will be a joint effort between IT personnel and Weston Personnnel.
e) Geotechnical – START or REAC
f) Lab Procurement – IT (Andy B. to provide laboratory names (must be able to perform Region VII SOP
g) Documentation – Shared responsibility
REAC has good system that prints out labels and COCs. We would have to get a special printer. Training to be provided by REAC.
Info mgt. IT will manage the data because we get it.
h) QA (Data Validation) – Undecided. Andy B. to get us new Dioxin validation guidance.

Ted to get me a copy of Sampling Plan for previous effort.

Discussed Signs (START), Trailers (Decon size?) and fence installation (surveying makes sense.

APPENDIX A3

5/25/99 Scoping Meeting

Scoping Meeting Notes
Centredale Manor Project
5/25/99

Attendees: Ted Bazenas – EPA OSC
Mike Quinlan – IT QA
Mike Blodgett – IT RM
Barry Taggart – IT T&D

Discussed approach to project and project schedule.

Drum Area

- Geoprobing will be initiated in the area of the buried drums based on Geophysical data provided. Maximum 25 ft. sq. grid to be used in drum area.
- Screening of samples will be conducted using a PID and HazCat if appropriate. Samples will be collected for 2,3,7,8-TCDD and PCBs for 5 day TAT. Other analyses may be performed at this time based on field screening. Should look into immunoassay.
- Test pitting can be initiated based on field screen results – **State of RI has given permission to backfill the pits unless extremely contaminated soils are encountered (i.e. saturated with chemicals).** Characterization samples will be collected at this point if buried drums are present.

Grid/Residence Sampling

- Sampling will proceed at grid locations where previous sample results indicate dioxin greater than 1 ppb. 5 day TAT required Centredale/Brook Village area. 25% percent of locations for Full TAL/TCL suite will be based on Sample station. Some will be judgemental to provide additional information for T&D.
- Geoprobe rig to be used in dry areas and hand auguring to be used for wetland locations. Surface samples at residences to be collected by hand.
- Definition of surface sampling may changed from 2" depth to 1' depth for flood plain sampling based on EPA risk assessment protocols.
- Assume sampling in Dam area will be conducted per USACE request.

Remediation

- Buried drums and hotspots will require remediation. T&D will be set up before remediation is performed. Dioxin hotspot removals will be initiated based on data review. Capping is an alternative to off-site disposal. Fencing will most likely be the action to address flood plain contamination.
- Efforts will be made to use equipment that can be located on clean ground during remediation.
- Small Frac Tank will be on site to store decontamination fluids.

T&D

- Full TCLP is typically going to be needed, however totals are usually needed to demonstrate attainment of Universal Treatment Standards.
- EPA has made determination that waste generated from the site will not be F-listed. This increases the likelihood that waste will be non-haz dioxin containing.

Tentative Schedule

- Draft QAPP and Work Plan to be submitted on 4 June 99 provided that the off-site laboratory information can be incorporated by this time.
- EPA to review and turn over to the Management Group on Wednesday 9 June for their review which should be completed w/in one week.
- Training on ERT data management system (Scribe®) to be conducted on 15 June. Two people from IT, two from START and possibly some from EPA.
- Geoprobing to begin in drum area on 21 June if all goes well.
- Clearing and Grubbing Activities, some fence installation, support trailer setup, grid location markouts to be conducted between 1 June and 18 June.
- Test pitting to start as early as 5 July
- Drum Excavation to start 2 August.

EPA-NE QAPP Worksheet #8a - Rev. 9/98
Complete this worksheet for each project scoping meeting held. Attach meeting agenda and notes. (Refer to *QAPP Manual* section 5.1 for guidance.)

Title:
Revision Number:
Revision Date:
Page ____ of ____

Project Scoping Meeting Attendance Sheet

EPA Regulation Program: RCRA FIFRA TSCA CERCLA DW CWA CAA
Program: Brownfields, NPDES, etc. ____
Projected Date(s) of Sampling ____
Project Manager ____

Site Name Centredale Manor
Site Location North Providence RI
CERCLA Site/Spill Identifier No. 01
Operable Unit ____
Other Site Number/Code ____
Phase: ERA SA/SI pre-RI RI (phase I, etc.) FS RD RA post-RA (circle one)
Other phase: ____

Date of Meeting: 5-25-99
Meeting Location: Centredale Manor Site

Name	Title	Affiliation	Phone #	Project Role
TED BAZENAS	OSC	EPA	617 918-1230	OSC
MIKE QUINLAN	IT QA	IT	508 497-6130	QA TECH OVERSIGHT
Michael Blodgett	RM	IT	508 497-6154	RM
BARRY TAGGART	T&D COORDINATOR	IT	508 497-6147	T&D

Meeting Purpose: Discuss schedule including Analyt. TATs & T&D.

Comments: See attached Notes

APPENDIX A4

6/7/99 Telecon (re: Method 8290)

INTERNATIONAL TECHNOLOGY CORPORATION

RECORD OF ☒ TELECON ☐ MEETING

Project Name	Number	Phase	Task	Subtask
Centredale Manor				

Date 6-7-99 Time 10 AM

CALL FROM ☐ CALL TO ☒ NAME: Mike Quinlan - IT

CALL FROM ☐ CALL TO ☐ NAME: Andy Beliveau - EPA

Telephone Number:

Company Name:

Address:

City

State Zip Code

Other Participants — Name/Location/Representing:

Topic Method for Dioxins Analysis

Summary (Decisions & Specific Actions Required by Named Persons):

Andy indicated that method 8290 was preferable for the Centredale Manor site for the following reasons:

1) 8290 was used for sample analysis for previous investigations at the site (consistency) and

2) The spiking procedure for 8290 allows for closer monitoring of cleanup procedure common for preparation of soils & sediments for analysis.

Required Action: M. Quinlan to change QAPP to reflect using 8290. Also contact the lab. regarding cost impact, if any.

Prepared by (Signature): Michael Quinlan

Distribution:
Original to Project File
Copy to Project Manager
Copy to Preparer

☐ Other Distribution (By Preparer)

PAGE 1 OF 1

548A-8-87