
Site-Specific Brownfields Sampling, Analysis, and Monitoring Plan

Brownfields Assessment Demonstration Pilot

(Insert Pilot Name and State)

The attached U.S. EPA Region 2 Sampling, Analysis, and Monitoring Plan (SAMP) template has been submitted in compliance with the provisions of *(Insert Pilot Name and State) Brownfields Assessment Demonstration Pilot Cooperative Agreement No. (Insert Number)*.

The undersigned agrees to follow the accompanying Generic Brownfields QAPP boilerplate to prepare site-specific SAMPs using this template for remedial pilot projects funded under the U.S. EPA Region 2 Brownfields Economic Re-development Initiative. The undersigned also agrees to incorporate any comments provided by their governing state environmental regulatory authorities (NYSDEC or NJDEP) concerning the development of site-specific SAMPs.

Municipal Brownfields Pilot Project Manager Concurrence: _____
Signature

Printed Name/Date

U.S. EPA Region 2 Project Manager Approval: _____
Signature

Printed Name/Date

and when applicable

State/Commonwealth Project Manager Approval: _____
Signature

Printed Name/Date

U.S. EPA Region 2
Site-Specific Brownfields Sampling, Analysis, and Monitoring Plan (SAMP)
Preparation Template

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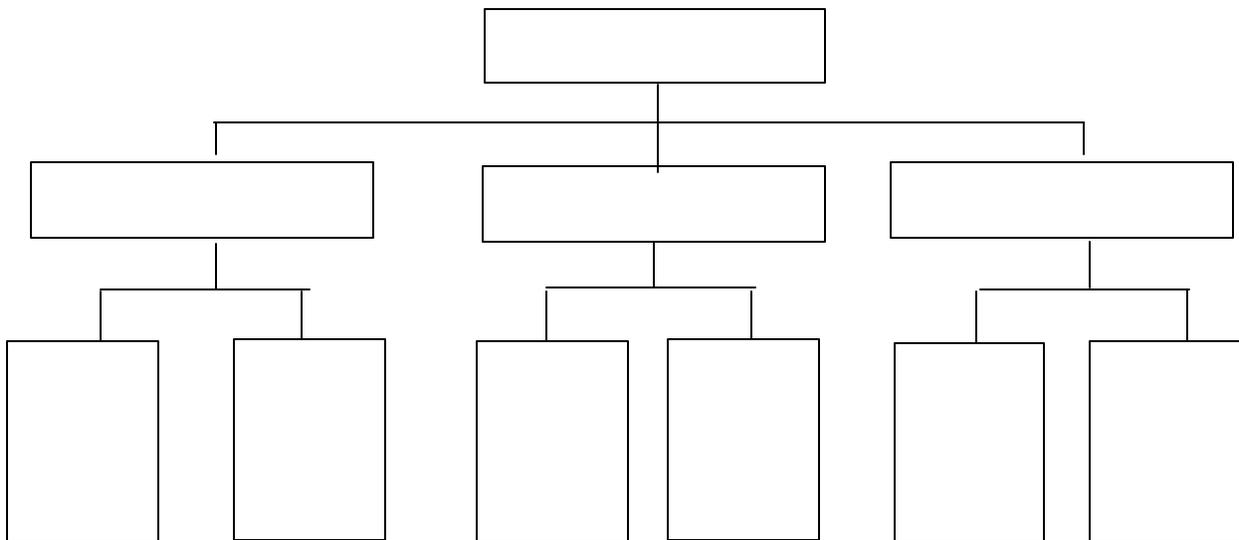
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B.0 Project Organization and Responsibilities

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

B.1 Organizational Chart

In this section of the Site-Specific Brownfields SAMP, develop an organizational chart that identifies the chain of command for key personnel, including the QA representative, participating in the proposed site investigation project. Include titles, responsibilities, and organization affiliation of all project participants. (Fill-in the blanks, if applicable, otherwise insert another project specific chart.)



Note: In lieu of completing an organizational chart, a table specifying the key personnel, their titles, and responsibilities is sufficient to delineate the infrastructure of the proposed Brownfields site investigation project.

B.2 Personnel Information

In this section of the Site-Specific Brownfields SAMP, to delineate the roles of the key individuals named in the organizational chart, a brief summary explaining each person's responsibility for their given project activity is required. In addition, the telephone numbers should also be provided for each of the key individuals listed to facilitate communication.

