CONROY ENVIRONMENTAL CONSULTANTS, INC.
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BROWNFIELD CLEANUP PROGRAM
REMEDIAL INVESTIGATION WORK PLAN

353 MCKIBBIN STREET
BROOKLYN, NEW YORK 11206

JUNE 2005

Prepared for:

Mehadrin Dairy Corporation
(and it's affiliates LFW Dairy Corporation and BBM LLC)
30 Morgan Avenue
Brooklyn, New York 11237

Prepared by:

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Introduction and Purpose

This site-specific RIWP is submitted pursuant to a BCP Application for 353 McKibbin Street Brooklyn New York (site). The RIWP Is developed in accordance with the Draft Brownfield Cleanup Program Guide (guidance), New York State Department of Environmental Conservation (NYSDEC), May, 2004. Other NYSDEC guidance documents cited by the guidance are also used.

The purpose of the RIWP is to adequately characterize the nature and extent of on-site contamination and off-site contamination, in order to assess exposure is to humans and the environment and to provide data for preparation of a remediation plan.

The RIWP is developed with regard to factors including site history, geology, and contaminant type and volume.

The RIWP specifies data collection criteria enabling possible selection of innovative approaches to site remediation.

Site History and Description

Historical uses of the site include but are not limited to a furniture manufacturing plant. Environmental remediation of the vacant property will permit subsequent construction of a 50,000 sq. ft. commercial kosher food distribution center/warehouse. The new building will be occupied by Mehadrin Dairy Corporation, and it's affiliates LFW Dairy Corporation and BBM LLC. The proposed building cannot be erected until remediation is conducted in accordance with the BCP.

The proposed new building will be on an approximately one acre parcel of land. Estimated development costs are $6.5 million for construction of the building, plus up to an estimated $1 million for environmental remediation, equaling a total development cost of approximately $7.5 million.

In accordance with the goals of the BCP the future use of the site will be beneficial in terms of employment and neighborhood improvement.

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Objectives, Scope of Field Activities (including Exposure Assessment), and Rationale

The objective of the RIWP is to specify site specific investigation plans that will yield data necessary to prepare a remediation plan. The RIWP provides data collection methods that will facilitate the assessment of alternative remedial methods including possible innovative approaches. The design and installation of groundwater monitoring wells will provide and also facilitate:

- groundwater sampling;
- calculation of groundwater flow direction;
- possible aquifer characterization via pump tests;
- possible vapor extraction tests;
- possible remediation via groundwater extraction and treatement;
- possible remediation via bioremediation;
- possible remediation via vapor extraction; and
- possible monitoring and sampling of groundwater and/or soil remediation.

Groundwater monitoring wells will be drilled and constructed according to NYSDEC guidance and the drilling and installation of the wells will be directly supervised by a CECI Senior Hydrogeologist in order to account for conditions that are encountered in the field such as:

- presence or absence of contaminants at specific depths;
- lithology;
- depth to groundwater; and
- possible drilling refusal requiring the relocation of a drilling location.

The Proposed Groundwater Monitoring Wells PMW-2, PMW-3, PMW-4, and PMW-5 will be drilled and constructed as follows:

- hollow stem rotary auger drilling rig will be used;
- Soil samples will be obtained from monitoring well drilling locations via split spoon sampler;
- Decontamination procedures will be followed;
- Wells will be constructed of 4 inch diameter schedule 40 PVC riser and slotted wrapped screen;
- Sand pack grain size will be compatible with screen slot size;
- Well screen will extend 10 feet into groundwater and five feet above groundwater;

- Sand pack will extend to 2 feet above the well screen and be installed via tremie pipe;
- Bentonite seal of hydrating pellets extending 2 feet thick above well screen and installed via tremie pipe ;
- Bentonite containing grout extending to ground surface and installed via tremie pipe;
- Well stick up consisting of riser pipe sufficient to provide access during other concurrent onsite activities (such as remedial excavation);
- 8 inch diameter protective steel pipe with locking lid, protective bollards and anchored in a concrete well pad installed around the stickup;
- Locking j-plug on sealing the top of the stickup;
- Measuring point elevations provided by a licensed surveyor and permanently etched on the north side of the top of the stick up;
- Permanent metal plate bearing the well designation installed into the concrete well pad; and
- Wells will be developed via purging groundwater using a submersible pump;

The rationale for Proposed Groundwater Monitoring Wells PMW-2, PMW-3, PMW-4, and PMW-5 is to provide:

- Points to calculate groundwater flow direction;
- Hydrogeologically upgradient, downgradient and sidegradient groundwater quality data points regardless of the indicated groundwater flow direction; and
- Soil quality data points.

The Proposed Soil Borings PSB-12 through PSB- 28 will be conducted using direct push technology. Soil and groundwater samples will be collected from each soil boring. Possible soil boring(s) that cannot be completed using direct push technology (due to boring refusal caused by lithology conditions) will be completed using a hollow stem rotary auger drilling rig, split spoon soil sampler and temporary groundwater well points.

The rationale for Proposed Soil Borings PSB-12 through PSB- 28 are the locations with regard to obtaining soil and groundwater quality data in the portions of the site that lack existing soil data (note that the existing soil boring locations provided only soil quality data, no groundwater quality data, and were not drilled and sampled in the same manner as the Proposed Soil Borings will be).

Soil and groundwater samples obtained from the Proposed Groundwater Monitoring Wells and the Proposed Soil Borings will be screened in the field using visual observations and a photoionization detector in order to optimize sample selection for laboratory analysis.

Sample collection and documentation methods will facilitate the preparation of risk assessment model(s). Risk assessment model(s) will be selected based upon the nature on possible contaminants indicated via the soil and groundwater sampling. Computer based risk assessment model(s) will be used wherever possible. The selection of the risk assessment model(s) will be conducted with the concurrence of the NYSDEC.

Risk assessment model(s) will also address possible fish and wildlife site specific exposures. A possible route for the site is a possible exposure route provided by the City storm water system should it empty directly into a waterway.

The soil and groundwater sampling will also contribute to the delineation of potential impacts to soil and groundwater of potential releases from the known historical uses at three AOCs. A major focus of the RIWP work plan is the identification of source areas which may be present a the site.

The sampling design is a judgment-based sampling strategy that relies upon the information available from the Phase I and Phase II ESAs, subsequent site visits, and interviews conducted with owners. Soil and groundwater samples will be collected to characterize the horizontal and vertical presence or absence of contaminants. The parameters to be analyzed include, but are not necessarily limited to based upon field conditions, volatile organic compounds, Semi-VOCs, pesticides, herbicides, metals, PCBs and toxicity characteristics.

Designation	Reference	Media Sample	Possible Analytes
PSB-12	Figure 1	Soil/Groundwater	As Stated Above
PSB-13	Figure 1	Soil/Groundwater	As Stated Above
PSB-14	Figure 1	Soil/Groundwater	As Stated Above
PSB-15	Figure 1	Soil/Groundwater	As Stated Above
PSB-16	Figure 1	Soil/Groundwater	As Stated Above
PSB-17	Figure 1	Soil/Groundwater	As Stated Above
PSB-18	Figure 1	Soil/Groundwater	As Stated Above
PSB-19	Figure 1	Soil/Groundwater	As Stated Above

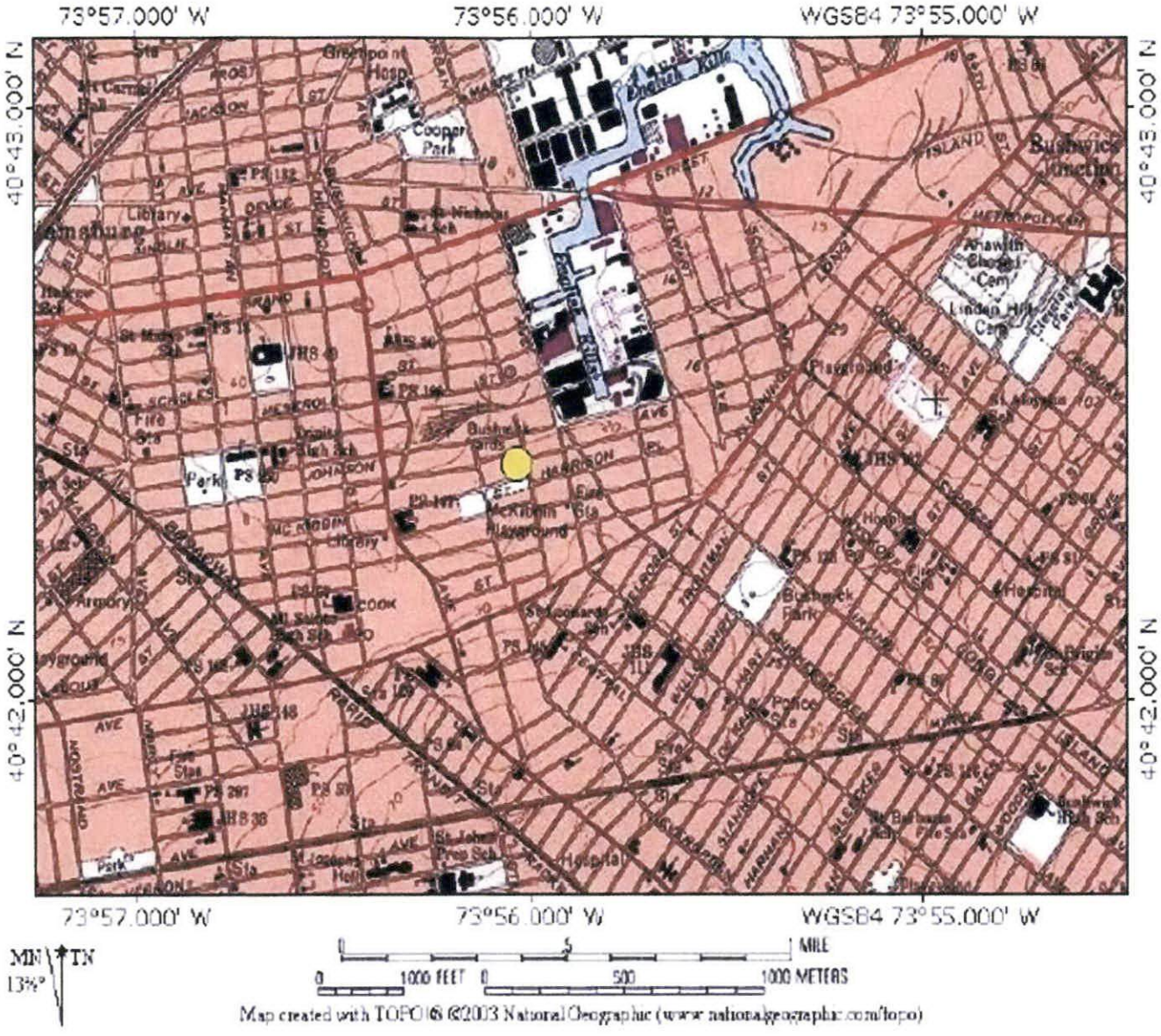
PSB-20	Figure 1	Soil/Groundwater	As Stated Above
PSB-21	Figure 1	Soil/Groundwater	As Stated Above
PSB-22	Figure 1	Soil/Groundwater	As Stated Above
PSB-23	Figure 1	Soil/Groundwater	As Stated Above
PSB-24	Figure 1	Soil/Groundwater	As Stated Above
PSB-25	Figure 1	Soil/Groundwater	As Stated Above
PSB-26	Figure 1	Soil/Groundwater	As Stated Above
PSB-27	Figure 1	Soil/Groundwater	As Stated Above
PSB-28	Figure 1	Soil/Groundwater	As Stated Above
PMW-2	Figure 1	Soil/Groundwater	As Stated Above
PMW-3	Figure 1	Soil/Groundwater	As Stated Above
PMW-4	Figure 1	Soil/Groundwater	As Stated Above
PMW-5	Figure 1	Soil/Groundwater	As Stated Above

