U.S. EPA Region 2 Brownfields Planning Document for Site-Specific Quality Assurance Project Plans

Region 2 Brownfields Quality Assurance Program
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Acknowledgement

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1.0 Introduction

According to 2 CFR 1500.11 and 40 CFR 35, the U.S. Environmental Protection Agency (EPA) requires that a Quality Assurance Project Plan (QAPP) be prepared for all grant recipient's federally funded projects involving the collection and use of environmental data. For the EPA Brownfields Program, this requirement means that whenever environmental samples are being collected as part of a site assessment, or a cleanup project, a QAPP must be prepared and approved by EPA prior to the start of any field work at the site.

In order to properly plan a project and capture it successfully in a QAPP, EPA Region 2 Hazardous Waste Support Section (HWSS) has designed a practical approach to the QAPP development process by streamlining the documentation requirements for all Brownfields projects. The purpose of this document is to provide an overview of that QAPP process and an understanding of the requirements and expectations of the Region 2 HWSS for both the Brownfields grant recipient and their environmental consulting firm.

2.0 Background

To address real and perceived inconsistencies and deficiencies in quality control for laboratory data across governmental organizations, the Intergovernmental Data Quality Task Force (IDQTF) workgroup was formed that included representatives from the U.S EPA Regions, Department of Defense, and the Department of Energy. The goal was to develop a consistent QA program applicable to any Federal department, agency or program because the approaches and requirements for QAPPs differ among Federal agencies. The Uniformed Federal Policy (UFP)-QAPP was developed as a single national consensus document to be used by all stakeholders. EPA Region 2 has adopted this policy for the development of QAPPs in the Brownfields Program. Use of the QAPP templates will assist in capturing the required project-specific information in a consistent format and expedite the review of the QAPP by the approval authority.

3.0 QAPP Overview

A QAPP is a document that describes planned activities that will be conducted while assuring the quality of the data for making environmental decisions. The QAPP includes the background behind the environmental problem, the project objectives, the tasks to be performed, the design concept for the sampling locations, the set of defined sampling and analytical procedures involving quality assurance (QA), quality control (QC), and the generation, evaluation and assessment of collected data. A QAPP is required for every project conducted by or funded by EPA where data is collected or used. The QAPP must be approved before any environmental sampling and analyses begins.

4.0 Site-Specific QAPPs

The *Site-Specific QAPP* is a project plan specific to the Brownfields site assessment or cleanup work to be performed at a particular site.

4.1 Required QAPP Elements

There are four basic QAPP elements to be addressed in the Site-Specific QAPP:

- Project Management/Objectives
- Measurement/Data Acquisition
- Assessment/Oversight
- Data Review

The Brownfields Site Specific QAPP Requirement Summary Table provides a cross walk of the Required QAPP Elements and the Corresponding Site-Specific QAPP Sections and Templates. The Templates are found in Appendix 1. The Sections are described below.

Brownfields Site-Specific QAPP Requirement Summary		
Project Management/Objectives		
Section 1	Title and Approval Page	Template #1
Section 2	Project Organization/Responsibility	Templates #2a and #2b
Section 3	Problem Definition/Project Quality Objectives	Templates #3a and #3b
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Measurement/Data Acquisition		
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Section 7	Field Equipment Calibration/Corrective Action	Template #7
Section 8	Laboratory Equipment Calibration/Corrective Action	Template #8
Section 9	Sample Handling and Custody Requirements	Templates #9a and #9b
Section 10	Field/Analytical Laboratory Quality Control Summary	Template #10
Section 11	Data Management and Documentation/Project Reports	Templates #11a and #11b
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Section 13	Project Data Validation Process (Step IIa and IIb)	Template #13b
Section 13	Project Matrix/Analytical Validation (Step IIa and IIb)	Template #13c
Section 13	Usability Assessment (Step III)	Template #13d

QAPP Elements
Project Management
Section 1 – Title and Approval Page
Project Title Site Name/Site Location Revision Number Revision Date Approving Officials (names, titles, signatures and date signed) • Project Manager (Environmental Consultant) • Project Quality Assurance (QA) Officer (Environmental Consultant) • State/Territory Grant Recipient Program Manager • EPA QA Officer • EPA Project Officer

Section 2 – a. Project Organizational Chart
Identifies the reporting relationships between the organizations involved in the project. • State/Territory Grant Recipient • Environmental Consultant • Environmental Laboratory • State/Territory Regulatory Agency • EPA Project Officer • EPA Quality Assurance Officer • Subcontractors
Section 2 – b. Personnel Responsibilities
Identifies project personnel responsible roles for both consultant and subcontractors with resumes attached to the Site-Specific QAPP.
Section 3 – a. Problem Definition/Project Description (includes Sampling Design/Site Maps
• Identifies the reasons for conducting the project including detailed site history; current property owner/use; proposed future reuse/development plans for the site; discuss likely chemicals/contaminants of concern; provide a topographic map of area around the site showing significant structures, terrain, previous sampling locations, inferred groundwater flow direction to illustrate the problem. Include other existing data applicable to the project. The information should clearly define the problem to be solved, decisions to be made, outcomes to be achieved and environmental questions to be answered for the current investigation. • Provide an outline for the tasks to be performed and the principle use of the data obtained for each task. Identify the media and parameters being sampled; field measurements (PID, low flow parameters), field and off-site analytical testing; distinguish between the critical data which will drive decisions (specific analyses or compounds of concern) and non-critical data used for supporting purposes; cite regulatory standards or criteria to which the data will be compared; and provide a clear discussion on what the task is attempting to determine. • Describe the project sampling approach. Provide the rationale for selecting the sampling locations and matrices for each analytical group and concentration level. Be specific with the locations and numbers. Discuss the purpose behind a set or series of samples in a particular area and how the sampling design will address the whole site. When sampling locations, sampling depths and/or choice of analytical parameters cannot be predetermined, document the decision logic or input that will be used in the field to make those determinations. Include detailed sampling maps.
Section 3 – b. Project Quality Objectives
The Project Quality Objectives shall define the type, quantity and quality of data needed to answer specific environmental questions and support proper environmental decisions.
Section 4 – Project Timeline
Provide the start and completion dates for all key project tasks including Site-Specific QAPP review and approval, field activities and sampling, laboratory results turnaround and reporting activities to be completed.
Measurement Data Acquisition
Section 5 – a. Sampling Methods and Locations
List all site locations that will be sampled and include the number of samples, matrix, and depths discussed in Section 3 in tabular format.