B.3 Laboratory Information

An essential component of the environmental measurement data collection process is to delineate the analytical laboratory(ies) responsible for performing all confirmatory analyses. Therefore, in this section of the Site-Specific Brownfields SAMP, develop a table summarizing the laboratory name, location, contact, telephone number, and analyses to be performed.

| Laboratory Name & Address ¹ | Contact & Telephone Number | Sample Analyses |
|--|----------------------------|-----------------|
| | | |
| | | |
| | | |
| | | |

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. Alternately, an on-site audit or a quality assurance management plan review may be sufficient mechanisms means to assess a laboratory's ability.

C.0 Site Background

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

C.1 Historical Data Review Report

In this section of the Site-Specific Brownfields SAMP, provide a summary of the history/background of the particular property under investigation. This initial “environmental assessment” is commonly referred to as a Phase I Brownfields Site Assessment. Undertaking a Phase I Brownfields Site Assessment is useful in its ability to form the basis of a Historical Data Review Report summary for project planning purposes. It should describe site-specific chemical processes, raw materials, final products, wastes, and waste storage/disposal practices to the greatest possible extent. In addition, this summary should also provide an overview of how this information will relate to the current investigation. This will typically involve examining previous site operations and practices to identify potentially contaminated areas.

Sources of background information include federal, state and local officials and files (site inspection reports and legal actions), deed or title records, former facility employees, local residents, and facility records. When available, historical monitoring results from previous investigations may also be relied upon to provide an understanding of the environmental condition of the site. However, it is essential to assess the reliability and usefulness of existing analytical data. Existing analytical data without documentation or QA/QC controls may also still prove useful, and should be included in the Historical Data Review Report summary. In addition, it is customary to include site maps along with facility blueprints and aerial photographs when available in the Historical Data Review Report summary. In conjunction, a local Agricultural Extension Agent should be contacted to provide insights into soil types and drainage patterns. County property and tax records, and United States Geological Survey (USGS) topographic maps are additional sources of site and regional information.

To ensure Phase I Brownfields Site Assessment historical data review reports and supporting topographic information are properly assembled, it is advantageous to follow an accepted guide on conducting a preliminary environmental investigation. Fortunately, there are many guides specific to performing Phase I site assessment activities available. Several of these accepted guides are

provided as either an appendix or as literature citations in Volume 1 of the U.S.EPA Region 2 Brownfields Project Planning Guidance. These guidance documents discuss project planning, historical/background review, site reconnaissance, and the evaluation and reporting of collected information. It should be noted that although a variety of accepted protocols exist for conducting a Phase I site assessment, a single guidance should be used exclusively to avoid confusion.

C.2 Site Reconnaissance Reports

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

C.3 Project Definition

In this section of the Site-Specific Brownfields SAMP, briefly state the problem that the data collection project is designed to solve and/or the decisions to be made (the project objectives). This summary is to include a description of the relevant characteristics of the site, such as site use history, suspected contaminants and their location, range of contaminant concentrations, media that may be affected, and likely migration routes. When applicable, cite previous studies that indicate why the site investigation project is needed.

D.0 Data Use Objectives

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

D.1 Brownfields Site Investigation Reports

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

D.2 Quality of Data Needed for Environmental Data Measuring

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

D.3 Project Description

In this section of the Site-Specific Brownfields SAMP, provide a detailed description of the work to be performed. This description shall identify the media to be sampled, whether field or fixed laboratories will be used, if in-situ field analytical screening methods will be used, likely action levels, anticipated work schedules, required reports, etc.

E.0 Sampling and Analysis

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

E.1 Sampling Design

To design a suitable monitoring network, it is important to consider sample representativeness, comparability, and completeness. Likewise, other relevant factors may influence the design of a proposed sampling network such as the homogeneity of the system under investigation, accessibility of the sampling area, stream flow conditions, tidal fluctuation, and weather conditions. As a result, the intent of this section is to describe the overall monitoring system by providing a justification for the design of a proposed sampling network and the identification of specific sample locations.