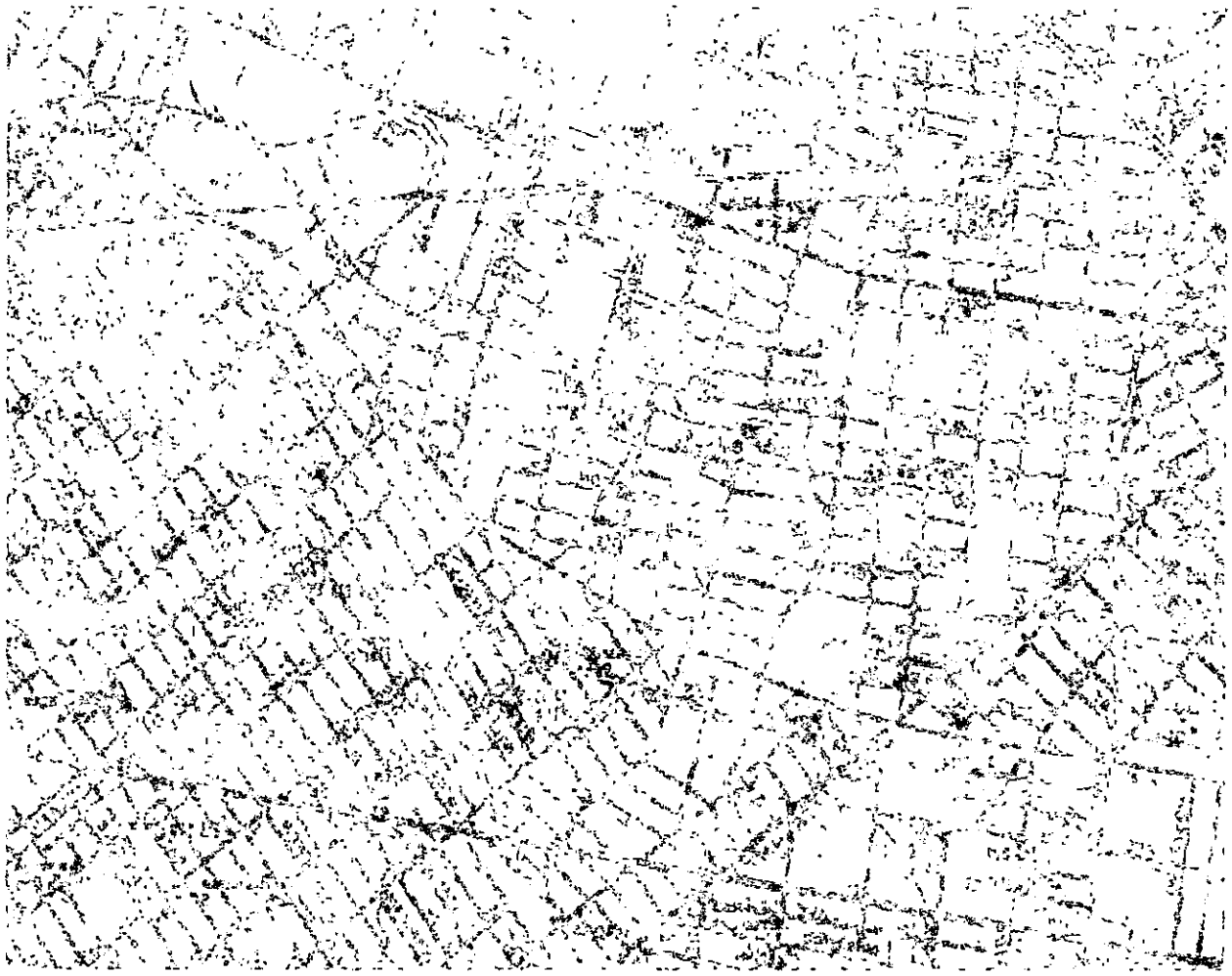
QA/QC Plan

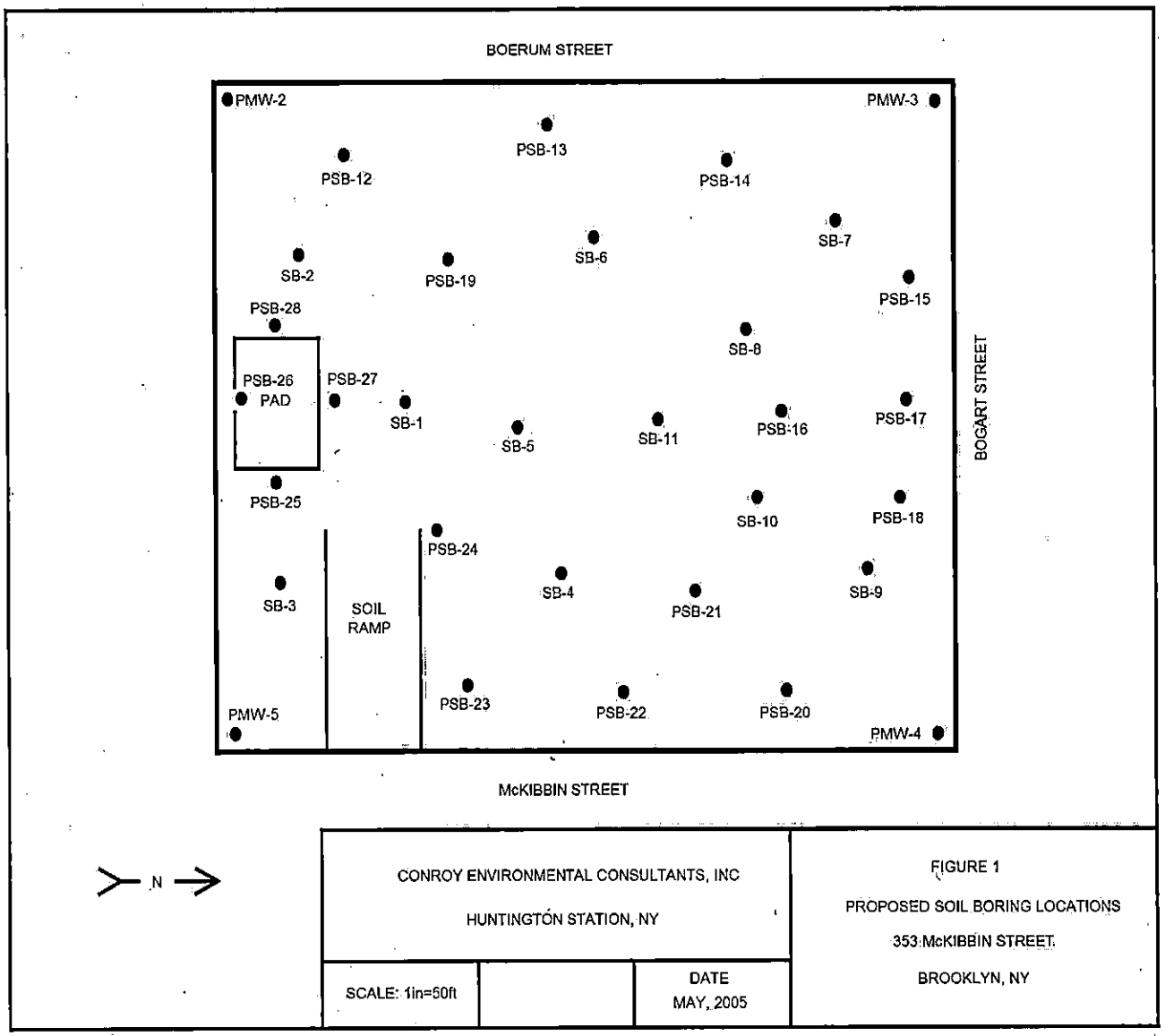
Refer to the SAMP (attached).

Health and Safety Plans (HASP)

Shown below is a DRAFT HASP for the site RI.


73°57.000' W
73°56.000' W
WGS84 73°55.000' W
40°43.000' N
40°42.000' N
MIN
13½°
TN
0
5
MILE
0
1000 FEET
0
500
1000 METERS
Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)




BOERUM STREET
PMW-2
PMW-3
PSB-13
PSB-12
PSB-14
SB-7
SB-6
SB-2
PSB-19
PSB-15
PSB-28
SB-8
PSB-26
PAD
PSB-27
SB-1
SB-5
SB-11
PSB-16
PSB-17
BOGART STREET
PSB-25
SB-10
PSB-18
PSB-24
SB-4
SB-9
SB-3
SOIL
RAMP
PSB-21
PSB-23
PSB-22
PSB-20
PMW-5
PMW-4
McKIBBIN STREET
N
CONROY ENVIRONMENTAL CONSULTANTS, INC
HUNTINGTON STATION, NY
FIGURE 1
PROPOSED SOIL BORING LOCATIONS
353 McKIBBIN STREET
BROOKLYN, NY
SCALE: 1in=50ft
DATE
MAY, 2005

Brownfields Cleanup Program

Site Specific

Sampling, Analysis and Monitoring Plan

(SAMP)

Brownfields Cleanup Program
353 McKibbin Street
Brooklyn, New York

CONTENTS

Assessment/Oversight:

Data Validation and Usability:

List of Figures

List of Attachments

BROWNFIELDS SAMP - DATE: May 19, 2005

FORM A: TITLE PAGE AND APPROVAL PAGE

Brownfields

Site Specific

Sampling, Analysis and Monitoring Plan

(SAMP)

The undersigned agrees to follow the accompanying Generic Brownfields Quality Assurance Project Plan (QAPP) boilerplate to prepare site-specific SAMPs using this template for remedial pilot projects funded under the NYSDEC Region 2 Brownfields Program. The undersigned also agrees to incorporate any comments provided by their governing state environmental regulatory authorities (NYSDEC) concerning the development of site-specific SAMPs.

New York State Department of
Environmental Conservation Concurrence:

_____

Signature

_____

Printed Name/Date

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM B: PROJECT ORGANIZATION AND RESPONSIBILITY

B.0 Project Organization and Responsibilities

• NYSDEC Review and Oversight	Hari Agrawal, P.E.
• Overall Project Coordination	William Conroy, P.G.
• Overall QA	William Conroy, P.G.
• Systems Auditing	William Conroy, P.G.
• Performance Auditing	William Conroy, P.G.
• Sampling Operations	William Conroy, P.G.
• Sampling QC	William Conroy, P.G.
• Laboratory Analyses	South Mall Analytical Laboratory
• Laboratory QC	William Conroy, P.G.
• Data Processing Activities	William Conroy, P.G.
• Data Processing QC	William Conroy, P.G.
• Data Quality Review	William Conroy, P.G.

B.1 Organization

Hari Agrawal, P.E. – NYSDEC Oversight
William Conroy, P.G. – Conroy Environmental Consultants, Inc.

B.2 Personnel Information

Hari Agrawal, P.E
Brownfields Project Manager
NYSDEC, Region 2
47-40 21st Street, Long Island City, New York 11011-5407
718-482-4909

William Conroy, P.G.
Brownfields Project Manager
Conroy Environmental Consultants, Inc.
66 Murdock Street
Huntington Station, New York 11746-4349
631-423-1240

B.3 Laboratory Information

Laboratory Name & Address[1]	Contact & Telephone Number	Sample Analyses
South Mall Analytical Laboratories 41 North Mall Street Plainview, New York 11739	Joseph Schualys 516-293-2191	

[1] Demonstration of a laboratory's capability, with respect to their ability to analyze selected contaminants, should be ascertained whenever possible. One approach to rendering such a determination is to obtain Performance Evaluation (PE) results for any pertinent analyses from an ongoing State or Federal monitoring program. If no applicable PE results are available, method control samples containing the analytes of interest at the concentration levels of concern could be submitted prior to initiating the project for pre-qualification. Alternatively, an on-site audit or a quality assurance (QA) management plan review may be sufficient mechanism means to assess a laboratory's ability.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM C: PROJECT DEFINITION

C.0 Site Background

This section contains the Historical Data Review and the Site Reconnaissance Reports. These reports are extractions from the Phase I Assessment (attached). The Phase I was completed for 353 McKibbin Street.

1. An Area Of Concern (AOC) consists of 353 McKibbin.

C.1 Historical Data Review Report

C.1.1 Former Use

See the Phase I Assessment (attached).

Sanborn Fire Insurance Maps

See the Phase I Assessment (attached).

Aerial Photographs

See the Phase I Assessment (attached).

Interviews

See the Phase I Assessment (attached).

Site Inspection

See the Phase I Assessment (attached).

See the Phase I Assessment (attached).

BROWNFIELDS SAMP - DATE: May 5, 2005
FORM D: PROJECT DESCRIPTION/PROJECT TIME LINE

D.0 Data Use Objectives

- Locating and identifying potential sources of hazardous waste or petroleum contamination (sampling data are used when formulating remediation strategies, and estimating remediation costs).
- In so far as feasible given budget constraints to delineate horizontal and vertical contaminant concentrations, identifying clean areas, estimating volume of contaminated soil, and establishing a clearly defined removal design.
- Determining if there is an impact threat to public health or the environment from hazardous waste or petroleum releases.
- Provide data to assist in determining treatment and disposal options and characterizing soil for on-site or off-site treatment.
- Verifying the attainment of clean-up goals. Ascertaining if additional remediation is required.

D.1 Brownfields Site Investigation Reports

Upon the completion of the Brownfields sampling project, a Site Investigation Report (SIR) will be submitted. All sampling data will be compared to the NYSDEC TAGM Soil Cleanup Objectives. The report will specify which samples exceed NYSDEC Guidelines for which parameters. The Brownfield SIR will recommend one or more of the following to summarize the environmental condition and recommended actions for the property:

- Further sampling is required.
- Remedial actions are recommended.
- No additional actions are recommended.

The Brownfield SIR will base any of the aforementioned recommendations concerning the property on the collected data and on other data or facts that have been collected on the subject property.

D.2 Quality of Data Needed for Environmental Data Measuring

As per the U.S.EPA Region 2 Generic Brownfields QAPP boilerplate:

The sampling results must be representative of the concentration of contaminants that actually exist at the site that is being studied, as these results will be used to determine potential costly remedial actions. To ensure the accuracy of the results, this Site-Specific Brownfields SAMP is based on the following procedures:

- The available site information is evaluated;
- Suitable geophysical techniques, field screening, and sampling techniques are planned;
- Proper sample collection, preservation, and transport techniques are specified;
- Proper fixed laboratory analyses have been planned;
- Appropriate quality assurance/quality control (QA/QC) samples are specified to be collected and analyzed;
- Plans are made to interpret the geophysical and analytical data; and
- The data usability criteria have been set.

A Photoionization Detector (PID) will be used as a field screening technique to detect likely areas of volatile organic compound (VOC) contamination that may be present. However, at least 20% of the locations where PID negative screening data is obtained will be analyzed at a fixed laboratory for confirmation to minimize the occurrence or impact of false non-detect results in screening data.

This percentage will be raised to 50% for background or "presumed clean" samples with limited deliverables.

D.3 Project Description

D.3.1 353 McKibbin Property AOC

The identified possible sources of contamination include:

See the Phase II Environmental Site Assessment (attached).

D.4 Project Time Line

Activities	Dates	
	Activity Start Date	Activity End Date
Preparation of SAMP	05/19/05	05/19/05
Client Review of SAMP	05/20/05	05/23/05
NYSDEC Review of SAMP	06/15/05	06/22/05
Revisions of SAMP	06/23/05	06/24/05
Conduct Soil Sampling Activities	06/27/05	07/01/05
Analytical Testing and Lab Report	06/28/05	07/04/05
Prepare RI Report / Remedial Work Plan	07/05/05	07/06/05
Client RI Report / Remedial Work Plan	07/07/05	07/08/05
Revisions to RI Report / Remedial Work Plan	07/11/05	07/11/05
Submittal of RI Report / Remedial Work Plan to NYSDEC	07/12/05	-

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM E: SAMPLING DESIGN

E.0 Sampling and Analysis

The purpose of performing a Brownfields site investigation is to determine the presence and identity of contaminants, as well as, the extent to which they have become integrated into the surrounding environment. The objective of this effort will be to collect and analyze environmental samples which are representative of the media under investigation. The methods and equipment used for collecting environmental matrices of concern will vary with the associated physical and chemical properties of each media designated for sampling. To ensure sampling and analytical protocols are appropriate, it is necessary to describe the objectives and details comprising these activities. As a result, the design of a proper sampling scheme, including protocols for collecting rinse blanks, trip blanks, duplicates, and background samples should be derived from an accepted guidance. As such, the U.S.EPA Superfund Program Representative Sampling Guidances, Volume 1: Soil 6; Volume 5: Water and Sediment, Part 1 - Surface Water and Sediment 7; Volume 5: Water and Sediment, Part II - Ground Water 8 are included as attachments to the Generic Brownfields QAPP boilerplate. These media specific guides are the U.S.EPA's formal sampling Guidances which outline protocols for the collection of representative samples to ensure the accurate characterization of site conditions. Therefore, following these guides will assist in the design of a fitting sampling network which is thoroughly justified and documented in the corresponding Site-Specific Brownfields SAMP.

E.1 Sampling Design

CECI has designed surface and subsurface soil sampling site investigations to determine the impacts to soil of potential releases from the known historical uses at three AOCs. The SAMP includes 17 soil/groundwater samples at depth and 4 monitoring wells. The locations of surface soil sampling points and soil direct push or boring locations are depicted in the location maps and the rationale for the location and sampling parameters for each follows.