Section 5 – b. Analytical Methods and Requirements
Provide all analytical services including the matrix, analytical group, concentration level, analytical SOP, sample volume, container size, preservation requirements, holding time, data package turnaround time in tabular format.
Section 5 – c. Reference Limits and Evaluation
Identify the target analytes/contaminants of concern, applicable state regulatory criteria, and published achievable detection and reporting limits.
Section 5 – d. Analytical Laboratory Sensitivity and Project Criteria
Complete this template for each matrix, analytical group and concentration level. Define the data quality indicators performance criteria within the analytical method and the associated QC sample(s) used to assess the specific criteria. Specify the QC sample(s) which are associated with each specific analysis. This Template initially helps evaluate potential concerns with sensitivity of an analytical method in relation to the project criteria, particularly primary contaminants of concern. Finally, the Template is critical in understanding the usability of a data point when a sample result is near the project criteria, which in turn is near the quantitation limits and/or detection limits of the method. Is the data usable, or is more data needed to support a decision or trend in site contaminants? Include each type of laboratory QC; frequency; laboratory acceptance criteria (control limits). Typical Brownfields projects will include but are not limited to, the following: Organic Analyses – Method blanks, surrogates, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) Inorganic Analyses – Method blanks, laboratory control samples (LCS)
Section 5 – e. Secondary Data Criteria and Limitations Table
Identify all secondary data and information that will be used for the project, and their originating sources. Specify how the secondary data will be used, and the imitations on their use.
Section 6 – Project Specific Method and Standard Operating Procedures (SOPs) Reference
SOPs document the steps that are followed in collecting and analyzing environmental samples. A level of uniformity and consistency is established in the work being performed by defining the set of procedures that will be used. Therefore, provide a reference table of the field sampling SOPs; the analytical laboratory SOPs and the analytical method reference.
Section 7 – Field Equipment Calibration/Corrective Action
Provide the initial calibration (including standards and concentrations used), and continuing calibration checks used throughout the operation to check for drift (standards, blanks, etc.). Indicate the frequency that each is performed (when and how often); indicate the acceptance criteria (control limits) that need to be met to proceed; and discuss the corrective actions taken in the field when the control limits are not met.
Section 8 – Analytical Laboratory Equipment Calibration/Corrective Action
Provide the initial calibration (include the number of initial calibration standards and calibrations range); the independent calibration check standard include relevant concentrations; continuing calibration checks (calibration blanks and concentration of continuing calibration check standards). For each calibration step include the frequency that each is performed; acceptance criteria (control limits) and laboratory corrective actions to be taken when control limits are not met.
Section 9 – a. Sampling Handling Systems

Identify components of the project-specific sample handling system. Record personnel and their organizational affiliations that is primarily responsible for ensuring proper handling, custody and storage of field samples from the time of collection, to laboratory delivery, to final sample disposal. Indicate the number of days field samples and their extracts/digestates will be archived prior to disposal.
Section 9 – b. Sample Custody Requirements
Describe the chain-of-custody (COC) procedures that will be followed in preparing the field sample for transport to the laboratory (if an SOP is available, simply reference and include the SOP in the QAPP as an appendix). Provide a copy of the COC, sample label, and custody seal.
Section 10 – Field Quality Control Summary
Summarize by matrix, analytical group, and concentration level the number of field QC samples that will be collected and sent to the laboratory. Typical Brownfields projects will include field duplicate samples for each matrix and parameter, field rinsate blanks (equipment blanks) trip blanks for aqueous VOC samples, matrix spike/matrix spike duplicate (MS/MSD) samples and performance evaluation (PE) samples (i.e., a certified standard submitted to the laboratory as a blind QC sample). For field duplicate soil samples, document whether they are being collected as a collocated duplicates, (collected adjacent to each other), or as a split of a single homogenized sample. Collocated duplicate data is useful for evaluating the homogeneity of the soil/sediment matrix within a relative area. MS/MSD samples are considered part of the field QC program because they need to be specified on the chain-of-custody (COC). MS/MSD samples are ***Not*** discrete samples, they are just ***additional*** volume is for the laboratory. The information presented in the table is what will be used in the data evaluation/assessment process described in Section 13.
Section 11 – a. Data Management and Documentation
Identify the documents and records that will be generated for all aspects of the project including, but not limited to, sample collection and field measurement, on-site and off-site analysis (if applicable) and data assessment. Provide copies of all field forms that will be used.
Section 11 – b. Project Reports
Identify the frequency and type of planned Data Management Reports, the project delivery dates, the personnel responsible for report preparation, and the report recipients. For the final project report, a detailed description of its contents should be provided including any routine tables and graphics. The main body of the report, summary tables and graphics will be provided in hard copy. Appendices requiring large volumes of paper to reproduce (such as the laboratory data package) are preferred in electronic format on a CD. Summary data tables of the field sample results should always include project criteria/standards for easy comparison, and results exceeding criteria should be highlighted. Specify how long the project file will be maintained and stored, and its final disposition after that period.
Assessment/Oversight (Optional)
Section 12 – a. Planned Project Assessments
Identify the type, frequency, and responsible parties of planned assessment activities that will be performed for the project. Since Brownfields projects are relatively short term, a typical assessment plan would be oversight of the field team and subcontractors; and peer review of the final report.
Section 12 – b. Assessment Findings and Corrective Action Responses

For each type of assessment, describe procedures for handling QAPP and project deviations encountered during the planned project assessments.

Data Review

Section 13 – a. Project Data Verification Process (Step I)

Describe the processes that will be followed to verify project data. Describe how each item will be verified, when the activity will occur, and what documentation is necessary, and identify the person responsible. **Internal** or **External** is in relation to the data generator. See Table 1 for examples. Missing information should be addressed with the laboratory or field samplers, and any pertinent information should be documented and/or provided in the final report.