*Therefore, in this section of the Site-Specific Brownfields SAMP, summarize the proposed sampling network design for the investigation of a particular property. This summary must provide a rationale for the selection of sampling locations for each parameter/matrix to be sampled during the project. For instance, a judgmental sampling strategy with broad spectrum analysis using the **Superfund Program Representative Sampling Guidances** may be designated. In addition, identify all action levels pertinent to the site investigation project. A detailed site map with anticipated sampling locations should be included. When applicable, describe all in-situ field analytical screening techniques that will be utilized and identify the number of samples which will be sent for confirmatory U.S.EPA CLP analyses.*

**U.S. EPA REGION 2
 BROWNFIELDS SAMP PREP TEMPLATE
 FORM F-1: METHOD AND SOP REFERENCE TABLE**

**REVISION NO. 2
 REVISION DATE: May 2000 Final**

F-1.0 Standard Operating Procedures

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

F-1.1 Sampling SOPs

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

F-1.2 SOP Reference Table

In this section of the Site-Specific Brownfields SAMP, utilize the following form to create an SOP Reference Table. The appropriate number/letter reference from this table will be used to complete Forms F-2 through J, and Form L. In addition, it is essential to attach all referenced Project Analytical and Sampling SOPs to the Site-Specific Brownfields SAMP.

| |
|--|
| ANALYTICAL METHOD REFERENCE <i>(Include document title, method name/number, revision number, date)</i> |
| 1a. |
| 2a. |
| 3a. |
| 4a. |
| PROJECT ANALYTICAL SOPs <i>(Include document title, date, revision number, and originator's name)</i> |
| 1b. |
| 2b. |
| 3b. |
| 4b. |
| PROJECT SAMPLING SOPs ¹ <i>(Include document title, date, revision number, and originator's name)</i> |
| 1c. |

2c.

3c.

4c.

¹ Project Sampling SOPs include sample collection, sample preservation, equipment decontamination, preventive maintenance, etc...

**U.S. EPA REGION 2
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 FORM F-2: SAMPLING AND ANALYTICAL METHODS REQUIREMENTS**

**REVISION NO. 2
 REVISION DATE: May 2000 Final**

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 Samples ² | Sampling SOP ³ | Parameter/Fraction | Minimum Sample Volume ⁴ | Sample Container ⁵ | Sample Preservation | Analytical Method ⁶ | CLP Contractual Reporting Limit | Technical Holding Time |
|-----------------------------------|--------------------------------|---------------------------|--------------------|------------------------------------|-------------------------------|---------------------|--------------------------------|---------------------------------|------------------------|
|-----------------------------------|--------------------------------|---------------------------|--------------------|------------------------------------|-------------------------------|---------------------|--------------------------------|---------------------------------|------------------------|

| | | | | | | | | | |
|-------------|-------|-------|--|-------|--|-------------|----------|-----------------------------------|---------------------------------|
| Soil () | _____ | _____ | <u>Target Compound List (TCL):</u> | 4 oz. | 2 oz. clear wide-mouth glass with Teflon lined septum. | Cool to 4°C | OLM0 4.2 | 10 µg/kg | 14 days |
| | _____ | _____ | Volatile Organics (VOCs) | 4 oz. | 4 oz. amber wide-mouth glass with Teflon lined cap. | Cool to 4°C | OLM0 4.2 | Compound Specific (330-830 µg/kg) | 7 days extract; 40 days analyze |
| | _____ | _____ | Acid Extractable Organics Base & Neutral Organics (BNAs) | 4 oz. | 4 oz. amber wide-mouth glass with Teflon lined cap. | Cool to 4°C | OLM0 4.2 | Compound Specific (1.7-170 µg/kg) | 7 days extract; 40 days analyze |
| | _____ | _____ | Pesticides/Aroclors (PCBs) | 6 oz. | 4 oz. amber wide-mouth glass with Teflon lined cap. | Cool to 4°C | ILM0 4.0 | Analyte Specific (0.2-5000 µg/L) | 180 days; (28 days Hg) |
| | _____ | _____ | | 6 oz. | | Cool to 4°C | ILM0 4.0 | | 14 days |
| | _____ | _____ | <u>Target Analyte List (TAL):</u> | | | | | 10 µg/L | |
| | _____ | _____ | Total Metals | | 8 oz. clear wide-mouth glass with Teflon lined cap. | | | | |
| | | | Cyanide | | 8 oz. clear wide-mouth glass with Teflon lined cap. | | | | |

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.