The sampling design is a judgment-based sampling strategy that relies upon the information available from the Phase I and Phase II ESAs, subsequent site visits, and interviews conducted with owners. Surface soil samples, soil samples from excavations, and soil samples from borings will be collected from the sites to characterize the type and extent of contaminants that may be present. The parameters that will be analyzed include volatile organic compounds, Semi-VOCs, Priority Pollutant metals, and PCBs. The analytical results from soil samples will be compared to NYSDEC TAGM 4046 Soil Cleanup Objectives. These action levels are designed to be conservatively protective of groundwater as well as mitigate risk from direct soil ingestion, and will be considered when making recommendations regarding future site redevelopment.

Sample #	Location	Media Sample	Potential Contaminants
PSB-12	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-13	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-14	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-15	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-16	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-17	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-18	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-19	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-20	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-21	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-22	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-23	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-24	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-25	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-26	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-27	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PSB-28	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PMW-2	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PMW-3	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PMW-4	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs
PMW-5	Figure 1	Soil/Groundwater	SVOCs, PP Metals, PCBs

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM F-1: METHOD AND SOP REFERENCE TABLE

F-1.0 Standard Operating Procedures

Often many routine laboratory and field operations are cataloged to form Standard Operating Procedures (SOPs). Whenever SOPs are applicable and available, they should always be incorporated into the overall data collection activities inherent to performing a Brownfields site investigation. Site Specific Brownfields SAMPs should delineate all activities which could directly or indirectly influence data quality. This should include a determination of all operations which can be covered by SOPs. Therefore, all Site Specific Brownfields SAMPs should contain, at a minimum, SOPs for the following operations:

- Sampling and analytical methodologies.
- Field equipment selection and use.
- Field equipment calibration and standardization.
- Field equipment preventive maintenance.
- QC procedures for intra-laboratory and intra-field activities.
- Data validation.
- Document control procedures.

F-1.1 Sampling SOPs

To ensure environmental sample collection efforts are representative of site conditions, it is customary to utilize accepted SOPs to optimize sampling activities. Sampling SOPs are typically proven protocols which may be varied or changed, as required, depending upon site conditions and/or equipment limitations imposed by the procedures. In all instances, those sampling procedures which will be employed to collect environmental samples for a given site investigation must be documented in the Site-Specific Brownfields SAMP.

To facilitate the selection of appropriate sample collection techniques, it is advantageous that the sampling SOPs employed for a site-specific Brownfields investigation be derived from an accepted guide. As such, the *U.S.EPA Compendia of Emergency Response Team (ERT) Sampling Procedures* including *Soil Sampling and Surface Geophysics Procedures* [9], *Surface Water and Sediment Sampling Procedures* [10], and *Groundwater Sampling Procedures* [11] are included as attachments to the Generic Brownfields QAPP boilerplate. These media specific sampling protocols are the U.S. EPA's accepted SOPs for collecting potentially contaminated environmental matrices of concern such as soil and water. Therefore, to optimize sample collection efforts, these protocols are to be used in conjunction with the *Superfund Program Representative Sampling Guidances*.

F-1.2 SOP Reference Table

ANALYTICAL METHOD REFERENCE

1a. CLP Volatile Organic Compound Analysis – (see Attachment A)

2a. CLP Semivolatile Organic Compound Analysis –(see Attachment A)

3a. CLP Semivolatile Organic Compound Analysis – (see Attachment A)

4a. CLP Priority Pollutant Compound Analysis – (see Attachment A)

PROJECT ANALYTICAL SOPs

1b. Photovac Model 2020 Instrument Manual, dated 2000, prepared by PerkinElmer, Inc. (manufacturer) (see Attachment B)

2b. Quality Assurance Manual for Selected Laboratory (to be submitted when Laboratory is selected)

3b. Field Screening with a Photoionization Detector, SOP #6, dated September 2003, prepared by CECI Env'l Eng., P.C. (see Attachment C)

PROJECT SAMPLING SOPs

1c. U.S.E.P.A. Compendia of Emergency Response Team (ERT) Sampling Procedures including Soil Sampling and Surface Geophysics Procedures, Surface Water and Sediment Sampling Procedures, and Groundwater Sampling Procedures. This SOP is part of the Generic Brownfield QAPP.

2c. Sampling and Guidelines and Protocols dated March 1991, prepared by the New York State Department of Environmental Conservation.

NYSDEC REGION 2 - BROWNFIELDS SAMP - DATE: May 5, 2005

FORM F-1: SAMPLING AND ANALYTICAL REQUIREMENTS

F-2.0 Sampling and Analytical Parameters

In this section of the Site-Specific Brownfields SAMP, detail the data collection and analysis design for the project. Tabulate by matrix/parameter(s) the analytical method(s) for analyzing each matrix of concern, and the anticipated detection limit(s) of the selected laboratory protocols. Insert the appropriate SOP number/letter reference in the table. Form F-1 contains the Method and SOP Reference Table. Attach analytical SOPs for sample collection and analysis for each parameter/matrix.

Matrix (Sample Type)1	Number of Samples2	Sampling SOP3	Parameter/Fraction	Minimum Sample Volume4	Sample Container5	Sample Preservation	Analytic-al Method6	CLP Contractual Reporting Limit	Technical Holding Time
Soil		See Section F-1.2 2c, 3c 2c, 3c 2c, 3c 2c, 3c	Target Compound List (TCL): Volatile Organics (VOCs) Acid Extractable Organics Base & Neutral Organics (BNAs) Pesticides/Aroclors (PCBs) Priority Pollutant Metals: Total Metals	4 oz. 4 oz. 4 oz. 6 oz.	2 oz. clear wide-mouth glass with Teflon lined septum. 4 oz. amber wide-mouth glass with Teflon lined cap. 4 oz. amber wide-mouth glass with Teflon lined cap. 8 oz. clear wide-mouth glass with Teflon lined cap.	Cool to 4°C Cool to 4°C Cool to 4°C Cool to 4°C	OLM0 4.2 OLM0 4.2 OLM0 4.2 ILM0 4.0	10 µg/kg Compound Specific (330-830 µg/kg) Compound Specific (1.7-170 µg/kg) Analyte Specific (0.2-5000 µg/L)	14 days 7 days extract; 40 days analyze 7 days extract; 40 days analyze 180 days; (28 days Hg)

Legend:1 Sample Type: insert sample location, identification number, and sample depth when necessary. 2 The number of samples includes one field duplicate sample. 3 The reference number corresponds to the Project Sampling SOP delineated in Form F-1. 4 Triple volume is required for matrix spike/matrix spike duplicate analysis. 5 All sample bottles must comply with the *U.S.EPA Specifications and Guidance for Contaminant-Free Sample Containers*, OSWER Directive #9240.0-05A, EPA 540/R-93/051. 6 The complete analytical method citation is delineated in Form F-1.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM G: PREVENTIVE MAINTENANCE - FIELD EQUIPMENT

G.0 Preventive Maintenance -Field Equipment

The purpose of this section is to delineate the SOPs/methods which will be utilized to ensure that all field equipment will function in an optimum manner. This summary should reference all pertinent SOPs/methods for performing these activities. It should also include a brief description of each specified procedure along with the frequency of application for employing these methods.

It is important to note that all field equipment should be maintained in accordance with each respective instrument manufacturer's operating instructions with all maintenance activities recorded in a log book. Each equipment log book should remain with instrument except when it is sent out for repairs. This equipment log book is useful in tracking records of usage, maintenance, and repairs.

The field equipment and/or systems requiring periodic preventive maintenance are identified in the following table. All references are included on how periodic preventive and corrective maintenance of field measurement or test equipment will be performed to ensure availability and satisfactory performance. These references include descriptions of how to resolve field instrument deficiencies and when reinspections will be performed. In addition, these references describe the availability of spare parts identified in the manufacturer's operating instructions and how SOPs will be maintained.

Instrument	Activity	Frequency	SOP Reference
Portable Photoionization Detector (PID)	Soil Screening	Daily	1b and 3b

BROWNFIELDS SAMP REVISION DATE: September 10, 2003

FORM H: CALIBRATION AND CORRECTIVE ACTION - FIELD EQUIPMENT

H.0 Calibration and Corrective Action - Field Equipment

The purpose of this section is to delineate the SOPs/methods which will be used to ensure that all field equipment calibration and corrective actions will be performed in a proper manner. This summary should reference all pertinent SOPs/methods for performing these activities. It should also include a brief description of each specified procedure along with the frequency of application for employing these methods. In conjunction, it is essential that these activities should always be recorded in a log book.

Performing instrument calibration is a necessary function which ensures the accuracy and precision of field testing equipment. Subsequently, the following procedures should always be implemented when calibrating field instrumentation:

- Reference the applicable SOP or provide a written description of the calibration procedure(s) used for each field measurement system.
- List the frequency planned for re-calibration and/or the criteria, including acceptance limits, utilized to dictate the frequency of re-calibration.
- List the calibration standards to be used and their source(s), including traceability procedures.

Corrective actions are the processes for rectifying a field measurement system which is not operating within specified control limits. These techniques which facilitate the collection of representative field measurement data should always include the following information:

- The pre-determined limits for data acceptability beyond which corrective action is required.
- Procedures for corrective actions.
- Identify the individuals responsible for initiating and approving the implementation of corrective actions for each measurement system.

Therefore, the table below identifies all tools, gauges, and equipment for field screening data collection efforts which require calibration to operate within specified limits. References are provided for all calibration procedures using certified equipment and standards with recognized performance criteria. In addition, the procedures are specified for maintaining calibration and corrective action records.

Instrument	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Reference
Photoionization Detector (PID)	Calibrate with standard gas	Daily	Reading equal to standard concentration	Adjust span knob until reading equals standard	1b, 3b
PID continued	Zero meter	Daily	Reading equal to zero after checking standard gas	Adjust zero control knob until reading is zero	1b, 3b

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM I: PREVENTIVE MAINTENANCE - LABORATORY EQUIPMENT

I.0 Preventive Maintenance - Laboratory Equipment

The purpose of this section is to delineate the SOPs/methods used to ensure the optimum performance of laboratory equipment. It is essential that the frequency and application of these methods be appropriately recorded in a log book. In conjunction, it is advantageous to provide a schedule of all the routine preventive maintenance tasks which will be performed to minimize laboratory instrument downtime. It is customary that these SOPs/methods note and address all critical spare parts that should be on hand to minimize instrument downtime.

All laboratory equipment should be maintained in accordance with each respective instrument manufacturer's operating instructions with all maintenance activities recorded in a log book. Each equipment log book should remain with instrument except when it is sent out for repairs. This equipment log book is useful in tracking records of usage, maintenance, and repairs.

The selected analytical laboratory will provide the soil analytical support for this SAMP. Consequently, the selected analytical laboratory will be responsible for performing preventive maintenance on the laboratory equipment. The selected analytical laboratory will include the proper certifications in the appropriate categories of the ASP/CLP under the Contract Laboratory Protocol (CLP) section. The selected analytical laboratory will be required to submit and follow their approved Quality Assurance Manual, including preventive maintenance.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM J: CALIBRATION AND CORRECTIVE ACTION - LABORATORY EQUIPMENT

J.0 Calibration and Corrective Action - Laboratory Equipment

The purpose of this section is to delineate the analytical techniques which will ensure the laboratory instrumentation employed will accurately and precisely quantitaté the target analytes of concern.

The selected analytical laboratory will provide this information for all the target compound list of parameters such that the data objectives of this SAMP are supported. The protocol will follow the *USEPA – Contract Laboratory Protocol OLMO 4.1* for inorganic analytes and the *USEPA – Contract Laboratory Protocol OLMO 4.2* for the organic analytes. Additionally, the selected analytical laboratory will be required to submit and follow their approved Quality Assurance Manual, including calibration and corrective action procedures for the laboratory equipment.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM K: SAMPLE HANDLING AND CHAIN OF CUSTODY REQUIREMENTS

K.0 Sample Documentation and Handling

An essential element of any Brownfields sampling/analytical scheme is to maintain sample integrity from collection to data reporting. This involves tracing the possession and handling of samples from the time of collection through analysis and final disposition. The documentation used to track a sample's history is referred to as the "chain-of-custody." To facilitate sample chain-of-custody efforts, all inspections, investigations, and photographs which are taken will be recorded and a thorough review of all notes will be performed before leaving the site.

To promote the management of sample integrity, all parties involved will be informed that a sample is considered to be under a person's custody if; (a) it is in a person's physical possession, (b) it is in view of that person after he/she has taken possession, (c) secured by that person so that no one can tamper with the sample, or (d) secured by that person in an area which is restricted to authorized personnel. A person who has samples under their custody must always comply with these procedures in order to ensure sample integrity.

K.1 Sample Documentation

All sample documents must always be legibly written in ink. Any corrections or revisions to sample documentation will be made by lining through the original entry and initialing any changes. To elaborate on these requirements, the following sub-sections are provided to outline sample documentation procedures which must be employed when conducting a Brownfields investigation.

K.1.1 Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate and factual account of field procedures may be reconstructed. All entries must be signed by the individuals who are making them. Nonetheless, all field logbook entries must always document the following specific information:

- Site name and project number.
- Contractor name and address.
- Names of personnel on site.
- Dates and times of all entries.
- Descriptions of all site activities, including site entry and exit times.

- Noteworthy events and discussions.
- Weather conditions.
- Site observations.
- Identification and description of samples and locations.
- Subcontractor information and names of on-site personnel.
- Dates and times of sample collections and chain of custody information.
- Records of photographs.
- Site sketches.
- All relevant and appropriate information delineated in field data sheets and sample labels.

K.1.2 Field Data Sheets and Sample Labels

Field data sheets, along with corresponding sample labels, are routinely used to identify samples and document field sampling conditions and activities. Field data sheets must be completed at the time of sample collection and must always include the following information:

- Site name.
- Contractor name and address.
- Sampler's name.
- Sample location and sample identification number.
- Date and time the sample was collected.
- Type of sample collected.
- Brief description of the site.
- Weather conditions.
- Analyses to be performed.
- Sample container, preservation, and storage information.

Sample labels are always to be securely affixed to the sample container. They must always clearly identify the particular sample, and delineate the following information:

- Site name and designated project number.
- Sample identification number.
- Date and time the sample was collected.
- Sample preservation method.
- Sample pH (water samples only).
- Analysis requested.
- Sampling location.