Section 13 – b. Project Validation Process (Step IIa and Step IIb)

Describe the processes that will be followed to validate project data. Describe how each item will be validated, when the activity will occur, and what documentation is necessary, and identify the person responsible. See Table 1 for data elements. Evaluate the field QC sample results. For the field duplicates sample results, tabulate the relative percent difference (RPD) including these results in the final report as per Section 13c. If other field QC samples were submitted such as matrix spike/matrix spike duplicate samples, field rinse/equipment blanks and/or trip blanks, this data should be tabulated with the appropriate recoveries and reported accordingly as per Section 13c.

Section 13 – c. Project Matrix and Analytical Validation (Step IIa and Step IIb) Summary

Identify the matrices, analytical groups, and concentration levels that each entity performing validation will be responsible for, as well as criteria that will be used to validate those data. See Table 1 for data elements. Include the evaluation of both the field QC and the laboratory QC results as done in Section 13b. Document the presence or absence of any problems or issues and note any sample data that may be impacted. Indicate how the results will be documented and what will be presented in the final report.

Section 13 – d. Usability Assessment (Step III)

Describe the procedures/methods/activities that will be used to determine whether data are of the right type, quality and quantity to support environmental decision-making for the project. Describe how data quality issues will be addressed and how limitations on the use of the data will be handled. Tabulate the field sample data together with the state/federal standards for presentation in the final report. Highlight any sample results exceeding criteria. Check the table for correctness and appropriate units. Prepare site figures/maps and other graphical representations, as appropriate, and check for correctness and accuracy. Evaluate the field sample results at the parameter level. Document any limitations on how the data should be used and/or interpreted drawing on the following:

- The sensitivity criteria in Section 13. As sample concentrations approach the reporting limit, and on down to the method detection limit (MDL), the precision and accuracy of the data can be expected to worsen which can impact the usability of the data.
- The results of the field data specified in Section 13.
- The results of the laboratory data specified in Section 13.

Some items to consider:

- Pay attention to contaminants of concern where the concentration is near project criteria and reporting limits for the method. Are there sufficient surrounding data points to

support a trend of real contamination? Or is more data needed to support a conclusion or decision?

- Look at the field duplicate results in evaluating the heterogeneity of the particular matrix. The variability can impact the usability of low-level results near the project criteria. Are more data needed to support a conclusion or decision? Or was it a solo hit just above the criteria?
- Look at sample results that are reported at elevated limits due to dilution of the sample during analysis. Is the usability of the data compromised because the reporting limits are greater than the project criteria? Does the laboratory need to be contacted to determine the reason for the dilution? Can cleanup and reanalysis be performed to salvage the data?
- When applicable, look at the low flow quality data. Does the turbidity data impact the use of the semi-volatiles, PCBs or metals data where the concentration is near the project criteria and reporting limits for the method?

Based on the results of the data usability summary above, use summary tables and site maps to perform the overall project evaluation. Document any observations, trend, anomalies or data gaps that may exist. Evaluate how the samples results have impacted the goals for the property, and whether the project objectives have been met. Draw conclusions and recommendations from all the information obtained above, and document appropriately in the final report.

5.0 References

EPA-New England, Region 1 Planning and Documenting Brownfields Projects, Generic Quality Assurance Project Plans and Site-Specific QAPP Addenda, Brownfields QAPP Program, Revision FINAL, March 2009.

Quality Assurance Guidance for Conducting Brownfields Assessments, EPA 540-R-98-038, September 1998.

Uniform Federal Policy for Quality Assurance Plans, Part 1: UFP-QAPP Manual, EPA -505-B-04-900A, Final Version 1, March 2005

Uniform Federal Policy for Quality Assurance Plans, Part 2A: UFP-QAPP Workbook, EPA -505-B-04-900C, Final Version 1, March 2005

Appendix 1

Brownfields Site-Specific QAPP Templates

Brownfields QAPP Template #1

Title and Approval Page

Title: Project Title/Property Name Quality Assurance Project Plan (QAPP)
Project Name/Property Name: [ ]
Property/Site Location: [ ]
Revision Number: [ ]
Revision Date: [ ]
Brownfields Cooperative Agreement Number:_____

[Name of Brownfields Recipient]
Brownfields Recipient

[Name of the Environmental Consultant/Firm]
Preparer's Name and Organizational Affiliation

Preparer's Address, Telephone Number, and E-mail Address

[Date]
Preparation Date (Day/Month/Year)

Brownfields Recipient Program Manager: _____
Signature

[Name of Brownfields Recipient Program Manager and Date]
Printed Name/Organization/Date

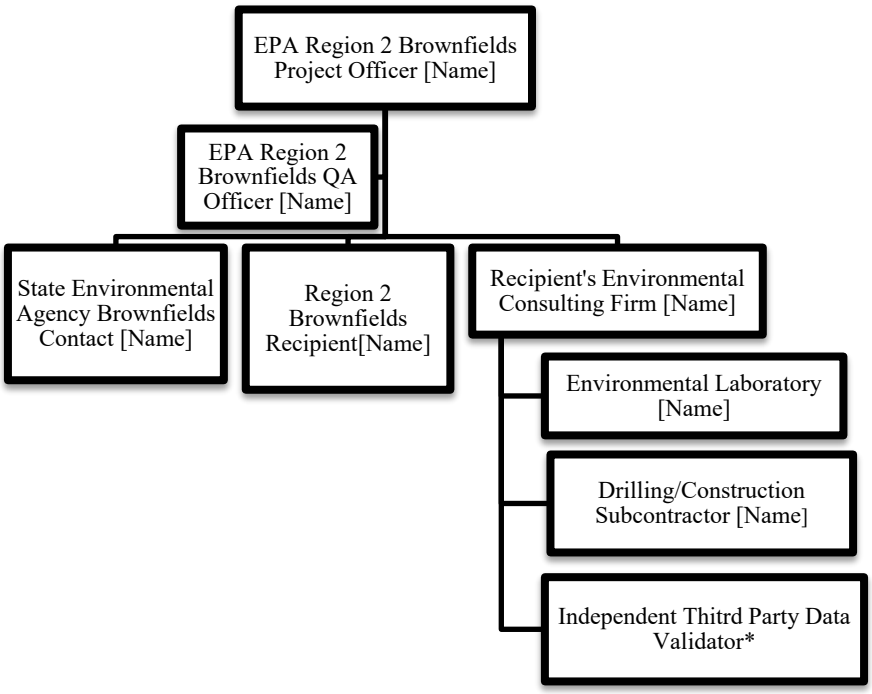
Environmental Consultant Quality Assurance Officer: (QAO) _____
Signature