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FORM F-2 (CONTINUED): SAMPLING AND ANALYTICAL METHODS REQUIREMENTS

| Matrix (Sample Type) ¹ | Number of Samples ² | Sampling SOP ³ | Parameter/Fraction | Minimum Sample Volume ⁴ | Sample Container ⁵ | Sample Preservation | Analytical Method | CLP Contractual Reporting Limit | Technical Holding Time |
|-----------------------------------|--------------------------------|---------------------------|--|------------------------------------|--|--|-------------------|-----------------------------------|---------------------------------|
| Aqueous (_____) | _____ | ----- | <u>Target Compound List (TCL):</u> | | | | | | |
| | | | Volatile Organics (VOCs) | 80 ml | 40 ml VOC vial with Teflon lined septum. | 1:1 HCl to pH<2; Cool to 4°C; 25 mg Ascorbic Acid ⁷ | OLM0 4.2 | 10 µg/L | 14 days |
| | | | Acid Extractable Organics Base & Neutral Organics (BNAs) | 2 Liters | 1 Liter amber glass with Teflon lined cap. | Cool to 4°C; 80 mg Na ₂ S ₂ O ₃ (sodium thiosulfate) ⁸ | OLM0 4.2 | Compound Specific (10 - 25 µg/L) | 7 days extract; 40 days analyze |
| | | | Pesticides/Aroclors (PCBs) | 2 Liters | 1 Liter amber glass with Teflon lined cap. | Cool to 4°C | OLM0 4.2 | Compound Specific (0.05-5.0 µg/L) | 7 days extract; 40 days analyze |
| | | | <u>Target Analyte List (TAL):</u> | 1 Liters | | | ILM0 4.0 | Analyte Specific | 180 days (28 days Hg) |
| | | | Total Metals | 1 Liters | 1 Liter HDPE bottle with Teflon lined cap. | 1N HNO ₃ to pH<2; Cool to 4°C | ILM0 4.0 | (0.2-5000 µg/L) | 14 days ⁹ |
| | | | Cyanide | | 1 Liter HDPE bottle with Teflon lined cap. | NaOH to pH>12; Cool to 4°C; 25 mg Ascorbic Acid ⁸ | | 10 µg/L | |

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 (MS/MSD) 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.
- ⁷ Ascorbic Acid should only be used in the presence of residual Chlorine.
- ⁸ Sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$) should only be used in the presence of residual Chlorine.
- ⁹ Maximum holding time is 24 hours when sulfide is present.

I.0 Preventive Maintenance - Laboratory Equipment

In this section of the Site-Specific Brownfields SAMP (when applicable), identify the laboratory equipment and/or systems requiring periodic preventive maintenance. Cite references on how periodic preventive and corrective maintenance of equipment shall be performed to ensure availability and satisfactory performance. Likewise, specify how the availability of critical spare parts which are identified in the instrument manufacturer's operating instructions and/or SOPs will be assured and maintained.

| <u>Instrument</u> | <u>Activity</u> | <u>Frequency</u> | <u>SOP Reference</u> ¹ |
|-------------------|-----------------|------------------|-----------------------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

¹ **Insert the appropriate reference number/letter from Form F-1, Method and SOP Reference Table.**

J.0 Calibration and Corrective Action - Laboratory Equipment

The purpose of this section is to delineate the analytical techniques which will assure the laboratory instrumentation employed will accurately and precisely quantitate the target analytes of concern. Hence, it is essential to identify all the tools, gauges, and instruments which must be calibrated to affirm data measurement activities are within known limits. To facilitate these efforts, it is important to specify all instrument calibration procedures using certified equipment and standards with recognized acceptance/performance criteria. In conjunction, it is essential to specify the procedures for maintaining all pertinent calibration and corrective action records.

Therefore, in this section of the Site-Specific Brownfields SAMP (when applicable), specify the calibration and corrective action criteria for operating all pertinent laboratory instrumentation. However, the project objectives and acceptance/performance criteria put forward in the accompanying generic QAPP boilerplate specify the use of our U.S.EPA CLP analytical Statements of Work (SOWs) for acquiring all confirmatory data. The U.S.EPA CLP SOWs delineate all of the pertinent calibration procedures and corrective actions required to perform these analyses. As a result, cite that the calibration procedures and corrective actions which will be employed for each respective Brownfields site investigation are to be performed in accordance with the appropriate U.S.EPA CLP SOW. For Target Contaminant List (TCL) determinations, specify the use of U.S.EPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration OLM0 4.2 or latest revision. For Target Analyte List (TAL) determinations, specify the use of U.S.EPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration ILM0 4.0 or latest revision.