K.1.3 Chain of Custody Record

A chain-of-custody record must always be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for with a copy of the record being kept for each individual which

endorsed it. It is integral that the chain-of-custody record must always include the following information:

- Contractor name and address.
- Sample identification number.
- Sample location.
- Sample collection date and time.
- Sample information (matrix type, number of bottles collected, container type, etc.).
- Names and signatures of samplers.
- Signatures of all individuals who have had custody of the samples.

K.1.4 Custody Seals

Custody seals are used to demonstrate that a sample container has not been opened or tampered with. The individual who has sample custody must always sign, date, and affix the custody seal to the sample container in such a manner that it cannot be opened unless it is broken. When samples are not under direct control of the individual currently responsible for them, they will be stored in a locked container which is also to be affixed with a custody seal.

K.2 Sample Handling and Shipment

It is customary for field sampling personnel to always transport environmental samples directly to the laboratory within 24 hours of sample collection. To assist in these efforts, field sampling personnel will either utilize an overnight delivery service within 24 hours of sample collection or will transport them to the laboratory directly.

When preparing sample containers for shipment they must always be securely closed with a custody seal affixed to each cap. All sample containers will be labeled as described above. Subsequently, they are to be placed in an appropriate transport container and packed with an absorbent material such as vermiculite. All sample containers will be packed with ice to maintain a temperature of 4°C. All sample documentation will then be affixed to the underside of each transport container lid. The transport container lid will then be closed and affixed with a custody seal accordingly.

Regulations for packaging, marking/labeling, and shipping hazardous materials and wastes are issued by the
U.S. Department of Transportation (U.S. DOT). Air carriers which transport hazardous materials, such as Federal Express, may also require compliance with the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations. The IATA protocol details the procedures for the shipment and transportation of hazardous materials by a common air carrier. All current IATA regulations will be followed to ensure compliance with U.S. DOT

protocol.

K.3 Sample Handling and Chain of Custody Requirements

All samples collected as part of this SAMP will be collected in the appropriate laboratory supplied containers. The containers will comply with the USEPA Specification and Guidance for Contaminant-Free Sample Containers, OSWER Directive #92405.05A, EPA 540/R-93/051. The sample containers will be appropriately labeled, identified on the Chain of Custody and placed in a cooler with ice packs. Subsequently, at the end of the field work for that day, the samples will be shipped via overnight mail or delivered directly to the selected analytical laboratory accompanied by the completed Chain-of-Custody. Examples of Chain of Custody forms, labels, and custody seals will be provided by the selected laboratory after their selection.

All samples will be assigned unique sample numbers. Samples will be numbered in the following manner:

- Site Identification (S = Scolite, I = IDA)
- Boring Number: 1,2,3,...
- Sample Interval: e.g. 0-0.5'

Soil samples to be field screened will be obtained according to the appropriate SOP, such as:

- Subsurface Sampling With A Split Spoon (3c.)
- Soil Sampling With A Hand Augur (2c).

All samples will be placed in a resealable plastic bag. All samples will be labeled with the sampling date, the sample location and sample interval, and the collection method. All information regarding samples will be logged in the field notes. At each sampling location, the bags will be temporarily stored in a specified area for field screening. The bags from a boring will be field screened with the PID after all samples have been collected from that boring. The PID readings will be accomplished according to SOPs 1b and 3b. Once all the field readings have been taken, the unused soil samples will be emptied into the boring hole. All empty sampling bags will be disposed of as non-hazardous waste.

A sufficient amount of soil will be collected for each of the analytical parameters to be determined twice by the specified analytical methods according to the specified protocol. This will ensure that a re-analysis can be performed if necessary. Samples destined for organic compound analysis will be placed in glass jars to prevent the plasticizers and other organic compounds found in plastics from contaminating the samples.

Appropriate preservation by cold temperature storage at 4°C will be utilized to ensure that the analytical parameters are not affected by the time the sample reaches the analytical laboratory. Samples will be analyzed prior to the applicable holding time for each analytical parameter.

All sample handling in the field and transportation will conform to the sample custody procedures. Field custody procedures include proper sample labeling, chain-of-custody forms, and packaging and shipping procedures. Sample labels will be attached to all sampling bottles before each sampling day's effort to ensure that proper sample identification is maintained. As noted earlier, each label will identify the sampling site and sample location.

Each sample cooler will be lined with two plastic bags of 6 mil thickness. Styrofoam, bubble wrap or empty plastic bottles will be used to fill up empty space in each cooler and prevent breakage of containers during handling and transport. Ice packs, ice in bottles, or ice will be placed in between the plastic lining bags to accomplish sample preservation.

After each sample is packaged and labeled, the following information will be recorded on the chain-of-custody form:

1. site name and address
2. sampler(s)' name(s) and signature(s)
3. names and signatures of the persons involved in the chain of possession of the samples
4. sample number
5. number of containers
6. sample location
7. date and time of collection
8. type of sample, sample matrix (soil) and analysis requested
9. any pertinent field data collected (PID reading)

The sampler will:

- sign and date the "Relinquished" space,
- remove one copy of the chain-of-custody form,
- seal the remaining copies of the form in a resealable plastic bag, and,
- tape the bag containing the chain-of-custody form to the underside of the sample cooler lid.

When the sample cooler is filled with sample containers and the chain-of-custody form has been filled out fully and affixed to the underside of the lid, the 6 mil plastic bags will be sealed around the samples by twisting the top and securely taping each bag closed to prevent leakage. A sample custody seal will be placed around the outer bag which will include the signature of the project manager or his/her designee, and the date and time. The sample cooler itself will be sealed with tape prior to shipment to the laboratory. Custody seals will be placed spanning the cooler lid and cooler base in such a manner to

make unauthorized tampering visible during transport, but especially at the laboratory. These seals will include the signature of the project manager or his designee and the date and time.

Further details for the above procedures are given in SOPs 6c,7c, and 8c (see SOP Reference Table F-1.2).

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM L: ANALYTICAL PRECISION AND ACCURACY

L.0 Analytical Data Quality Requirements and Assessments

An important aspect in the Brownfields project planning process is to define what levels of data are required. These data quality requirements are to be based on a common understanding of its intended use, the complexity of the measurement process, and the availability of resources. Once data quality requirements are clearly determined, QC protocols are to be defined for measuring whether these environmental monitoring acceptance/performance criteria are being met.

L.1 Data Acceptance/Performance Criteria

When conducting a Brownfields site investigation, it is essential to collect data which are of sufficient quantity and quality to support accurate decision making. The most effective way to accomplish these objectives is to determine the type, quantity, and quality of environmental measurement data which are necessary to achieve monitoring goals prior to the commencement of sampling. To ensure the level of detail is commensurate with the objectives of a Brownfields site investigation, a common sense "systematic planning" approach should be followed. This process is useful in promoting the development of "acceptance and/or performance criteria" for gauging the collection, evaluation, and use of environmental measurement data.

Data "acceptance and/or performance criteria" are prerequisites established to specify the quality of Brownfields site investigation environmental monitoring results required to support decisions. Data acceptance/performance criteria are predicated in accordance with the anticipated end uses of the information which are to be collected. The establishment of data acceptance/performance criteria are applicable to all phases and aspects of the remediation process including site investigation, design, construction, and clean up operations. It is important to note that the level of detail and quality needed will often vary with the intended use of the data. Consequently, in most instances QA/QC activities involving precision and accuracy determinations are relied upon to assess acceptance/performance criteria.

L.2 Analytical Precision

Analytical precision measurements are typically determined when performing instrumental analyses to assess the errors associated with analyte interferences, sample heterogeneity, and poor laboratory practices. They are commonly undertaken by incorporating matrix spike, matrix spike duplicate, and/or matrix

duplicate quality control sample analyses into the analytical scheme. Precision measures are often best expressed by calculating the Relative Percent Difference (RPD) between a sample and its duplicate determination. The Relative Percent Difference (RPD) between the two results will be calculated as follows and used as an indication of the precision of the analyses performed:

$$RPD = \frac{|S - D|}{(S+D)/2} \times 100$$

S = Sample
D = Duplicate
| | = Indicates absolute value of the difference to express RPD as a positive value.

L.3 Analytical Accuracy

Analytical accuracy determinations are typically undertaken when performing instrumental analyses to assess the proficiency of the measurement process. They are commonly undertaken by incorporating calibration verification, method blank, calibration blank, method control, surrogate spike, and/or matrix spike quality control sample analyses into the analytical scheme. Accuracy measures are often best expressed by calculating the Percent Recovery (%R) between true and found values as follows:

$$\%R = \frac{A}{B} \times 100$$

A = The found analyte concentration determined experimentally. B = The true analyte concentration.

L.4 Analytical Precision and Accuracy Requirements

This section delineates the analytical techniques for ensuring the laboratory equipment employed will accurately and precisely quantitate each target analyte of concern. Therefore, the selected analytical laboratory will provide this information for all the target compound list of parameters such that the data objectives of this SAMP are supported. The protocol will follow the *USEPA – Contract Laboratory Protocol OLMO 4.1* for inorganic analytes and the *USEPA – Contract Laboratory Protocol OLMO 4.2* for organic analytes. Also, the selected analytical laboratory will be required to submit and follow their approved Quality Assurance Manual and laboratory SOPs for all analytical procedures employed by the laboratory, especially with regards to obtaining the proper analytical precision and accuracy. These documents will identify the analytical methods and equipment required, including sub-sampling or extraction methods, laboratory decontamination procedures and materials, waste disposal requirements (if any), and specific performance requirements (quantitation levels, precision limits, accuracy limits, etc.) for each method. These requirements are summarized in the following sub-sections of this SAMP for all fixed laboratory confirmatory and in-situ field screening analyses which

will be undertaken in this site-specific Brownfields investigation.

L.4.1 Fixed Laboratory Precision and Accuracy Requirements

The analytical precision and accuracy protocols will be conducted in accordance with the appropriate USEPA CLP SOW. The USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration OLM0 4.2 or latest revision will be used for TCL determinations. The USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration ILM0 4.0 or latest revision will be used for TAL determinations. Also, the SOPs of the selected analytical laboratory will specify the precision and accuracy protocols that will be followed within the use of the USEPA documents mentioned above.

L.4.2 In-situ Field Analytical Precision and Accuracy Requirements

The precision and accuracy of the portable PID will be ensured in conformance with SOPs 1b and 3b (see reference Table F.1.2).

These SOPs include the following QA/QC protocols:

- Sample documentation (recording sample collection location, time and date, and associated field measurements, etc.).
- Field analytical screening documentation (providing raw data, calculations, and final results for the field screening analysis of all environmental and accompanying QC samples).
- Method calibration (requiring the initial and continuing calibration of all field analytical instrumentation according to the instrument manufacturer's operating instructions).

Please refer to these SOPs for further detail.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM M: FIELD QUALITY CONTROL REQUIREMENTS

M.0 Data Measurement Quality Objectives

When conducting a Brownfields site investigation, all measurements should be made so that results are reflective of the environmental media and conditions being measured. To assess if environmental monitoring measurements are of an appropriate quality, "acceptance and/or performance criteria" are typically established. Acceptance/performance criteria are commonly assessed by evaluating the Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC) of pertinent QA/QC options specified for sampling and analytical activities.

- Precision; a measure of the reproducibility of analyses under a given set or conditions.
- Accuracy; a measure of the bias that exists in a measurement system.
- Representativeness; the degree sampling data accurately and precisely depict selected characteristics.
- Completeness; the measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under "normal" conditions.
- Comparability; the degree of confidence with which one data set can be compared to another.

M.1 Sample Collection Precision

Sample collection precision is customarily assessed by collecting field duplicate samples. Field duplicate samples are used to evaluate errors associated with sample heterogeneity, sampling methodology and analytical procedures. The analytical results from these samples are important because they provide data to evaluate overall measurement precision. One field duplicate will be collected for every 20 samples collected (soil is the only matrix) and will be analyzed for each of the analytical methods performed for the group of 20.

M.2 Sample Collection Accuracy

To assess sample accuracy, field QC samples such as rinsate, trip, and/or field blanks, are typically incorporated into the sampling scheme. The data acquired from the analysis of blanks are useful in their ability to evaluate errors which can arise from cross-contamination. The occurrence of cross-contamination can result from the improper handling of samples by field and/or lab personnel, improper decontamination procedures, improper shipment and storage, and on-site

atmospheric contaminants. Therefore, to facilitate sample collection accuracy, it is essential to maintain the frequent and thorough review of field procedures so that deficiencies can be quickly documented and corrected. One field blank will be collected at the end of each day of boring or surface sampling. The field blank will be analyzed for as many of the following that apply to that day's sampling: CLP SVOCs, CLP PCBs, and CLP Priority Pollutant metals.

M.3 Sample Collection Representativeness

Representativeness is an expression of the degree to which a sample accurately and precisely represents a characteristic of a population, parameter variations at a sampling point or an environmental condition. Representativeness is a qualitative parameter which relies upon the proper design of a fitting sampling program and proper laboratory protocol. This criterion is best satisfied by making certain that sampling locations are selected properly and a sufficient number of samples are collected. Therefore, sample representativeness will be assessed by collecting field duplicates. Traditionally, field duplicates are by definition, equally representative of a given point in space and time.

M.4 Sample Collection Comparability

Comparability is defined as an expression of the confidence with which one data set can be compared to another. In most instances, the proficiency of field sampling efforts will be the determining factor which affects the overall comparability of environmental measurement data. To optimize the comparability of environmental measurement data, sample collection activities should always be performed using standardized procedures whenever possible. When performing this Brownfields site investigation, these efforts will be facilitated by adhering to the quality control criteria and technical guidelines put forth in this QAPP boilerplate.

M.5 Sample Collection Completeness

Completeness is defined as the measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions. Data completeness is often expressed as the percentage of valid data obtained from a given measurement system. To consider data valid, it is customary to assess if a set of data satisfies all of the specified acceptance/performance criteria (accuracy measures, precision measures, etc.) to render a determination. This necessitates that the data acquired for all confirmatory analyses critical to a Brownfields site investigation sampling program be validated (100%). Therefore, by performing a full data validation effort to ensure completeness, the rationale for considering data points non-

critical will not be required.