[Names of Environmental Consultant QAO and Date]
Printed Name/Organization/Date

EPA Region 2 Brownfields Project Officer: _____
Signature

[Name of EPA Region 2 Brownfields Project Officer and Date]
Printed Name/Organization/Date

Brownfields QAPP Template #2a
Project Organizational Chart



Fill in all necessary information

*Data validation to be performed by third party – independent to project (can be within Environmental Consulting firm or subcontracted to a data validation firm).

Brownfields QAPP Template #2b
Personnel Responsibilities

Name	Title	Telephone Number	Organizational Affiliation	Responsibilities[1]
[ ]	Environmental Consultant Project Manager		Name of Environmental Consulting Firm	
[ ]	Sampling Assistance(s)		Name of Environmental Consulting Firm	
[ ]	Brownfields Recipient Program Manager		Name of Brownfields Recipient	
[ ]	State Brownfields Contact		Name of State Environmental Agency	
[ ]	EPA Brownfields Project Officer (BPO)		EPA Region 2	
[ ]	EPA Brownfields Quality Assurance Officer (QAO)		EPA Region 2	
[ ]	Environmental Laboratory Contact		Name of Environmental Laboratory	
[ ]	Third Party Data Validator[2]		Name of Third Party Data Validator	

Fill in all necessary information

[1]Include resumes as an appendix to the Site-Specific QAPP

2Data validation to be performed by third party – independent to project (can be within Environmental Consulting firm or subcontracted to a data validation firm).

Brownfields QAPP Template #3a
Problem Definition/Project Description

PROBLEM DEFINITION

[Discuss the purpose or reason for this particular sampling event; the problem to be addressed, and the environmental questions being asked.]

PROJECT DESCRIPTION

Site Location and Description

[Provide a description of the site and sampling locations and how they were chosen. Provide the rationale for selecting sample locations and matrices for each analytical group and concentration level. For example, Environmental Consultant [name of consultant] will collect approximately [number and type] of samples from [location]. The [type] samples will be analyzed by [name of laboratory]. Include a detailed map showing sampling locations. Discuss the Quality Assurance/Quality Control (QA/QC) samples to be collected; the sampling methods to be used along with the referenced sampling methods Standard Operating Procedures (SOPs). May refer to Template #6 for SOP information.

Site History

[Description of the site history, include contaminants of concern, environmental indicators, historic results and any actions at the site]

PROJECT DECISION STATEMENTS (linking data results with possible actions)

Example: A residential community is proposed for the site. If the concentration of lead in the soil sample data results is above the State regulatory residential cleanup levels throughout the site, then it can be concluded that the site is not clean, and a cleanup remedy must be performed until the cleanup levels for lead are achieved.

1. [If….., then…..statement for general purpose of sampling]
2. [If….., then…..statement for specific sampling type]
3. [If….., then…..statement for result and action level]
4. [If necessary, additional "If….., then…..statement"]
5. [If necessary, additional "If….., then…..statement"]

Fill in all necessary information

Brownfields QAPP Template #3b

Project Quality Objectives/Systematic Planning Process Statements

Use this template to develop the project quality objectives (PQOs) that define the type, quantity and quality of data needed to answer specific environmental questions, and support proper environmental decisions. The questions below are examples only, and are neither inclusive nor appropriate for all projects. Fill in all necessary information.

Overall project objectives include:

- [Explain objective of sampling event]
- [Contaminants and matrix of event]

Who will use the data?

Data will be used by the EPA Region 2 Brownfields Recipient to determine …….

What will the data be used for?

[Explain the ultimate use of data.]

What types of data are needed?

- [Target analytes and matrix]
- [Field screening, on-site analytical and/or off-site laboratory techniques]
- [Sampling techniques (e.g., low-flow sampling)]

How "good" do the data need to be in order to support the environmental decision?

[The quality of data is determined by establishing criteria for performance measures that include precision, accuracy/bias, sensitivity (quantitation limit), data comparability representativeness and completeness. Refer to Template #12.]

How much data are needed?

[Number of samples, matrix and analysis]

Where, when, and how should the data be collected/generated?

[Sample locations, critical samples, time frame, etc.]

Who will collect and generate the data?

[Name of Environmental Consultant]

How will the data be reported?

[All data will be reported…….]

How will the data be archived?

[Data will be archived in….]

Brownfields QAPP Template #4
Project Schedule/Timeline

List all project activities that will be performed during the course of the project. Include the anticipated start and completion dates.

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of QAPP	Name of Environmental Consultant			QAPP	
Review of QAPP	Names of EPA Region 2 BPO, QAO and Hydrogeologist			Approved QAPP by EPA Region BPO	
Preparation of Health and Safety Plan	Name of Environmental Consultant			HASP	
Procurement of Equipment	Name of Environmental Consultant			N/A	
Laboratory Request	Name of Environmental Consultant			N.A	
Field Reconnaissance/Access	Name of Environmental Consultant			N/A	N/A
Collection of Field Samples	Name of Environmental Consultant			N/A	N/A
Laboratory Package Received	Name of Environmental Consultant			Unvalidated data package	
Validation of Laboratory Results	Name of Environmental Consultant or Third Party Data Validator [1]			Validated data Packages	
Data Evaluation/ Preparation of Final Report	Name of Environmental Consultant			Final Report	

Fill in all necessary information

[1]Data validation to be performed by third party – independent to project (can be within Environmental Consulting firm or subcontracted to data validation firm).