K.0 Sample Documentation and Handling

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

K.1 Sample Documentation

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

K.1.1 Field Logbook

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

K.1.2 Field Data Sheets and Sample Labels

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

K.1.3 Chain of Custody Record

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

K.1.4 Custody Seals

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

K.2 Sample Handling and Shipment

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

K.3 Sample Handling and Chain of Custody Requirements

Therefore, in the Site-Specific Brownfields SAMP, specify the processes which will be followed for maintaining environmental sample integrity. This involves describing the sample handling and chain-of-custody procedures which will be followed. This description should also indicate the sample containers, sample numbering system, sample shipment mechanisms, chain-of-custody forms, sample tags, and custody seals the field sampling personnel will utilize. It is important to note that all of the applicable SOPs for collecting, transferring, storing, analyzing, and the disposing of samples should be delineated on Form F-1 accordingly.

To facilitate these efforts, the U.S.EPA Sampler's Guide to the Contract Laboratory Program is included as an attachment to this QAPP boilerplate. The U.S.EPA Sampler's Guide is designed to assist field sampling personnel in clarifying the

procedures necessary to submit environmental samples for CLP analyses. It is intended to only serve as a guide for planning Brownfields sample handling and chain-of custody procedures. As a result, please do not contact any of the representatives listed in the U.S.EPA Sampler's Guide or forward any of the required paper-work to the agency unless utilizing our CLP resources.

L.0 Analytical Data Quality Requirements and Assessments

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

L.1 Data Acceptance/Performance Criteria

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

L.2 Analytical Precision

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

L.3 Analytical Accuracy

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

L.4 Analytical Precision and Accuracy Requirements

In this section of the Site-Specific Brownfields SAMP, delineate the analytical techniques for assuring the laboratory equipment employed will accurately and precisely quantitate each target analyte of concern. This will involve identifying 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 to be summarized in the following sub-sections of this SAMP for all fixed laboratory confirmatory and in-situ field screening analyses which will undertaken when conducting a site-specific Brownfields investigation.

L.4.1 Fixed Laboratory Precision and Accuracy Requirements

The project objectives and acceptance/performance criteria outlined in the accompanying generic QAPP boilerplate rely on the use of our U.S.EPA CLP SOWs for acquiring all fixed laboratory confirmatory data. As a result, the U.S.EPA CLP SOWs delineate all of the pertinent analytical precision and accuracy protocols for performing these analyses. They describe in detail all of the necessary calibration procedures, quality control sample determinations, acceptance criteria, and corrective actions required to render an accurate and precise quantitation of all the target analytes of concern. Therefore, cite that the analytical precision and accuracy protocols for conducting a site-specific Brownfields investigation are to be performed in accordance with the appropriate U.S.EPA CLP SOW. For TCL determinations, specify the use of U.S.EPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration OLM0 4.2 or latest revision. For TAL determinations, specify the use of U.S.EPA Contract Laboratory Program Statement of

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

Many in-situ field analytical screening techniques (immunoassay, XRF, etc.) are often classified as quantitative determinations, although only minimal Quality Assurance/Quality Control (QA/QC) procedures and data deliverable requirements are specified. Unless duplicate samples are analyzed in a fixed laboratory for confirmation, the uncertainty of in-situ field analytical screening data cannot be evaluated. As such, to generate quantitative in-situ field analytical screening data, traditional QA/QC procedures must be employed to identify site specific false negative and false positive results.

To ensure in-situ field analytical screening data are of an appropriate quality, QA/QC protocols for ascertaining precision and accuracy must be utilized when performing such analyses. Optional QA/QC protocols to consider when performing these analyses include:

- *Sample documentation (recording sample collection location, time & 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).*
- *Method blank analysis (requiring that a volume of deionized, distilled laboratory water be carried through the entire analytical sequence with every sample delivery group to check on the occurrence of contamination resulting from sample preparation and measurement activities).*
- *Duplicate sample analysis (requiring the analysis of a duplicate environmental sample with every sample delivery group to document method reproducibility).*
- *Fixed laboratory confirmation analysis (requiring that a portion of all environmental samples analyzed with a field analytical screening technique undergo fixed laboratory quantitation to document method performance).*
- *Method control sample analysis (requiring the analysis of a pre-prepared sample spiked at the action level with every sample delivery group to document method performance).*