M.6 Sampling Quality Control Requirements

To facilitate the documentation of a program to monitor sample collection operations, the pertinent field sampling QC procedures are delineated in the following table:

QC Sample	Frequency	Acceptance Criteria	Corrective Action
Field Quality Control Requirements			
Field Duplicate	5% per parameter per matrix or one per event.	Relative Percent Difference (RPD) less than 50 %	Sampling techniques, sample media, and analytical procedures will be examined to identify the cause of the high RPD and evaluate the usability of the data.
Co-located Sample	10% per parameter per matrix or one per event.	Relative Percent Difference (RPD) less than 30 %	Sampling techniques, sample media, and analytical procedures will be examined to identify the cause of the high RPD and evaluate the usability of the data.
Equipment Rinsate Blank	5% per parameter per matrix per equipment type per decontamination event	No target analytes above five times the detection limit (ten times for common laboratory contaminants)	Equipment decontamination procedures will be reviewed.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM N: DATA MANAGEMENT AND DOCUMENTATION

N.0 Data Reporting

It is essential to the success of any Brownfields site investigation that a data flow or reporting scheme be developed. For any such scheme to be effective, it must address the complete scope of measurement results generated from all facets of an environmental monitoring project including the collection of raw data through the storage of validated results. In addition, it must also completely cover the step-wise procedures for entering data onto various reporting forms, as well as, into computer systems. These procedures should always cover routine data transfer and entry validation checks to ensure these processes are complete. To assist in these efforts, whenever possible, pre-printed forms should always be utilized for transcribing data.

N.1 Data Formatting

When conducting a Brownfields site investigation there must always be adequate documentation available to enable the summation of all pertinent measurement data. This is necessary to assist in the interpretation of the data while ensuring that it is both scientifically valid and legally defensible. As a result, it is integral that all records be legible, complete, and properly organized. In some instances, it may be appropriate to utilize a document control system. Therefore, when planning a Brownfields site investigation project, one must consider the type of record to be maintained, and the process for how these records will be stored.

N.2 Field Data Reporting

All real-time measurements and observations must always be recorded in project log books, field data records, or in similar types of record keeping books. Field measurements may include pH, temperature, specific conductance, alkalinity, water flow, soil gas readings, and possibly Flame Ionization Detector (FID)/PID measurements. All measurement data collected by performing in-situ analyses must always be recorded directly and legibly in field logbooks, with all entries being signed and dated. If entries must be changed, it is essential that these changes be made in such a manner that none of the original entries become obscured. Likewise, the reason for making a change should be specified with the correction and explanation being signed and dated at the time the revision was made. Therefore, to ensure the effective management of this information, it is important that field data records be organized into standard formats whenever possible, and retained in permanent files.

N.3 Laboratory Data Reporting

Whenever laboratory data are acquired, an analytical report should always be prepared to summarize the results of each environmental sample analyzed in accordance with this generic QAPP boilerplate. An analytical report should always contain information regarding the analytical methods or procedures employed, sample results, QA/QC results, chain of custody documentation, laboratory correspondence, and all accompanying raw data. It is integral that all data necessary for calculating percent recoveries be presented along with the analytical results.

To facilitate data interpretation efforts, it is advantageous for analytical reports to have all environmental sample data cross-referenced with the appropriate QC audit results (field blank, equipment rinsate blank, field duplicate, matrix spike, and matrix spike duplicate, etc.). Analytical reports should always cross-reference all laboratory data identification numbers with the corresponding field sample codes noted on the chain-of-custody as well. In addition, all pertinent handling/processing dates (time of collection, laboratory receipt, extraction, and analysis) for each sample applicable to the project must be referenced along with the applicable sample holding time.

Another important aspect to consider when formatting requirements for assembling an analytical report are the units for reporting final laboratory results. In most instances, the appropriate units for the reporting of final laboratory results are often dictated by factors such as the environmental sample media, analytical methodology, program/regulatory requirements, project objectives, and performance criteria. Therefore, it is important to specify the appropriate deliverables needed to assemble a complete analytical package for documenting that the pertinent resulting data are of an appropriate quality.

N.4 Data Management and Documentation Requirements

CECI will manage and document the field data. All field data will be entered into field notebooks dedicated to this project. Photocopies of separate data sheets, such as boring logs created by the driller, will be stapled into the field notebooks. Sample Chain-of-Custody copies, field notebooks and all analytical data and the QC data package reports received from the laboratory will be kept in the project files in CECI's office.

The selected analytical laboratory will manage and document the laboratory data. This selected laboratory will have to provide the procedures that will be used to manage data in their Quality Assurance Manual, including the issues of:

- accuracy,
- precision,
- data quality assessment,
- information management,
- sample control and management,
- data generation,
- verification and approval reports,
- reduction and storage, and
- document control.

CECI will require a final report that will include:

- the sampling results, and
- a QC data package.

The QC package will be required to describe any issues or concerns that arose in extracting and analyzing the samples, organic surrogate recoveries, method blank results, laboratory control samples, MS/MSD results for organic analyses, and laboratory duplicate/spike sample results for inorganic analyses.

CECI will retain an independent data validator to conduct a data validation on the project data. Twenty percent of the laboratory samples analyzed will be subjected to full data validation. Data validation will adhere to the procedures given in the following documents:

- CLP Protocol SOP No. HW-6: CLP Organics Data Review
- Preliminary Review SOP No. HW-2: Evaluation of Metals Data for Contract Laboratory Protocol; and
- USEPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis.

N.4.1 Fixed Laboratory Data Deliverable Requirements

The laboratory deliverable package will adhere to the U.S.EPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration OLM0 4.2 or latest revision for organics and U.S.EPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration ILM0 4.0 or latest revision for metals.

The laboratory data will be reviewed by the methods found in:

- CLP Protocol SOP No. HW-6: CLP Organics Data Review
- Preliminary Review SOP No. HW-2: Evaluation of Metals Data for Contract Laboratory Protocol; and
- USEPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis.

N.4.2 In-situ Field Analytical Data Deliverable Requirements

The analytical data deliverables for the Photoionization Detector (PID) will be entered onto the field screening data sheets. These data sheets will require entries for:

- Date and time of instrument calibration
- Deviations from the acceptance criteria and the corrective actions taken and the outcome, and
- Sampling results for every sample collected during the field effort.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM O: ASSESSMENT AND RESPONSE ACTIONS

O.0 Quality Assurance Requirements

The data collection scheme put forward in this generic Brownfields QAPP boilerplate encourages the design of a monitoring network which blends in-situ field analytical screening techniques with confirmatory fixed laboratory analyses. It specifies that a minimum of 20% of all samples collected during a Brownfields site investigation undergo fixed laboratory U.S.EPA CLP TAL and TCL confirmatory analyses. In conjunction, it specifies that approximately 50% of all background or "presumed clean" reference samples should likewise undergo fixed laboratory U.S.EPA CLP TAL and TCL confirmatory analyses to limit false negative and sampling errors. Therefore, to ensure data are of an appropriate quality, the following protocols apply whenever duplicate samples are collected to confirm field screening and/or laboratory analyses with limited analytical deliverables:

- When applicable, rinse and trip blanks will be collected and analyzed with all environmental samples.
- When CLP methods are used to corroborate field sampling or laboratory data with limited analytical deliverables, additional method specific duplicate samples should not be analyzed.
- Protocols for these CLP confirmatory analytical methods, sample containers, data deliverables, preservatives, chain-of-custody forms, matrix spike sample volumes, and shipping requirements are derived from the U.S.EPA Sampler's Guide to the Contract Laboratory Program.

O.1 Definitive Data Requirements

When conducting a Brownfields site investigation, definitive data should always be acquired using rigorous analytical protocols, such as conventional U.S.EPA reference methods. This involves securing the acquisition of data which are media-specific to confirm target analyte identities and concentrations.

Conventional analytical methods are known to produce tangible raw data (chromatograms, spectra, digital values, etc.) in the form of paper printouts and/or computer-generated electronic files. In most instances, definitive data can be generated at the site with a field analytical screening technique or at an off-site fixed laboratory by employing the necessary QA/QC protocols. But regardless of what type of determination is utilized, for data to be definitive, an assessment of analytical or total measurement error must be determined. Therefore, the following criteria should always be implemented when performing a site-specific Brownfields investigation:

- Definitive data QA/QC elements.
- Sample documentation (location, date and time collected, batch, etc.).
- Chain of custody for samples analyzed by an off-site laboratory.
- Sampling design approach (systematic, simple or stratified random, judgmental, etc.).
- Initial and continuing calibration.
- Determination and documentation of instrument and method detection limits.
- Analyte(s) identification.
- Analyte(s) quantification.
- QC blanks (trip, method, rinsate).
- Matrix spike recoveries.

O.2 Analytical Error

Performing an estimate of analytical error is the process of determining a measure of overall precision for a particular analytical method. To render a determination of analytical error, an appropriate number of duplicate aliquots are taken from at least one thoroughly homogenized sample. These duplicate sample aliquots are then analyzed with standard laboratory QC parameters to calculate and compare method performance criteria (variance, mean, and coefficient of variation).

O.3 Total Measurement Error

The determination of total measurement error is an estimate of the overall precision of an environmental data acquisition system, from sample collection through analysis. To render a determination of total measurement error, an appropriate number of samples are independently collected from the same location. These collocated samples are then analyzed with standard laboratory QC parameters to calculate and assess measurement error goals (variance, mean, and coefficient of variation). Measurement error goals are acceptance/performance criteria typically established for the purpose of evaluating data quality. To ascertain a thorough assessment of total measurement error, this process should be undertaken for each environmental matrix under investigation and/or repeated for a given media at more than one location.

O.4 Assessment and Response Actions

The sampling personnel are the first to detect and correct problems that could or will affect field data quality. They can often detect instrument perturbations, or malfunctions and correct them. In the case of major malfunctions, they are usually the best to select and quickly implement corrective actions so that data corruption and loss is minimized. Therefore, this SAMP requires field sampling personnel to try to detect problems early. Then the field sampling personnel should consult the on-site field supervision, who will make the ultimate choices regarding the corrective action or actions that will be taken.

If a malfunction or problem arises, the following steps will be followed:

- Define the malfunction in the context of data validity;
- Determine who should investigate the malfunction;
- The assigned person(s) will investigate the malfunction;
- The assigned person(s) and supervision will determine the appropriate corrective action;
- Determine who should implement the corrective action;
- Determine how effective the corrective action is and implement the correction;
- Check to see if the malfunction has been eliminated by the corrective action;
- Repeat the above steps until the malfunction is eliminated.

All malfunctions and problems will be documented in a separate field log to allow review during the data validation. Items that will be recorded are:

- Name of the person who identified the malfunction;
- A statement defining the malfunction;
- The corrective action prescribed;
- The schedule for completing the corrective action;
- Signatures of each responsible party, including the field supervision.

Analytical laboratory results will be assessed for compliance with the degree of precision, accuracy, completeness and sensitivity as required as follows:

Precision of laboratory analyses will be assessed by comparing the analytical results of analytical laboratory duplicate analyses. The relative percent difference (RPD) will be calculated for each pair of duplicate analyses using the formula that appears below.

Accuracy of laboratory results will be assessed for compliance with the established Quality Control criteria that are described in the companion QAPP using the analytical results of method blanks, reagent/preparation blanks, matrix spikes samples and field blanks. The percent recovery (in %) of matrix spike samples will be calculated using the formula that appears below.

Completeness will be assessed by comparing the number of valid (usable results (as determined by a QA/QC Officer – Analytical Activities) to the total possible number of results using the formula that appears below. The completeness of laboratory analyses must be 80 percent or greater. If the completeness requirement for the project is not ultimately satisfied, the valid data will remain usable.

Reaching of targeted quantitation limits depends on instrument sensitivity and matrix effects. Therefore, monitoring instrument sensitivity is important to ensure data quality through consistent instrument performance. The instrument sensitivity will be monitored by the analysis of method blanks and calibration check samples.

Standard statistical formulas will be used to evaluate data and determine precision and accuracy.

The arithmetic mean is defined as the average obtained by dividing a sum by the number of its addends. A number of recovery results are averaged together to improve the accuracy of the measurement. The following equation will be used to determine the arithmetic mean.

Where n = number of measurements X_i = value of measurements

The standard deviation is defined as the square root of the average squared difference between the individual values and the average value. A number of recovery results are evaluated to find the numerical variation in the data that is then used in the determination of the percent relative standard deviation. The following equation will be used to determine the standard deviation.

$$\sigma_{n-1} = \sqrt{\frac{\sum_{i=1}^{n} (X - \bar{X})^2}{n - 1}}$$

Where n = number of measurements
X_i = value of measurements
$\bar{X}$ arithmetic mean

The percent relative standard deviation (%RSD) is determined by dividing the standard deviation of the values by the arithmetic mean of the values and multiplying by 100. The %RSD is calculated on a series of measurements to evaluate the instrument's analytical precision (e.g., initial calibration).

The following equation will be used to determine %RSD.

$$\%RSD = (\sigma_{n-1}) \times 100 / \bar{X}$$

The percent recovery of a parameter will be determined by dividing the amount recovered by the true amount added and multiplying by 100. The percent recoveries of spiked samples are evaluated to establish the analytical accuracy of a measurement. The following equation will be used to determine the percent recovery.

$$\%R = (SSR - SR) \times 100 / SA$$

Where SSR = spiked sample result
SR = sample result or background
SA = spike added

The relative percent difference will be determined by dividing the difference between two numbers by their arithmetic mean and multiplying by 100. The RPD will determine the analytical precision of two duplicate measurements. The following equation will be used to determine RPD.

$$RPD = ((| R_1 - R_2 |) / ((R_1 + R_2) / 2)) \times 100$$

Where R_1 = value of the first result
R_2 = value of the second result

System or performance audits or standard QC procedures will be used to determine the need for corrective action. The necessary steps in the corrective action system will be:

1. checking to see if pre-determined limits for data acceptability have been exceeded;
2. Identifying and defining malfunctions and problems;
3. assigning responsibility for investigating a malfunction or problem;
4. investigating and determining the cause of the malfunction or problem;
5. determining a corrective action to eliminate the malfunction or problem;
6. assigning and accepting responsibility for undertaking the corrective action;
7. undertaking the corrective action and evaluating its effectiveness;
8. determining if the corrective action has eliminated the problem; and,
9. documenting the corrective action and its effect.

For each measurement system, the measurement analyst will be responsible for identifying the need for corrective action and initiating the corrective action procedure. The laboratory supervisor will be responsible for the implementation of the corrective action and evaluating its effectiveness. The laboratory QA Officer will be responsible for documenting the fact that the corrective action has resolved the malfunction or problem. The corrective action implemented will depend upon the QA/QC criteria that did not meet the necessary criteria and may range from qualifying the data to re-sampling at the site. All malfunctions and problems requiring corrective action and the corrective action employed to resolve the problem will be reported. Field corrective action will consist of repeated sampling and will be documented in the field logbook. Please refer to the LQAP and ILA provided in Attachment B-1 (to be provided when laboratory is selected) for laboratory corrective action information.