Brownfields QAPP Template #5a
Sampling Methods and Locations

List all site locations that will be sampled and include sample identification (ID) number. Specify matrix, and if applicable, depths at which samples will be taken. Only a short reference for the sampling location rationale is necessary for the table. The QAPP text should clearly identify the detailed rationale associated with each reference. Complete all required information, using additional templates if necessary. **Below (in italics) is an example of such information.**

Matrix	Sampling Location(s)	Depth (*units*)	Analytical Group[1]	No. of Samples (*identify field duplicates*)	Sampling SOP Reference	Rationale for Sampling Location
Groundwater	*EPA-2*	*16 ft*	*VOCs*	*1*	*EPA Low Flow Sampling SOP*	*Wells selected were chosen based on the direction of groundwater flow relative to the source.*

Fill in all necessary information

[1]Analytical Groups include: volatiles; semivolatiles; pesticides; PCBs, total metals; cyanide, etc.

Brownfields QAPP Template #5b
Analytical Methods and Requirements

Identify all laboratory or organization(s) that will provide analytical services for the project, including on-site screening, and/or off-site laboratory analytical work. Group by matrix, analytical group, concentration level, analytical/preparation method SOP, sample volume container size, preservation of samples, maximum holding time and the laboratory contact information. If applicable, identify the subcontractor laboratory and backup laboratory or organization that will be used if the primary laboratory or organization cannot be used. **Below (in italics) is an example of such information.**

Matrix	Analytical Group	Concentration Level[1]	Analytical & Preparation Method/ SOP Reference	Sample Volume	Containers (*number, size, type*)	Preservation Requirements (*chemical, temperature, light protected)*	Maximum Holding Time (*preparation/ analysis)*
Groundwater	*VOCs*	*Low*	*SW-846 Method 8260*	*120 ml*	*(3) 40 ml VOA vials w/Teflon lined septum*	*1:1 HCl to pH<2; cool to 4°C*	*10 days*

Fill in all necessary information

[1]Concentration Level refers to Trace; Low; Medium; High of the sample.

Brownfields QAPP Template #5c
Reference Limits and Evaluation Table

Complete this table for **each sample matrix**, analytical group and concentration level. Identify the target analytes/contaminants of concern, the applicable state regulatory criteria (project-required action limits), and the published achievable detection and reporting limits for each analyte. **Below (in italics) is an example of such information.**

Matrix *Aqueous*
Analytical Group *VOCs*
Concentration Level *Low*

Analyte	CAS Number	Name of State/Territory/Tribal: Regulatory Standards/Criteria	Analytical Method/Method Detection Limit	Achievable Laboratory Method Detection Limit/ Reporting Limit
Vinyl Chloride	*75-01-4*	*NJDEP Ground Water Quality Standards (GWQS)/1ug/L*	*SW-846 Method 8260B/5.0 ug/L*	*1.50 ug/L/5.0ug/L*

Fill in all necessary information

Brownfields QAPP Template #5d
Analytical Laboratory Sensitivity and Project Criteria

Complete this template for **each matrix**, analytical group and concentration level. Define the data quality indicators performance criteria within the analytical method, and the associated QC sample(s) used to assess the specific performance criteria. Specify whether the QC sample(s) associated with sample and/or analysis. **Below (in italics) is an example of such information.**

Matrix *Aqueous*
Analytical Group *VOCs*
Concentration Level *Low*

Analytical Method/SOP	Data Quality Indicators[1]	Performance Criteria (related to analytical method)	QC Sample such as Duplicate, Matrix Spike, Surrogates etc.) Used To Assess Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
EPA Method 624	*Precision*	*RPD < 20%* *Average Recovery 70-130%*	*LCS & LCS Duplicate*	*A*
	Accuracy	*Factor of two(-50% to + 100%) from the initial/continuing calibration*	*Internal standards*	*A*
	Accuracy	*Compound Specific (full range: 17-259%)* *RPD < 20%*	*Matrix spike & Matrix Spike Duplicate*	*A*
	Accuracy	*Limits 70%-130%*	*Surrogate Compounds*	*A*
	Contamination/cross contamination	*< Reporting Limit*	*Method Blank*	*A*

Fill in all necessary information

[1]Defined as Precision; Accuracy/Bias; Sensitivity/Quantitation Limits, Representativeness; Comparability, Completeness

Brownfields QAPP Template #5e
Secondary Data Criteria and Limitations Table

Identify all secondary data and information that will be used for the project, and their originating sources. Specify how the secondary data will be used, and the limitations on their use. **Below (in italics) is an example of such information.**

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Previous Investigation Sampling Results	[Document with results, i.e. Report]	[Who collected the data and when]	[i.e., Evaluate the purpose and scope of previous studies and compare with current study objectives]	[Reason for additional sampling, i.e. data gaps, and discussions on comparability issues, incomplete data sets as well as qualified data]
Municipality Drinking Water Data	*XYZ Municipality; Quarterly Drinking Water Check Report; 6/95-/6/96*	*Smith Laboratories Inc. – Volatiles Drinking Water Data; Sample Collection Dates - 6/12/95, 9/15/95, 12/10/95, 3/6/96, 6/12/96*	*To assess existing groundwater contamination*	*1. Unvalidated data used to generate the report* *2. Limited number of wells exist to sample*

Fill in all necessary information

Brownfields QAPP Template #6
Project Specific Method and Standard Operating Procedures (SOPs) Reference Table

List all field sampling SOPs, analytical method references (for preparation and analysis of the samples) and corresponding analytical laboratory SOPs that will be used for the Brownfields project. Include electronic copies of the SOPs in an Appendix to this QAPP.

ANALYTICAL METHOD REFERENCE (*Include document title, method name/number, revision number, date*)
1a.
2a.
3a.
ANALYTICAL LABORATORY SOPs (*Include document title, date, revision number, and originators' name*)
1b.
2b.
3b.
FIELD SAMPLING SOPs [1] (*Include document title, date, revision number, and originators' name*)
1c.
2c.
3c.
[1] Project Sampling SOPs include sample collection, sample preservation, equipment decontamination, preventive maintenance, etc.