- *Matrix spike analysis (requiring the analysis of an environmental sample spiked with a target analyte(s) of concern with every sample delivery group to assess matrix effects).*
- *Continuing calibration verification analysis (requiring the analysis of a known standard every 10 samples to check the accuracy of a measurement process).*

Therefore, in this section of the Site-Specific Brownfields SAMP, describe the QA/QC protocols which will be employed when using in-situ field analytical screening determinations. In conjunction, specify the frequency and acceptance/performance criteria for implementing

each prescribed QA/QC protocol. These protocols are essential because they enable Brownfields stakeholders to gauge any uncertainty evident in the data, and logically utilize that data to formulate sensible environmental decisions. Consequently, the utilization of proper QA/QC protocols will enable field measurement data to be quantitative, scientifically valid, and legally defensible.

M.0 Data Measurement Quality Objectives

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

M.1 Sample Collection Precision

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

M.2 Sample Collection Accuracy

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

M.3 Sample Collection Representativeness

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

M.4 Sample Collection Comparability

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

M.5 Sample Collection Completeness

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

M.6 Sampling Quality Control Requirements

Quality control procedures (checks and audit samples) with specified acceptance/performance limits are always to be used when conducting a Brownfields site investigation to monitor sampling operations.

Therefore, in this section of the Site-Specific Brownfields SAMP, summarize all of the respective sampling quality control activities which will be employed when conducting the investigation of a particular property. To assist in the design of an appropriate quality control program to monitor Brownfields site investigation sampling activities, it is advantageous to follow an accepted guide. As such, the U.S.EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations outlines the agency's accepted procedures and prerequisites for planning environmental data operations.

**U.S. EPA REGION 2
 BROWNFIELDS SAMP PREP TEMPLATE
 FORM M: FIELD QUALITY CONTROL REQUIREMENTS**

**REVISION NO. 2
 REVISION DATE: May 2000 Final**

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

| QC Sample | Frequency | Acceptance Criteria | Corrective Action |
|--|--|----------------------------|--------------------------|
| Field Quality Control Requirements | | | |
| Field Duplicate | 5% per parameter per matrix or _____ | | |
| Collocated Sample | 10% per parameter per matrix ¹ or _____ | | |
| Split Sample | 10% per parameter per matrix ² or _____ | | |
| Equipment Rinsate Blank | 5% per parameter per matrix per equipment type per decontamination event or _____ | | |
| VOA Trip Blank | 1 per cooler or _____ | | |
| Other (Specify) | | | |
| Legend: ¹ Applicable to soil/sediment matrices only. ² Applicable to groundwater/surface water matrices only. | | | |

N.0 Data Reporting

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

N.1 Data Formatting

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

N.2 Field Data Reporting

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

N.3 Laboratory Data Reporting

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

N.4 Data Management and Documentation Requirements

In this section of the Site-Specific Brownfields SAMP, delineate the data management and documentation procedures which will be followed when conducting an investigation of a particular property. This is to include all associated environmental measurement activities pertinent to field sample collection, laboratory analysis, and data storage and use. It is integral that analytical data packages always be assembled to include all of the relevant laboratory documentation needed to interpret the final environmental sample results (case narrative, sample results, QA/QC results, chain of custody documentation, laboratory correspondence, all associated raw data, etc.). Likewise, it is important to describe the envisioned procedures for detecting and correcting errors identified during the data reporting and data entry process. To assist in these efforts, provide examples of any forms or checklists, such as chain-of-custody or field calibration forms, which will be utilized. Traditionally, the type of information/data to request from the participating laboratory(ies) are as follows:

- *Data Results Sheets (include any performance evaluation sample results).*
- *Method Blank Results.*
- *Surrogate Recoveries and Acceptance Limits.*
- *Matrix Spike/Matrix Spike Duplicate Results and Acceptance Limits (organic analyses only).*
- *Spike/Duplicate Results and Acceptance Limits (inorganic analyses only).*
- *Laboratory Control Sample Results and Acceptance Limits.*
- *ICP Serial Dilution Results.*
- *ICP Interference Check Sample Results.*
- *Project Narrative which contains all observations and deviations.*