O.5 Correlation of Fixed Laboratory and In-situ Field Analytical Data

CECI will ensure that continuous samples of soil are collected from each soil boring. CECI will screen the samples with the PID at two-foot intervals and the sample with the greatest PID reading in the headspace will be sent for laboratory analysis. If no elevated readings are determined via the PID, then a sample at a grain size or color discontinuity will be selected for laboratory analysis. If no grain size or color discontinuity exists, then a sample will be collected at a random depth between the top and bottom. At least one sample from the middle of each boring will be analyzed at a fixed lab. A sample from the top of each boring and a sample from 6 inches above the water table or the termination of the boring, if higher, will be sent for laboratory analyses. Any PID readings above background will be considered evidence of potential contamination.

In addition, the statistical methods found in the USEPA Guidance for Data Quality Assessment Practical Methods for Data Analysis, EPA QA/G9 will be used if found to be necessary.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM P: PROJECT REPORTS

P.0 Quality Assurance Reporting

When conducting a Brownfields site investigation, it is essential to establish mechanisms for providing periodic reports on measurement system performance and data quality to management. These reports should always provide an assessment of measurement data in terms of PARCC, performance audit results, systems audit results, and significant QA problems along with any recommended solutions. In addition, it is prudent that these reports be prepared to include a separate QA section for the purpose of summarizing pertinent information on environmental measurement data quality.

P.1 Roles and Responsibilities

To ensure the successful outcome of any Brownfields site investigation project, it is integral for the environmental professional responsible for leading a municipality's remedial efforts to maintain close contact with the U.S.EPA Remedial Project Manager. This is necessary to ensure that pertinent information regarding the technical and financial progress of a site-specific Brownfields investigation is fully understood by all the parties which are involved. Customarily, this communication will begin upon the award of a U.S.EPA Brownfields pilot project grant. This will than necessitate the initiation of QA activities such as the development of project planning documentation.

P.2 Trip Reports

To provide a detailed accounting of what occurred during a particular sampling mobilization, trip reports are to be prepared for each site-specific Brownfields investigation. Traditionally, trip reports are to be completed within two weeks of the last day of each sampling mobilization. For the effective use of trip reports, it is important that they provide information in a timely manner by noting major events, dates, and personnel on-site (including affiliations). To facilitate these efforts, trip reports should be assembled as follows:

- Background.
- Observations and Activities.
- Conclusions and Recommendations (optional).
- Future Activities.

P.3 Project Report Requirements

A single Site Investigation Report will be prepared after the completion of all field activities and all laboratory results have been validated. In this report will be:

- descriptions of all sampling activities;
- a summary and discussion of the field screening and laboratory analytical results; and,
- recommendations for any further site investigation or remedial activities.

The following will be prepared by CECI field sampling staff geologist and will be included as attachments to the Site Investigation Report:

- field logs;
- field screening logs;
- soil boring logs;
- chain of custodies;
- calibration logs;
- complete field screening results; and,
- complete laboratory results.

The CECI Project Manager will ensure the report will be delivered to the City of Troy by November 21, 2003.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM Q-1: VERIFICATION OF SAMPLING PROCEDURES

When conducting a Brownfields site investigation it is integral to perform internal, as well as, external performance and systems audits. These audits are undertaken to evaluate the capability and performance of the total measurement system comprising a Brownfields environmental monitoring network. These oversight activities are useful in ensuring that field activities are providing samples reflective of the site and its conditions.

To evaluate the accuracy of the total measurement system or component thereof, performance audits are usually undertaken periodically to assess data collection efforts. In regard to field sampling operations, this oversight function is performed to critique in-situ monitoring efforts and sample collection activities. However, for performance audits to be effective, they should be scheduled in accordance with the applicable field operations warranting oversight. Alternately, a systems audit focuses on evaluating the principal components of a measurement system to determine proper selection and use. In regard to field sampling operations, this oversight activity is performed to critique the quality control procedures which are to be employed. Systems audits of this nature are to be performed periodically, prior to or shortly after, field operations commence until the project is completed.

Q-1.1 Verification of Sampling Procedures

Reviews of the sampling activities will be conducted by the Site Supervisor or their designated substitute. The intent of these reviews will be to verify that all established procedures that are documented in the QAPP are followed. Reviews will be conducted at the beginning of site activities and at the midpoint of the field work. Each review will include an examination of proposed and actual field sampling records, field instrument operating records, sample collection frequencies and techniques, maintenance of QA procedures, and chain-of-custody documentation. The reviews will be documented in a field notebook dedicated to this purpose for easy reference during data validation. Follow-up reviews will be required to document the correction of any deficiencies and the results of such reviews will be noted in the dedicated field notebook.

Q-2.0 Data Validation

To ensure that the measurement data acquired when performing a Brownfields site investigation are of an appropriate quality, it is important to specify and follow procedures for validating all pertinent environmental monitoring results. Data validation is regarded as a systematic process for reviewing a body of results against a set of established criteria to provide a specified level of assurance

concerning validity. It requires a systematic and uniform evaluation to be performed on the data to identify those results with questionable quantitative value.

The approach for performing data validation should always be independent of the data production effort, and objective in its application. In most instances, the criteria for validating data will include conducting checks for internal consistency, reviews for transmittal errors, and/or audits for verifying laboratory capability. This will typically involve interpreting the results of external performance audits such as split sample, duplicate sample (field and laboratory), spiked sample, and initial calibration determinations. In conjunction, the assessment of detection limit studies, intra-laboratory comparisons, inter-laboratory comparisons, tests for normality, tests for outliers, and data base entry checks may also be undertaken.

Q-2.1 Data Verification and Validation Requirements

Field screening and laboratory data will be reviewed to verify conformance with this plan's requirements for data quality. The QA/QC results will be reviewed to verify that the duplicate samples, trip blanks, equipment blanks, and matrix spike/matrix spike duplicates met the acceptance criteria listed in Form M. Failure to meet these requirements will result in uncertainties in data usability (see Form R). Additional steps to verify data quality will be:

- The complete data package received from the laboratory will be reviewed for completeness, correctness and contractual compliance. The following will be ensured:

  a. All samples will be accounted for;

  b. The required analyses were performed for each sample;

  c. QA/QC sample results are provided; and,

  d. Data transcription is free of errors.

- The QC package received from the laboratory will be reviewed to verify that it includes all of the elements listed in Form N (narrative description of any issues or problems encountered in extracting and analyzing the samples, organic surrogate recoveries, laboratory control sample recoveries, method blank results, MS/MSD results for organic analyses, and laboratory duplicate/spike sample results for inorganic analyses). Should any of these elements be missing from the QC data package, CECI will request the information from the selected laboratory. A complete copy of the laboratory results and QC data package will be included in the final Phase II ESA report as an attachment. The QA/QC review, including the results of the data verification and validation, will be discussed in the final report. The conclusions and recommendations made in the report will be qualified

to the degree that uncertainties about the validity of the sampling results are determined.

Additionally, the data will be reviewed to determine if the requirements of the site assessment have been met, including:

- Assess soil quality in each area of concern to determine if, and where, there are any exceedances of the NYSDEC TAGM 4046 Soil Cleanup Objectives.
- Determine if the levels of contaminants in soil are sufficient that, in light of the planned redevelopment activities, certain recommendations for remedial activities must be made.

To ensure that the data meet the needs of the SAMP and the site assessment, the following steps will be followed:

- CECI will subcontract with a selected data validator to perform the data validation for the SAMP. Data validation will follow the procedures outlined in the CLP Protocol SOP No. HW-6: CLP Organics Data Review and Preliminary Review, SOP No. HW-2: Evaluation of Metals Data for Contract Laboratory Protocol, and the USEPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis.
- Review the corrective action log and the sampling review log to assess whether there were significant anomalies or problems with the data collection.
- Tabulate all field screening and laboratory data on a site map to verify that the results are consistent and reasonable based on knowledge of past site activities.
- Verify that a minimum of 90 percent of the laboratory analyzed samples were validated and deemed acceptable by the laboratory.
- Verify that the QA/QC criteria for the duplicate samples and blanks were met.

Q-2.1.1Fixed Laboratory Confirmatory Data Verification and Validation Requirements

CECI will subcontract with a selected data validator to perform the data validation for the SAMP. Data validation will follow the procedures outlined in the CLP Protocol SOP No. HW-6: CLP Organics Data Review and Preliminary Review, SOP No. HW-2: Evaluation of Metals Data for Contract Laboratory Protocol, and the USEPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis. Full data validation will be performed on 20 percent of the laboratory samples.

The laboratory deliverable package will conform to the USEPA –Contract Laboratory Protocol OLMO 4.2 for organic analytes and the USEPA – Contract Laboratory Protocol ILMO 4.1 for the inorganic analytes.

Q-2.1.2 In-situ Field Analytical Data Verification and Validation Requirements

Data verification and validation of the in-situ field analytical equipment will be performed in the following manner:

- All field logs will be reviewed for accuracy and unusual conditions.
- The corrective action log and the sampling review log will be reviewed to assess whether there were significant anomalies or problems with the data collection.
- All field screening data will be depicted on a site map to verify that the results are consistent and reasonable based on the known information about past site activities.
- The field data will be reviewed to verify that it is consistent with the laboratory data via the relative percent difference method.

BROWNFIELDS SAMP - DATE: May 5, 2005

FORM R: DATA USABILITY

R.0 Data Quality Assessment

When performing a Brownfields site investigation, it is essential to correlate validated measurement data for reconciliation with the acceptance/performance criteria specified for the project. This will involve rendering a determination to ascertain whether measurement data are of the right type, quality, and quantity required to support environmental decision making efforts. To perform this activity, scientific and statistical procedures must be employed to provide an assessment.

The technique for determining if validated measurement results are adequate for their intended use is known as the Data Quality Assessment (DQA) process. The DQA process can provide information to enable a decision maker to draw conclusions about the strength of evidence depicted by a set of collected measurement data. To assist in these efforts, an outline of the formal DQA process is described in the U.S.EPA Guidance for Data Quality Assessment: Practical Methods for Data Analysis. As previously noted, this guide is included as an attachment to this generic QAPP boilerplate.

R.1 Data Quality Assessment Process

The DQA process is both a scientific and statistical evaluation technique which consists of the following five steps:

- Review project acceptance/performance criteria and sampling design.
- Conduct a preliminary data review.
- Select a statistical test (i.e., Shaprio-Wilk W test, Student's t-Test, etc.).
- Verify the assumptions of the selected statistical test.
- Draw conclusions from the data.

Even if the formal DQA process is not followed in its entirety, a systematic assessment of measurement data quality should always be performed when conducting a Brownfields site investigation. This systematic process will involve carrying out the following data assessments:

- Validating all pertinent measurement data for scientific anomalies.
- Correlating all pertinent measurement data to the PARCC parameters designated for the project.
- Identifying measurement data trends and outliers.

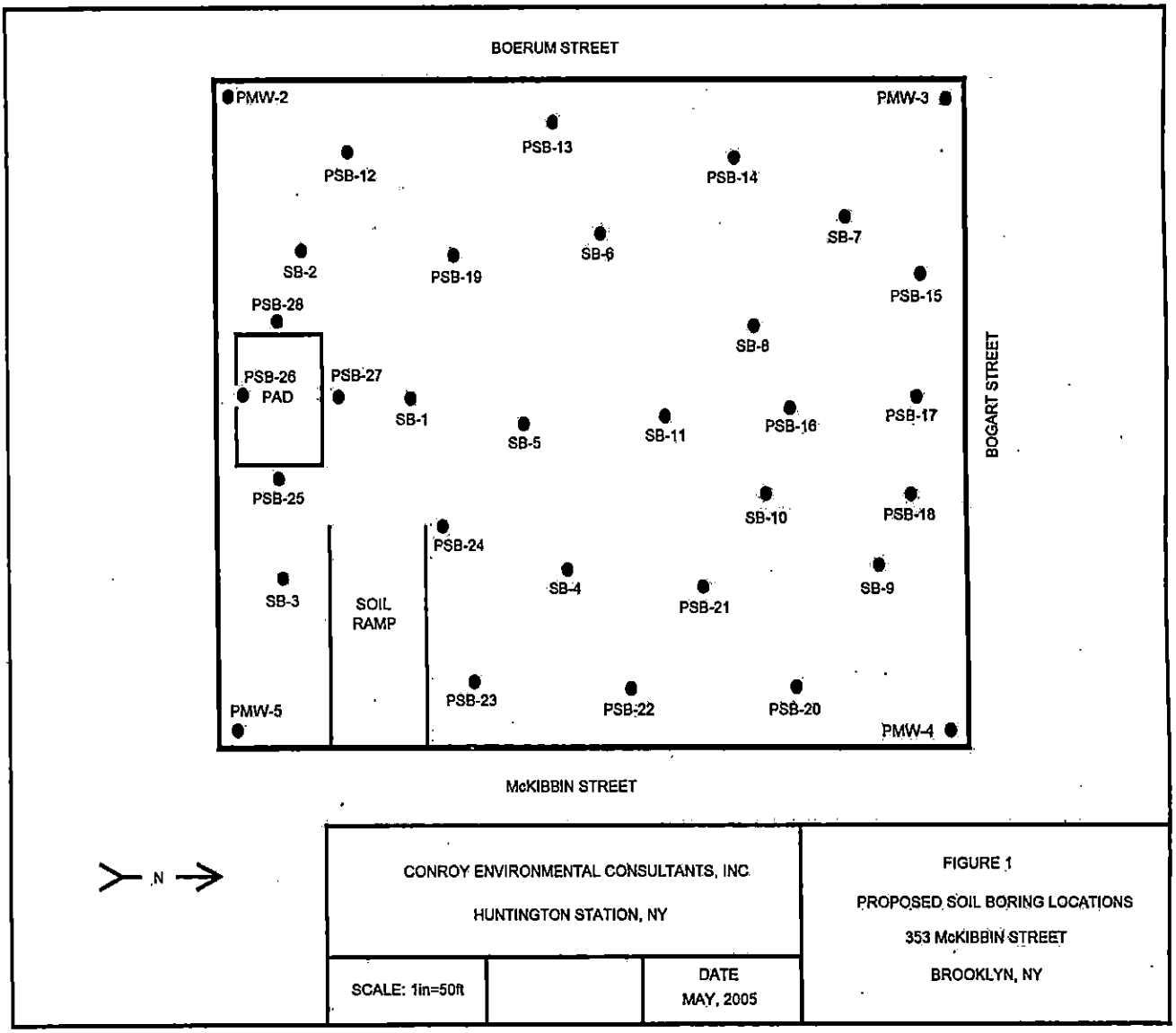
In doing so, one can assimilate an abstract estimation of data "worth" to provide Brownfields stakeholders with a rationale for making proper decisions.