Brownfields QAPP Template #7
Field Equipment Calibration, Maintenance, Testing, and Inspection

Identify all equipment and instruments (other than analytical instrumentation) that require calibration, maintenance, testing or inspection and provide the SOP reference number for each type of equipment. In addition, document the frequency of activity, acceptance criteria and corrective action requirements on the template. Below (in italics) is an example of such information.

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria		Corrective Action	SOP Reference
YSI or equivalent	*Calibrate with standard solutions as per manufacturing recommendations.*	*As per manufacturing recommend-ations.*	*As per manufacturing recommend-ations.*	*Prior to day's activities; end of day's activities; anytime anomaly suspected*	*pH Meter*	*+/- 0.1 units*	*Clean probe, replace battery, replace membrane, replace probe*	
					Dissolved Oxygen	*± 3%*		
					Specific Conductivity	*± 1%*		
					Temperature	*± 0.1 °C*		
					Turbidity	*± 2 NTU*		

Fill in all necessary information

Brownfields QAPP Template #8
Analytical Laboratory Instrument and Equipment Maintenance, Testing, and Inspection

Identify all analytical instrumentation that requires maintenance, testing or inspection and provide the SOP reference for each. Document the frequency, acceptance criteria and corrective action requirements on the template. **Below (in italics) is an example of such information.**

Instrument/ Equipment	Maintenance Activity	Testing/Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	Analytical SOP Reference
ICP-MS	*As per instrument manufacturer's recommendations*	*As per instrument manufacturer's recommendations; check connections*	*As per instrument manufacturer's recommendations*	*Acceptable recalibration; see ILM05.4*	*Inspect the system, correct problem, recalibrate and/or reanalyze samples.*	*EPA CLP RAS Laboratory ICP-MS Technician*	*ILM05.4*

Fill in all necessary information

Analytical Laboratory Instrument Calibration

Identify all analytical instrumentation that requires calibration and provide the SOP reference number for each. Document the frequency, acceptance criteria, and corrective action requirements on the template. **Below (in italics) is an example of such information.**

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Responsible Person	Analytical SOP Reference
ICP-MS	*See ILM05.4; as per instrument manufacturer's recommended procedures*	*ICP-MS Initial calibration: daily or once every 24 hours and each time the instrument is set up. Continuing calibration: beginning and end of run, and frequency of 10% or every 2 hours during an analysis run.*	*ICP-MS: As per instrument manufacturer's recommended procedures, with at least 2 standards. A minimum of three replicate integrations are required for data acquisition.*	*ICP-MS: inspect the system, correct problem, re-calibrate, re-analyze samples.*	*EPA CLP RAS Laboratory ICP-MS Technician*	*ILM05.4*

Fill in all necessary information

Sample Handling System

Use this Template to identify components of the project-specific sample handling system. Record personnel and their organizational affiliations primarily responsible for ensuring proper handling, custody and storage of field samples from the time of collection, to laboratory delivery, to final sample disposal. Indicate the number of days field samples and their extracts/digestates will be archived prior to disposal.

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): [ ] Name of Environmental Consultant Project Manager
Sample Packaging (Personnel/Organization): [ ] Name of Environmental Consultant Project Manager
Coordination of Shipment (Personnel/Organization): [ ] Name of Environmental Consultant Project Manager
Type of Shipment/Carrier: Applicable for project.
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): [ ]Name of Environmental Laboratory Sample Custodian
Sample Custody and Storage (Personnel/Organization): [ ] Name of Environmental Laboratory Sample Custodian
Sample Preparation (Personnel/Organization): [ ] Name of Environmental Laboratory Sample Technicians
Sample Determinative Analysis (Personnel/Organization): [ ] Name(s) of Environmental Laboratory Sample Technician(s)
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be shipped within [enter time –hours/days], and arrive at laboratory within 24 hours (1 day) of sample shipment.
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical methodology; See Template #6.
SAMPLE DISPOSAL
Personnel/Organization: [ ] Name (s) of Environmental Laboratory Sample Technician(s)
Number of Days from Analysis: Until analysis and QA/QC checks are completed; as per analytical methodology; See Template #6.

Brownfields QAPP Template #9b
Sample Custody Requirements

Describe the procedures that will be used to maintain sample custody and integrity for the site-specific project. Include examples of chain-of-custody forms, traffic reports, sample identification, custody seals, laboratory sample receipt forms, and laboratory sample transfer forms. Attach these items or reference the applicable SOPs where these items can be found.

Sample Identification Procedures: Describe the sample identification procedure in this section for the site-specific project. Provide an example.

Field Sample Custody/Tracking Procedures (sample collection, packaging, shipment, and delivery to laboratory): Describe the field sample custody/tracking procedures in this section for the site-specific project. Provide examples.

Laboratory Sample Custody/Tracking Procedures (receipt of samples, archiving, and disposal): Describe the laboratory sample custody/tracking procedures in this section for the site-specific project. Provide examples.

Chain-of-Custody Procedures: Describe the chain-of-custody procedures in this section for the site-specific project. Provide examples.

Brownfields QAPP Template #10
Field Quality Control Summary

Complete a separate template for **each matrix, analytical group, and concentration level** the number of field QC samples that will be collected and sent to the laboratory; and the QC samples performed by the laboratory. **Below (in italics) is an example of such information.**

Matrix	*Soils*
Analytical Group	*Metals*
Concentration Level	*Low/Medium - mg/kg (ppm)*
Sampling SOP(s)	*ABC Consultants SOP #123*
Analytical Method/SOP Reference	*EPA CLP SOW ILMO5.4*
Sampler's Name	*John Smith*
Field Sampling Organization	*ABC Consultants*
Analytical Organization	*XYZ Laboratory*
No. of Sample Locations	*10*

Quality Control (QC) Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)
Equipment Rinsate Blank (EB)	*1 per day, or per decontamination event.*	*No constituent > CRQL*	*Make a Note in the case narrative.*	*Laboratory ICP-MS Technician/Analyst*	*Contamination / Cross contamination.*
Field Duplicate	*1 per ≤ 20 samples*	*± 20% RPD*	*Flag outliers*	*Laboratory ICP-MS Technician / Analyst*	*Precision*

Fill in all necessary information

Brownfields QAPP Template #11a
Data Management and Documentation

Describe the documentation that will be generated for the project, and the data management procedures that will be used in handling that information. The three basic areas to cover are field data, laboratory data and data assessment (verification and validation of data) presented in the final report. Clearly specify what documentation will be provided in the final report and what documentation goes into the project files. Below is a list that includes but not limited to the types of documentation that may be routinely generated, collected and managed in a Brownfields project.