N.4.1 Fixed Laboratory Data Deliverable Requirements

The project and data quality objectives put forward in the accompanying generic Brownfields QAPP boilerplate specify the use of U.S.EPA CLP SOWs for acquiring all confirmatory fixed laboratory data. The U.S.EPA CLP SOWs delineate all of the pertinent analytical data deliverables which are to be provided by a laboratory performing these analyses. Therefore, cite that the analytical data deliverables acquired for a site-specific Brownfields investigation are to be generated in accordance with the appropriate U.S.EPA CLP SOW. For TCL determinations, specify the use of U.S.EPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration OLM0 4.2 or latest revision. For TAL determinations, specify the use of U.S.EPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration ILM0 4.0 or latest revision.

N.4.2 In-situ Field Analytical Data Deliverable Requirements

To ensure in-situ field analytical screening data are of an appropriate quality, it is important to specify the necessary deliverables required to assemble a suitable data package. This will involve making considerations for the following prerequisites:

- *Sample documentation (recording sample collection location, time & date, and associated field measurements, etc.).*
- *Field analytical documentation (requiring raw data, calculations, and final results for the field screening analysis of all environmental and accompanying QC samples be provided).*

Therefore, in the Site-Specific Brownfields SAMP, describe the data deliverables required to document all pertinent in-situ field analytical screening determinations. This is imperative to enable Brownfields stakeholders to comprehend the data, and logically utilize it to formulate sensible environmental decisions. Likewise, the utilization of proper data reporting forms will ensure field measurement results are scientifically valid and legally defensible.

O.0 Quality Assurance Requirements

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

O.1 Definitive Data Requirements

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

O.2 Analytical Error

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

O.3 Total Measurement Error

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

O.4 Assessment and Response Actions

In this section of the Site-Specific Brownfields SAMP, describe the procedures used to assess PARCC for every major measurement parameter, including all pollutant monitoring systems. This will include describing the statistical procedures for assessing the acceptance/performance criteria outlined for each measurement system utilized. These procedures must contain the equations required to calculate PARCC and method detection limits, as well as, the processes used to gather data for these calculations. The requirements of this element are usually met by integrating the appropriate statistical assessments depicted for data measurement QA objectives with the pertinent sample preparation and analytical procedures.

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

The data collection scheme put forward in the accompanying generic QAPP boilerplate specifies that at least 20% of all samples undergoing in-situ field analytical screening analysis be sent to a fixed laboratory for confirmation. In conjunction, approximately 50% of all background or “presumed clean” reference samples should likewise be sent to fixed laboratory for confirmation as well. These verifications are undertaken for the purpose of assessing the performance of in-situ field analytical screening techniques employed to acquire data. This is done to minimize the occurrence of acquiring false negative field analytical screening results (not detecting contamination) to assimilate an abstract estimation of data “worth.”

Performing a comparison of in-situ field screening measurement data to fixed laboratory confirmatory results can be presented in a number of formats. These formats include log-log scatter plots, percent difference histograms, and formal performance assessment in light of established goals. These statistical assessments provide information to enable a decision maker to draw conclusions about the strength of evidence depicted by the collected measurement data. An outline for rendering one of these formal statistical determinations is described in the U.S.EPA Guidance for Data Quality Assessment: Practical Methods for Data Analysis. To facilitate these efforts, this U.S.EPA guide is provided as an attachment to the accompanying generic QAPP boilerplate.

Therefore, in the Site-Specific Brownfields SAMP, describe the processes which will be employed for correlating field generated measurement data with its associated fixed laboratory confirmatory analytical results. To ensure these assessments are relevant and appropriate, it is advantageous to select and utilize one of the statistical approaches delineated in the U.S.EPA Data Quality Assessment guidance. In addition, it is essential that this summation include procedures for identifying and correcting any problems encountered as a result of these operations.

P.0 Quality Assurance Reporting

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

P.1 Roles and Responsibilities

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

P.2 Trip Reports

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

P.3 Project Report Requirements

In this section of the Site-Specific Brownfields SAMP, identify the frequency, content, and distribution of all reports detailing the status, internal assessment findings, implementation of corrective actions, and results for a given project. For example, the field team may be required to submit daily status reports comprised of field log sheets describing any field measurements taken, the number of samples collected with a summary of their status (shipped, at lab, or awaiting shipment), and/or deviations from SOPs. In addition, this summary must also delineate who will be responsible for preparing all reports to management along with a time line for preparation and distribution.