R.2 Data Usability and Reconciliation Requirements

All of the field screening results and laboratory data will be included in the final Phase II ESA report. Any questions on the usability of the data that come to light in the data review will be described in the report. The conclusions and recommendations made in the report will be qualified if there are uncertainties about the validity of the sampling results. All fixed laboratory data will be compared to the NYSDEC TAGM #4046 Soil Cleanup Objectives. The report will include a discussion of the usability of the field and fixed laboratory data based upon the data validation/usability evaluation described above.

LIST OF FIGURES

LIST OF ATTACHMENTS


BOERUM STREET
PMW-2
PMW-3
PSB-13
PSB-12
PSB-14
SB-7
SB-6
SB-2
PSB-19
PSB-15
PSB-28
SB-8
PSB-26
PAD
PSB-27
SB-1
SB-5
SB-11
PSB-16
PSB-17
BOGART STREET
PSB-25
SB-10
PSB-18
PSB-24
SB-4
SB-9
SB-3
SOIL
RAMP
PSB-21
PSB-23
PSB-22
PSB-20
PMW-5
PMW-4
McKIBBIN STREET
N
CONROY ENVIRONMENTAL CONSULTANTS, INC
HUNTINGTON STATION, NY
FIGURE 1
PROPOSED SOIL BORING LOCATIONS
353 McKIBBIN STREET
BROOKLYN, NY
SCALE: 1in=50ft
DATE
MAY, 2005

Health and Safety Plans (HASP)

Shown below is a DRAFT HASP for the site RI.

HEALTH AND SAFETY PLAN

FOR

WELL INSTALLATION ACTIVITIES

PREPARED FOR:

353 MCKIBBIN STREET
BROOKLYN, NEW YORK 11206

JUNE 2005

PREPARED BY:

Conroy Environmental Consultants, Inc.
66 Murdock Street, Suite 1
Huntington Station, NY 11746

SITE EMERGENCY FORM

Contaminants of Concern: To be added to final HASP
Minimum Level of Protection: To be added to final HASP

Do not endanger your life. Survey the situation before taking any action

Office Telephone: (631) 423-1240
Site Location Address: 353 MCKIBBINSTREET
BROOKLYN, New York 11206

EMERGENCY PHONE NUMBERS

Ambulance: 911
Fire: 911
Police: 911

Project Manager: (631) 423.1240
Health/ Safety Rep: (631) 423.1240

HOSPITAL LOCATION MAP

To be added to final HASP

HOSPITAL DIRECTIONS	HOSPITAL INFORMATION
To be added to final HASP	To be added to final HASP **NAME:** **ADDRESS:** **CITY, STATE:** **PHONE:**

EMERGENCY FIRST AID

1. Survey the situation. Do not endanger your own life. **DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT.**

2. Call 911 or the fire department **IMMEDIATELY**. Explain the physical injury, chemical exposure, fire or release.

3. Decontaminate the victim without delaying life-saving procedures.

4. If the victim's condition appears to be noncritical, but seems to be more severe than minor cuts, he/she should be transported to the nearest hospital by trained Emergency Medical Services (EMS) personnel. Let the doctor assume the responsibility for determining the severity of the injury. If the condition is obviously serious, EMS must transport the victim.

5. Notify the Project Manager.

EMERGENCY FIRST AID PROCEDURES	
To Stop Bleeding	Cardiopulmonary Resuscitation (CPR)
1. Give medical statement. 2. Assure airway, breathing and circulation. 3. Use **DIRECT PRESSURE** over the wound with clean dressing or your hand (use nonpermeable gloves). Direct pressure will control must bleeding. 4. Bleeding from an artery or several injury sites may require **DIRECT PRESSURE** on a **PRESSURE POINT**. Use pressure points for 30-60 seconds to help control severe bleeding. 5. Continue primary care and seek medical aid as needed.	1. Give medical statement 2. Arousal: Check for consciousness. 3. Open airway with chin-lift. 4. Look, listen and feel for breathing. 5. If breathing is absent, give 2 full rescue breaths. 6. Check the pulse for 5 to 10 seconds. 7. If pulse is present, continue rescue breathing: **1 breath every 5 seconds.**

MSDS DEFINITIONS

TLV-TWA	**Threshold Limit Value - Time Weighted Average** - The time-weighted average concentration for a normal 8-hour work day and a 40-hour work week, to which nearly all workers may be repeatedly exposed without adverse effect.
PEL	**Permissible Exposure Limit** - Time-weighted average concentrations similar to (and in many cases derived from) the Threshold Limit Values.
REL	**Recommended Exposure Limit** - as defined by NIOSH similar to the Threshold Limit Values.
IDLH	**Immediately Dangerous to Life or Health** - Any atmospheric condition that poses an immediate threat to life, or which is likely to result in acute or immediate severe health effects. Oxygen deficiency is IDLH.
LEL	**Lower Explosive Limit** - The minimum concentration of vapor in air below which propagation of a flame will not occur in the presence of an ignition source.
UEL	**Upper Explosive Limit** - The maximum concentration of vapor in air above which propagation of a flame will not occur in the presence of an ignition source.
FP	**Flash Point** - The lowest temperature at which the vapor of a combustible liquid can be made to ignite momentarily in air.
VP	**Vapor Pressure** - The pressure characteristic at any given temperature of a vapor in equilibrium with its liquid or solid form, often expressed in millimeters of mercury (mm Hg).
Odor Threshold	A property displayed by a particular compound. Low detection indicates a physiological sensation due to molecular contact with the olfactory nervous system (based on 50% of the population).
IP	**Ionization Potential** - The energy required to form an ion by removal of a given electron from an atom.

CONTAMINANTS PROFILE			
Chemical	Exposure Route	Symptoms of Overexposure	Incompatibilities
Gasoline	Inhalation Ingestion Skin Contact	• Intense burning of mucous membranes, throat, and respiratory tract, flushing of face, staggering gait, slurred speech, mental confusion. • Inebriation, drowsiness, blurred vision, dizziness, confusion, vomiting, cyanosis. • Prolonged skin contact may cause dermatitis.	Oxidizing agents such as hydrogen peroxide, nitric acid.
Diesel Fuel Jet Fuel Fuel Oils	Inhalation and/or Ingestion Skin Contact	• Irritation to respiratory passages, headache, dizziness and nausea, vomiting, loss of coordination. • Chemical pneumonitis (when oil is aspirated in the lungs). • Irritation, rash of acne pimples and spots.	Oxidizing agents such as hydrogen peroxide, nitric acid.
Lead	Inhalation and/or Ingestion Skin Contact	• Abdominal discomfort, nausea and/or constipation, diarrhea, metallic taste. • Weakness, muscle pains, irritability, headache. • Dizziness.	
Arsenic	Inhalation and/or Ingestion Skin	• Irritation to skin, diarrhea, respiratory distress, possible dermatitis, diarrhea, kidney damage, possible liver damage. • Muscle tremor, convulsions. • Possible gastrointestinal tract,	Varies

	Contact	reproductive effects.	
Mercury	Inhalation and/or Ingestion Skin or eye Contact	• Parsthesia, ataxia, dystarthia, vision, hearing disruption. • Spasticity, jerking limbs. • Dizziness.	Strong oxidizers such as chlorine.

Contaminants of Concern: To be added to final HASP
Minimum Level of Protection: To be added to final HASP

.0 DESCRIPTION OF REQUIREMENTS

Site-specific health and safety procedures including a detailed accident prevention plan are required due to the potentially hazardous conditions at this Site. All persons working on the site will be given a copy of this Site Safety Plan (SSP) for review prior to beginning work at the site. The Contractor shall implement, maintain and enforce these procedures during all phases of the Work.

The Contractor shall utilize the services of a health and safety professional, designated the Health and Safety Manager (HSM) to develop and implement the SSP, including the air monitoring program, conducting initial site specific training and providing support for all health and safety activities as needed, including the upgrading or downgrading of the level of personnel protection.

In addition, a Site Safety and Health Officer (SSHO) shall assist and represent the HSM in the continued implementation and enforcement of the SSP. The SSHO shall be assigned to the Site on a full time basis and be either the Contractor's employee or a subcontractor who reports to the Contractor and the HSM in matters pertaining the site safety and health.

The following definitions shall be used throughout this specification:

1. Site Safety and Health Officer (SSHO): The Contractor's employee assigned to the Site on a full time basis for the duration of the project with functional responsibility for implementation of the SSP.

2. Initial Remedial Action: An action taken to mitigate a health or safety problem so that subsequent work may have a lesser impact on worker safety or the environment.

3. Site: For the purpose of the SSP, the Site shall be the Support Zone, Contamination Reduction Zone, Exclusion Zone and all the area within the limits of work as shown on the Drawings.

4. Monitoring: Indicates the use of field instrumentation to provide information regarding the levels or organic vapors which are being released during remedial action. Monitoring shall be conducted to evaluate employee exposures to toxic materials.

5. Physician: A licensed physician with experience in the practice of occupational medicine and provided by the Contractor.

2.0 REGULATORY REQUIREMENTS AND APPLICABLE PUBLICATIONS

The site specific SSP shall be consistent with the requirements of:

1. Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926), specifically including 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response".

2. United State Environmental Protection Agency (USEPA) Standard Operating Guidelines Revised November 1984.

3. Corps of Engineers Accident Prevention and Safety and Health Requirements Manual, EM 385-1-1. Revised October 1984.

4. NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Site Activities, October 1985, DHHS (NIOSH) Publ. No. 85-115.

5. United States Environmental Protection Agency (USEPA) Standard Operating Procedures and Quality Assurance Manual, Region IV. April 1986.

The SSP shall address, but not necessarily be limited to, the following components as required by OSHA 29 CFR 1910.120(b)(4)(ii):

1. Names of key personnel and alternates responsible for site safety and health (responsibilities and chain of command)

2. Safety and health hazard assessment and risk analysis for each site task and operation (Accident Prevention Plan)

3. Site Description and Evaluation

4. Site Control Measures (work zones, communication, and security)

5. Education and Training

6. Personnel Protective Equipment

7. Medical Surveillance

8. Air Monitoring (Environmental and Personnel)

9. Confined Space Entry Procedures

10. Engineering Controls and Work Practices

11. Personnel Hygiene and Decontamination

12. Equipment Decontamination and Record Keeping

13. Emergency Equipment and First Aid Requirements

14. Emergency Response Plan and Contingency Procedures

15. Heat/Cold Stress Monitoring

16. Logs, Reports and Record Keeping

Determination of the appropriate level of worker safety equipment and procedures shall be made by the Contractor as a result of initial site survey, review of existing data and a continued safety and health monitoring program performed by the Contractor's HSM in accordance with the requirements specified herein.

Should any unforeseen or site specific safety related factor, hazard, or condition become evident during the performance of work at this Site, the Contractor will bring such to the attention of the Owner both verbally and in writing as quickly as possible, for resolution. In the interim, the Contractor shall take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

3.0 SITE CONTROL

Work Zones

The Contractor shall clearly lay out and identify the work zones in the field during all site characterization studies and thereafter whenever the potential for exposure to hazardous substances exists. Equipment, operations and personnel operations in the zones shall be controlled as required by these specifications and described in the EPA Standard Operating Safety Guidelines.

The work zone shall be limited to the areas where borings will be conducted and any other area or areas required to perform the proposed sampling.

It is not anticipated that it will be necessary to establish an exclusion zone, contamination reduction zone or support zone. It is not expected that contamination will be encountered at this site during sampling. If contamination is encountered then the following three paragraphs apply to the site. Otherwise the following three paragraphs do not apply.

The Exclusion Zone shall consist of the actual areas being drilled. The initial level of personnel protection required in this zone and for the balance of the site shall be Modified Level D. The required level of personnel protection equipment is subject to upgrading based on a determination of field conditions by the HSM and SSHO after on-site monitoring and evaluation.

The Contamination Reduction Zone shall be located between the Exclusion and Support Zones and will provide for the transfer of construction materials into the Exclusion Zone, the decontamination of waste transport vehicles prior to entering the Support Zone from the Exclusion Zone, the decontamination of personnel and clothing prior to entering the Support Zone and for the physical segregation of the Support and Exclusion Zones.

The Support Zone shall be established on the Site and is defined as the area outside the zone of significant contamination. The Support Zone shall be clearly delineated and shall be secured against active or passive contamination from the work site. The function of the Support Zone is to provide:

a. An initial entry area for personnel, material and equipment to the Exclusion Zone for site operations.
b. An exit area for decontaminated personnel, materials and equipment from the Exclusion Zone of site operations.
c. A location for support area facilities.
d. A storage area for clean safety and work equipment.

Communications

Telephone communications will be available at the site field office. Key members of all work parties will be provided with 2-way radios. Emergency numbers, including police, fire, ambulance, hospital and NYCHPD shall be prominently posted near the telephone.

Security

Site security shall be provided and maintained 24 hours per day for the duration of the work in order to restrict unauthorized access to the site. The Security Office shall be maintained in the Contractor's facilities. Specific components of this security operation are as follows:

a. Vehicular access to the work area shall be restricted to authorized vehicles only.
b. A log of security incidents will be maintained.
c. No visitors shall be allowed on-site without the expressed approval of the Engineer and Owner.

.0 TRAINING

The Contractor selected for sampling activities shall be required to verify that all of his personnel assigned to or regularly entering the Exclusion zone for the purpose of performing or supervising work, for health, safety, security or administrative purposes, for maintenance, or for any other site-related function, have reviewed appropriate safety training in accordance with 29 CFR 1910.120. Training for Contractor's personnel shall consist of a minimum of 40 hours classroom and 3 days field experience. In addition, Contractor's supervisory personnel shall have a minimum of 8 hours additional specialized training on managing hazardous waste operations. Documentation of all such training shall be submitted to the Owner before any employees will be allowed in the work area.

A site-specific health and safety briefing will be given to all personnel who will be working in the Work Area to familiarize them with the site safety procedures.

All personnel working in the Work Area shall receive a minimum of 8 hours per year of refresher training.

.0 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

The Contractor shall be required to develop contingency plans including evacuation procedures and routes to places of refuge or safe distances from the danger area, for the following potential emergencies: chemical exposure, personal injury, potential or actual fire or explosion, environmental accident (spill or release) and discovery of radioactive material. In the event of any such emergency, the Contractor shall without delay take diligent action to remove or otherwise minimize the cause of the emergency; alert the Owner and institute whatever measures might be necessary to prevent any repetition of the conditions or actions resulting in the emergency.