Field Sample Collection Documents and Records	Analytical Laboratory Documents and Records	Data Assessment Documents and Records	Project File
• Site and field logbooks • Boring logs • Well construction diagrams • Chain-of-Custody (COC) forms • Well Data Sheets • Field Data Sheets	• Sample receipt logs • Internal and external COC forms • Equipment calibration logs • Sample preparation worksheets/logs • Sample analysis worksheets/run logs • Telephone/email logs • Corrective action documentation	• Data validation reports • Field inspection checklist(s) • Laboratory Audit checklist (if performed) • Review forms for electronic entry of data into database • Corrective action documentation	• How long the project file will be maintained and stored, and its final disposition after that period.

Brownfields QAPP Template #11b
Project Reports

Identify the types of reports that will be routinely provided during the Brownfields project (e.g., status reports, final reports, etc.). Include the type of report, frequency of reporting, the project delivery dates, the personnel responsible for report preparation, and the report recipients.

Type of Report	Frequency (Daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
	[ ]	[ ]	[ ] Name of Third Party Data Validation Subcontractor; or Environmental Consultant Independent Data Reviewer	[ ] Name of Environmental Consultant
	[ ]	[ ]	[ ] Name of Environmental Consultant Project Manager	[ ] Name of Brownfields Recipient
	[ ]	[ ]	[ ] Name of Environmental Consultant Project Manager	[ ] Name of Brownfields Recipient
	[ ]	[ ]	[ ] Name of Environmental Consultant Project Manager	[ ] Name of Brownfields Recipient; [ ] Name of EPA Region 2 Brownfields Project Officer

Fill in all necessary information

Brownfields QAPP Template #12a
Planned Project Assessments Table

Identify the type, frequency, and responsible parties of planned assessment activities that will be performed for the project, if applicable. **This may be an optional activity for the project. If not applicable to the project, *state as such in the QAPP*. Do not complete the Template.**

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of Corrective Actions (Title and Organizational Affiliation)
Laboratory Technical Systems/ Performance Audits	[ ]						
Performance Evaluation Samples	[ ]						
On-Site Field Inspection	[ ]						

Fill in all necessary information

Brownfields QAPP Template #12b
Assessment Findings and Corrective Action Responses

For each type of assessment, describe procedures for handling QAPP and project deviations encountered during the planned project assessments. **This may be an optional activity for the project. If not applicable to the project, *state as such in the QAPP*. Do not complete the Template.**

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Project Readiness Review	Checklist or logbook entry	[ ] Name of Environmental Consultant Project Manager		Checklist or logbook entry	[ ] Name of Environmental Consultant	
Field Observations/ Deviations from Work Plan	Logbook	[ ] Name of Environmental Consultant Project Manager		Logbook	[ ] Name of Environmental Consultant; [ ] Name of Brownfields Recipient	
Laboratory Technical Systems/ Performance Audits	Written Report	[ ] Name of Environmental Laboratory		Letter	[ ] Name of Environmental Consultant; [ ] Name of Brownfields Recipient	
On-Site Field Inspection	Written Report	[ ] Name of Environmental Consultant Project Manager		Letter/Internal Memorandum	[ ] Name of Environmental Consultant; [ ] Name of Brownfields Recipient	
Performance Evaluation Samples	Electronic Report	[ ] Name of Environmental Laboratory		Letter or Written Report	[ ] Name of Environmental Laboratory	

Fill in all necessary information

Brownfields QAPP Template #13a
Project Data Verification Process (Step I)[1]

Describe the processes that will be followed to verify project data. Describe how each item will be verified, when the activity will occur, and what documentation is necessary, and identify the person responsible for verification. **Below (in italics) is an example of such information. See Table 1 for additional examples of data elements.**

Verification Input	Description	Internal/ External[2]	Responsible for Verification (Name, Organization)
Site/Field Logbooks	*Field notes will be prepared daily by the Environmental Consultant Project Manager and will be complete, appropriate, legible and pertinent. Upon completion of field work, logbooks will be placed in the project files.*	*I*	*[ ] Name of Environmental Consultant Project Manager*
Chains of custody	*COC forms will be reviewed against the samples packed in the specific cooler prior to shipment. The reviewer will initial the form. An original COC will be sent with the samples to the laboratory, while copies are retained for (1) the Sampling Trip Report and (2) the project files.*	*I*	*[ ] Name of Environmental Consultant Project Manager*
Laboratory analytical data package	*Data packages will be reviewed/verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.*	*I*	*[ ] Name of Environmental Laboratory*
Laboratory analytical data package	*Data packages will be reviewed as to content and sample information upon receipt by the Environmental Consultant Project Manager and the Third Party Data Validation Personnel.*	*I/E*	*[ ] Name of Environmental Consultant Project Manager; [ ] Name of Data Validation Personnel*[2]
Final Sample Report	*The project data results will be compiled in a sample report for the project. Entries will be reviewed/verified against hardcopy information.*	*I*	*[ ] Name of Environmental Consultant Project Manager*

Fill in all necessary information

[1]Step I – Completeness Check

[2]Internal or External is in relation to the data generator.