Q-1.0 Performance and Systems Audits

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

Q-1.1 Verification of Sampling Procedures

In this section of the Site-Specific Brownfields SAMP, describe the processes for reviewing all sampling procedures to ensure they are consistent with the proposed sampling network and rationale.

Q-2.0 Data Validation

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

Q-2.1 Data Verification and Validation Requirements

In this section of the Site-Specific Brownfields SAMP, describe the processes that will be used to validate and document the quality of the analytical data which are acquired. In addition, delineate the processes for assessing if the analytical data are adequate based upon predefined acceptance/performance criteria for meeting the needs of the Brownfields site investigation. It is important to note that all pertinent measurement results acquired through fixed laboratory or in-situ screening analyses must undergo data validation.

Q-2.1.1 Fixed Laboratory Confirmatory Data Verification and Validation Requirements

The project objectives and acceptance/performance criteria put forward in the accompanying generic QAPP boilerplate specify the use of our U.S.EPA CLP SOWs for acquiring all fixed laboratory confirmation data. The U.S.EPA CLP SOWs delineate the analytical determinations, QC requirements, and data deliverables for performing these analyses. In accordance, U.S.EPA Region 2 has developed standardized protocols for validating CLP analyses. As a result, the corresponding U.S.EPA Region 2 data validation protocols are practical for validating confirmatory Brownfields site investigation data. To expedite these efforts, the corresponding U.S.EPA Region 2 CLP data validation protocols (SOP No. HW-6: CLP Organics Data Review and Preliminary Review and SOP No. HW-2: Evaluation of Metals Data for the Contract Laboratory Program) are included as attachments to the accompanying generic QAPP boilerplate.

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

To ensure in-situ field analytical screening data are of an appropriate quality, QA/QC protocols for ascertaining precision and accuracy are to be prescribed when performing such analyses. These optional QA/QC protocols should include, but are not limited to, the following requirements:

- *Sample documentation (recording sample collection location, time & 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).*
- *Method blank analysis (requiring that a volume of deionized, distilled laboratory water be carried through the entire analytical sequence with every sample delivery group to check on the occurrence of contamination resulting from sample preparation and measurement activities).*
- *Duplicate sample analysis (requiring the analysis of a duplicate environmental sample with every sample delivery group to document method reproducibility).*
- *Fixed laboratory confirmation analysis (requiring that a portion of all environmental samples analyzed with a field analytical screening technique undergo fixed laboratory quantitation to document method performance).*
- *Method control sample analysis (requiring the analysis of a pre-prepared sample spiked at the action level with every sample delivery group to document method performance).*

- *Matrix spike analysis (requiring the analysis of an environmental sample spiked with a target analyte(s) of concern with every sample delivery group to assess matrix effects).*
- *Continuing calibration verification analysis (requiring the analysis of a known standard every 10 samples to check the accuracy of a measurement process).*

In-situ field analytical screening results and measurement data with limited deliverables should always be validated by assessing the quality control requirements designated for each respective technique. Therefore, in the Site-Specific Brownfields SAMP, describe the processes for validating the quality and usability of such data utilizing prescribed QA/QC protocols. To facilitate these efforts, it is advantageous to follow the U.S.EPA Region 2 CLP data validation SOPs included in this generic QAPP boilerplate as a basis for rendering these assessments. This is done by applying the criteria pertinent to the evaluation of an applicable QC sample audit assessment. This will enable a data user to comprehend the uncertainty evident in this data, and logically utilize that data to formulate sensible environmental decisions. In doing so, this will ensure that all resulting field measurement screening data are scientifically valid, and legally defensible.

R.0 Data Quality Assessment

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

R.1 Data Quality Assessment Process

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

R.2 Data Usability/Reconciliation Requirements

In the section of the Site-Specific Brownfields SAMP, describe the processes for determining whether all pertinent environmental measurement data successfully meet the requirements specified for their intended use. It is important that this summary include an outline of the methods which will be used to identify anomalies and departures from the assumptions delineated in the sampling and analysis design. In addition, it is integral to describe how any environmental measurement data limitations which are found to be evident will be reported.