Emergency medical care services shall be prearranged at a nearby medical facility with established emergency routes. The staff at the facility shall be advised of any potential unusual medical emergencies that might result.

The Contractor shall establish emergency communications with a health care facility and emergency services if warranted by anticipated site conditions. The name of this facility, name of contact, emergency routes and emergency communications arrangements are provided on the first page of this safety plan. In addition the Contractor shall provide the following equipment:

At least one first aid kit shall be provided and maintained fully stocked at a first aid station which is in close proximity to the work, but not inside a hazardous work area. The first aid station shall be specially marked and provided with adequate water and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions.

The Contractor shall have at least one certified First Aid Technician on the Site at any time that work being performed. This person may perform other duties, but must be immediately available to render first aid when needed. Certification shall be by the American Red Cross or other approved agency.

2A-10 B:C type dry chemical fire extinguishers shall be provided at the site security office.

6.0 PERSONNEL PROTECTIVE EQUIPMENT

The contractor shall be required to provide all on-site personnel with appropriate personnel safety equipment and protective clothing and will ensure that all safety equipment and protective clothing is kept clean and well maintained. "Action levels" for determining the specified minimum levels of protection shall be based upon air monitoring results and direct contact potential. Specific action levels are listed in Table 9.1. The level of personal protection required at the Site is not expected to exceed Modified Level D. Any changes to the minimum level of protection shall be approved by the SSHO and the Owner. At a minimum the following items shall be provided:

Protective clothing shall be furnished for on-site personnel consisting of:

Modified Level D Equipment:
(* refers to optional equipment, if applicable)

Work clothing as dictated by weather
Coveralls
Gloves*
Hardhat
Safety glasses or chemical splash goggles*
Safety shoes or boots; chemical-resistant, steel toe and shank
Escape air mask*
Outer, disposable, chemical resistant boots*
Face shield*

Level C Equipment:
(* refers to optional equipment, if applicable)

Full-face or half-mask air purifying, canister-equipped respirator (NIOSH approved)
Hooded chemical-resistant clothing
Coveralls*
Gloves, inner, chemical-resistant
Gloves, outer, chemical-resistant
Safety boots; chemical-resistant, steel toe and shank
Disposable outer, chemical-resistant boot covers*
Hardhat
Long cotton underwear
Escape air mask*
Face shield*
2 way radios (worn under outside protective clothing)*

All prescription eyeglasses in use on the Site shall be safety glasses. Prescription lens inserts shall be provided for full face respirators. Contact lenses are prohibited in the Exclusion and Contamination Reduction Zone.

Footwear used on-site shall be steel-toed, steel shank safety shoes or boots, with chemical resistant soles.

All on-site personnel shall wear a hardhat when engaging in construction, excavation, screening, or drilling activities.

All personnel protective equipment worn on-site shall be decontaminated or properly disposed of at the end of the workday. The SSHO is responsible for ensuring all reusable personal protective equipment is decontaminated and sanitized before being reissued.

Each respirator shall be individually assigned and not interchanged between workers.

Cartridges, canisters and filters shall be changed daily or upon breakthrough, whichever occurs first. A procedure for assuring periodic cleaning, maintenance and change-out of filters shall be provided by the Contractor.

Any outer protective clothing that has entered the Contamination Reduction and Exclusion Zones shall be properly disposed of or decontaminated at the completion of the workday.

Modified Level D shall be the minimum level of protection set for all primary operations performed in the Exclusion Zone, unless an upgrade is required in accordance with the provisions set forth in the Air Monitoring program.

7.0 PERSONAL HYGIENE AND DECONTAMINATION

All on-site personnel performing or supervising remedial work within a hazardous work area, or exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids shall observe and adhere to the personnel hygiene-related provisions of this paragraph. The following conditions and procedures shall be followed:

1. The Contractor shall be required to provide and require use by personnel of all protective clothing including disposable work clothing and safety boots, storage and disposal containers for used disposable outerwear, washing facilities, a facility for changing into and out of and storing work clothing separate from street clothing, a lunch and/or break room, and portable toilets.

2. Disposable outerwear shall not be reused and when removed, shall be placed inside disposal containers provided for this purpose located in the Contamination Reduction Zone.

3. Smoking and chewing shall be prohibited in the Exclusion and Contamination Reduction Zones.

8.0 AIR MONITORING

8.1 General

Air monitoring must be performed prior to commencement of work and in accordance with Sec. 8.3, Air Monitoring Frequency Guidelines. Organic vapor concentrations will be monitored in the field with a flame ionization detector (FID) or photoionization detector (PID). All readings will be taken in the workers' breathing zone to determine whether an action level has been met and/or exceeded. Air monitoring results will be documented on the Air Monitoring Log (Forms).

Additionally, due to the possibility of blowing dust, the site safety officer will continuously visually monitor for dust. If dust is observed then engineering controls will be applied to abate the dust. Engineering controls will consist of using water applied to the ground surface to abate the dust.

8.2 Action Levels

Air monitoring action levels (Table 8.1) have been established to indicate the chemical concentrations in the breathing zone that require an upgrade in level of personnel protective equipment (PPE). The action levels apply to all tasks performed on this site. Guidelines for frequency of air monitoring are presented in the next section.

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TABLE 8.1
AIR MONITORING ACTION LEVELS

Instrument*	Function	Measurement	Action
Photoionization Detector (PID), Flame Ionization Detector (FID)	Measured total organic vapors	0-5 ppm	• Level D required
		5-500 ppm	• Upgrade to Level C
		> 500 ppm	• **Stop work.** Contact PM and HSR for guidance
Oxygen/Combustible Gas Meter (O_2/LEL) **NOTE:** Combustible gas meter readings obtained in an oxygen deficient atmosphere will not be accurate	Measures oxygen level (O_2) and lower explosive limit (% LEL)	O_2 19.5-22%	• Acceptable conditions - Continue normal activity
		O_2 <19.5	• Ventilate the space • Notify PM and SSHO if unable to achieve acceptable conditions
		O_2 >22%	• **Leave area immediately**: this atmosphere is extremely flammable • Notify PM and SSHO
		LEL<10%	• Acceptable conditions - Continue normal activity
		LEL>10%	• **Leave area immediately** • Contact PM and SSHO for guidance on venting and other safety measures

* NOTE: Instruments must be calibrated according to manufacturer's recommendations

8.3 Air Monitoring Frequency Guidelines

Periodic monitoring will be conducted when: (1) it is possible that an IDLH condition or a flammable atmosphere has developed or (2) there is an indication that exposures may have risen over permissible exposure limits or published exposure levels since the last monitoring. Look for a possible rise in exposures associated with these situations:

- Change in Site Area - work begins on a different section of the site
- Change in Contaminants - handling contaminants other than those first identified
- Change in On-Site Activity - one operation ends and another begins
- Handling Leaking Drums or Containers
- Working with Obvious Liquid Contamination (e.g., a spill or lagoon)

Conduct air monitoring when the possibility of volatilization exists (such as with a new monitoring well or a well containing known product).

Conduct air monitoring on a well at a site known to have little contamination (documented by experience or laboratory data), only if an odor emanates from the well.

8.4 Confined Space Entry Procedures and Permit

Site work may require personnel to enter confined spaces. **No personnel shall enter an area identified as a confined space without using the confined space entry procedures.** The purpose of the confined space entry procedure is to protect employees from potentially hazardous environments and to facilitate immediate rescue in an emergency situation. A Confined Space Entry Permit must be posted at the entrance to each confined space.

DEFINITION: A Confined Space means an enclosed space which is large enough and so configured that an employee can bodily enter and perform assigned work; has limited or restricted means for entry or exit (some examples are tanks, vessels, silos, storage bins, hoppers, vaults, pits and diked areas); is not designed for continuous employee occupancy; and has one or more of the following characteristics: (A) contains or has a known potential to contain a hazardous atmosphere; (B) contains a material with the potential for engulfment of an entrant; (C) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section; or (D) contains any other recognized serious safety or health hazard.

EXAMPLES: Excavation pits, trenches, storage tanks, subsurface vaults, basements, silos, manholes, and sewers.

CHARACTERISTICS

- Limited access and egress
- Limited natural ventilation
- Not designed for human occupancy

PROTOCOL FOR CONFINED SPACE ENTRY

- Perform the appropriate air monitoring activity at various depths in the space prior to entry. Monitor for: (1) oxygen level, (2) flammable vapors, and (3) toxic vapors.
- Ventilate the atmosphere in the space so that entry may be made safely without respiratory protection. If this is not feasible, appropriate respiratory protection must be worn by authorized entrants and attendants.
- Wear appropriate respiratory protection when ventilation alone can not achieve acceptable atmospheric levels of oxygen or flammable or toxic vapors. Note: Respirators alone are not sufficient in oxygen deficient atmospheres.
- Provide emergency means of evacuation - lifelines, mechanical hoist, etc.
- Provide at least one observer to remain outside the confined space for every worker entering the confined space.

9.0 EQUIPMENT DECONTAMINATION

All equipment used in the Exclusion Zone shall be decontaminated in the Contamination Reduction Zone prior to leaving the Site. The procedures for decontamination of equipment shall be approved by the Engineer. The Contractor shall be responsible for monitoring all vehicle decontamination prior to exiting the Site, where required.

1. Personnel engaged in vehicle decontamination shall wear protective equipment including disposable clothing and respiratory protection consistent with the requirements of this SSP.

2. All equipment involved in intrusive activities in which exposure to contamination might occur, such as the installation of monitoring wells, test pits, or underground pipes, shall undergo equipment decontamination procedures. This shall include a high pressure wash area for equipment and vehicles and a steam cleaning system for use after the mud and/or site material has been cleaned from the equipment. All equipment being decontaminated by washdown shall be located in the Contamination Reduction Zone prior to maintenance work.

3. All decontamination wastewater shall be collected and sampled for appropriate off-site disposal.

All equipment used in sample collecting activities shall be decontaminated in accordance with the standard operating procedures of the Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual; United States Environmental Protection Agency, Region IV, Environmental Services Division, April 1, 1986.

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FORMS

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VAPOR MONITORING FORM

Project Name:

Project Number:

Contaminants:

Date	Time	Ionization Detector Reading		Explosimeter Reading		Radiation Monitor Reading Mr/hr	Location	Purpose	Initials
		FID	PID	%LEL	& O_2				

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VISITOR/TRAINEE GUIDELINES

Conroy Environmental Consultants, Inc. (CEC) is committed to providing a safe environment on all work sites for visitors, trainees, employees and/or passersby. In order to accomplish this, the following guidelines must be followed.

1. VISITORS

Any person not actively participating in the work at the site is regarded as a "visitor" and must follow these visitor/trainee guidelines. Visitors must be accompanied by an authorized representative while on site.

Sites must be marked with signs, placards, and/or barricades to designate hazardous boundaries. Visitors will not be allowed on any site that is not adequately marked.

2. TRAINEES

Trainees are employees of CEC or their representatives who have not yet completed the required safety training program. New hires and in-house company transfers will be considered trainees until safety training requirements are met.

Trainees will be informed of restrictions by their supervisor and must abide by them before visiting active sites.

Trainees will be permitted to visit CEC sites as observers as long as the following conditions are met:

- Trainees are supervised at all times while observing on site.
- Trainees do not perform work functions of any type while on site.
- Trainees do not handle any equipment, tools and/or supplies while on site.
- Trainees do not enter any hazardous or hot zone or confined space areas while on site.

Supervisors will be responsible for informing trainees of the above conditions and for ensuring that the conditions are met. Supervisors will also ensure that trainees will not be asked to violate the conditions listed above.

A Trainee/Visitor Agreement Form must be signed by both the trainee and the supervisor.

Infractions of the above agreement will be viewed as extremely serious and will be subject to discipline up to and including termination for either the trainee and/or supervisor.

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TRAINEE/VISITOR AGREEMENT FORM

CEC is committed to providing a safe working environment for all employees. In addition, CEC will comply with OSHA requirements for employee safety training prior to working on any hazardous site.

The following section is to be filled out by trainee/visitor.

Agreement between:

_____ _____ and CECI
Name (print/type) SSN#

Because we have your safety in mind, you will be considered a trainee until all training criteria are met. This means you must complete all training requirements prior to performing work activities on site. As a requirement of the training program, you will be asked to visit CEC sites as an observer. You must be supervised on all of these site visits.

As an on-site observer trainee, your signature below indicates your agreement to these restrictions.

You may not:

1. Perform work functions of any type.
2. Handle any equipment/tools and/or supplies of any type.
3. Enter any hazardous or hot zone areas.

I agree to adhere to the above conditions in all instances while on site as a trainee/visitor.

_____ _____
Signature Date

This section is to be filled out by supervisor.

As supervisor to the above trainee, I agree to the above restrictions and agree not to request him/her to perform activities contrary to those restrictions.

_____ _____
Signature Date

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AGREEMENT AND ACKNOWLEDGEMENT SHEET

CEC personnel have the authority to stop field activities at this site if any activity is not performed in accordance with the requirements of the Site Safety Plan. All project personnel, subcontractor personnel and visitors are required to sign the Agreement and Acknowledgement Sheet prior to conducting field activities at this site.

AGREEMENT AND ACKNOWLEDGEMENT SHEET	
1. I have read and fully understand the SSP and my responsibilities. 2. I agree to abide by the provisions of the SSP.	
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date

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TASK SPECIFIC HASP SHEET

DRILLING AND SAMPLING (SOIL AND GROUNDWATER) ACTIVITIES

Drilling activities conducted at the site will include the use of:

- Drilling rig
- Operator

During drilling activities, the following personal protection equipment will be employed in conjunction with the workers' Level C equipment:

- Hard hat
- Steel toe footwear
- PID to monitor for detection of volatile organic compounds (VOCs)
- 4-gas monitor for detection of ambient oxygen percent, lower explosion limit, and carbon monoxide
- Orange safety vests

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Reporting and Scheduling

A Remedial Investigation Report will be prepared in accordance with Section 3.14 of DER-10.

The Remedial Investigation Report will:

- Include the remedial investigation data, detailed engineering and geological interpretations of the data and conclusions appropriate to the site;
- Compare the site data to Standards, Criteria and Guidelines used by the Department and/or the soil cleanup levels developed for the BCP or pursuant to the Guidance;
- Characterize the possible nature and extent of contamination which has migrated from the site; .
- Include an on and off-site exposure assessment; and
- Include a possible recommendation regarding remediation.

Following is an estimated schedule for the remedial investigation.

Phase I - two (1) weeks:

- Conduct field activities; and
- Obtain analytical results.

Phase II two (1) week:

- Prepare Combined Remedial Investigation Report and Remedial Work Plan.