Brownfields QAPP Template #13b
Project Data Validation Process (Steps IIa and IIb)[1]

Describe the processes that will be followed to validate project data. Describe how each item will be verified, when the activity will occur, and what documentation is necessary, and identify the person responsible. **Below (in italics) is an example of such information. See Table 1 for additional examples of data elements.**

Step IIa/IIb[1]	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	*SOPs*	*Ensure that the sampling methods/procedures outlined in QAPP were followed, and that any deviations were noted/approved.*	*[ ] Name of Environmental Consultant Project Manager*
IIb	*SOPs*	*Determine potential impacts from noted/approved deviations, in regard to PQOs.*	*[ ] Name of Environmental Consultant Project Manager*
IIa	*Chains of custody*	*Examine COC forms against QAPP and laboratory contract requirements (e.g., analytical methods, sample identification, etc.).*	*[ ] Name of Data Validation Personnel*
IIa	*Laboratory data package*	*Examine packages against QAPP and laboratory contract requirements, and against COC forms (e.g., holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).*	*[ ] Name of Data Validation Personnel*
IIb	*Laboratory data package*	*Determine potential impacts from noted/approved deviations, in regard to PQOs. Examples include PQLs and QC sample limits (precision/accuracy).*	*[ ] Name of Environmental Consultant Project Manager; [ ] Name of Data Validation Personnel [Name*
IIb	*Field duplicates*	*Compare results of field duplicate (or replicate) analyses with RPD criteria*	*[ ] Name of Environmental Consultant Project Manager; [ ] Name of Data Validation Personnel*

Fill in all necessary information

[1]Step IIa – Compliance with Methods, Procedures, and Contracts

[1]Step IIb – Comparison with Performance Criteria in QAPP

Brownfields QAPP Template #13c
Project Matrix and Analytical Validation (Steps IIa and IIb)[1] Summary

Identify the matrices, analytical groups, and concentration levels that each entity performing validation will be responsible for, as well as criteria that will be used to validate those data. **Below (in italics) is an example of such information. See Table 1 for additional examples of data elements.**

Step IIa/IIb[1]	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa / IIb	*Soil/Sediment/ Aqueous*	*VOCs*	*Trace*	*Data Validation SOP for Organic Analysis of Trace Concentration VOCs under SOW SOM01.2*	*[ ] Name of Data Validation Personnel*

Fill in all necessary information

[1]Step IIa – Compliance with Methods, Procedures, and Contracts

[1]Step IIb – Comparison with Performance Criteria in QAPP

Brownfields QAPP Template #13d
Usability Assessment (Step III)[1]

Describe the procedures/methods/activities that will be used to determine whether data are of the right type, quality and quantity to support environmental decision-making for the project. Describe how data quality issues will be addressed and how limitations on the use of the data will be handled. **Below (in italics) is an example of such information.**

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:
Determine if any detectable amounts of contaminant(s) are present. If no detectable amounts are indicated and all data are acceptable for the verification and validation, then the data is usable.
If verification and validation are not acceptable then take corrective action (determine cause, data impact, evaluate the impact and document the rationale for resampling).
Describe the evaluative procedures used to assess overall measurement error associated with the project:
Determine if the quality control data is within the performance criteria (precision, accuracy, etc) through validation process IIb (Validation Activities).
Identify the personnel responsible for performing the usability assessment:
Project Management Team –Consisting of the Environmental Consultant Project Manager; Data Validator Personnel; Brownfields Recipient Project Manager.
Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:
The Usability Report will describe the rationale for the data and the presentation of any data limitations. For example, if the performance criteria are not usable to address the regulatory requirements or support the project-decision for the Brownfields Recipient, then the Report should address how this problem will be resolved and discuss the alternative approach.

Fill in all necessary information
[1]Step III – Usability Assessment

Table 1

Data Elements for Data Review Process				
Item	Step I - Data Verification	Step IIa - Data Validation Compliance	Step IIb - Data Validation Comparison	Step III -Data Usability
Planning Documents				
Evidence of approval of QAPP	X			Use outputs from previous steps
Identification of personnel	X			
Laboratory name	X			
Methods (sampling & analytical)	X	X	X	
Performance requirements (including QC criteria)	X	X		
Project quality objectives	X		X	
Reporting forms	X	X		
Sampling plans – locations, maps grids, sample ID numbers	X	X		
Site identification	X			
SOPs (sampling & analytical)	X	X		
Staff training & certification	X			
List of project-specific analytes	X	X		
Analytical Data Package				
Case narrative	X	X	X	Use outputs from previous steps
Internal lab chain of custody	X	X		
Sample condition upon receipt, & storage records	X	X		
Sample chronology (time of receipt, extraction/digestion, analysis)	X	X		
Identification of QC samples (sampling /lab)	X	X		
Associated PE sample results	X	X	X	
Communication Logs	X	X		
Copies of lab notebook, records, prep sheets	X	X		
Corrective action reports	X	X		
Definition of laboratory qualifiers	X	X	X	
Documentation of corrective action results	X	X	X	
Documentation of individual QC results (e.g., spike, duplicate, LCS)	X	X	X	
Documentation of laboratory method deviations	X	X	X	
Electronic data deliverables	X	X		
Instrument calibration reports	X	X	X	
Laboratory name	X	X		
Laboratory sample identification no.	X	X		
QC sample raw data	X	X	X	
QC summary report	X	X	X	

Data Elements for Data Review Process				
Raw data	X	X	X	Use outputs from previous steps
Reporting forms, completed with actual results	X	X	X	
Signatures for laboratory sign-off (e.g., laboratory QA manager)	X	X		
Standards traceability records (to trace standard source form NIST, for example)	X	X	X	
Sampling Documents				
Chain of custody	X	X		Use outputs from previous steps
Communication logs	X	X		
Corrective action reports	X	X	X	
Documentation of corrective action results	X	X	X	
Documentation of deviation from methods	X	X	X	
Documentation of internal QA review	X	X	X	
Electronic data deliverables	X	X		
Identification of QC samples	X	X	X	
Meteorological data from field (e.g., wind, temperature)	X	X	X	
Sampling instrument decontamination records	X	X		
Sampling instrument calibration logs	X	X		
Sampling location and plan	X	X	X	
Sampling notes & drilling logs	X	X	X	
Sampling report (from field team leader to project manager describing sampling activities)	X	X	X	
External Reports				
External audit report	X	X	X	Use outputs from previous steps
External PT sample results	X	X		
Laboratory assessment	X	X		
Laboratory QA plan	X	X		
MDL study information	X	X	X	
NELAP accreditation	X	X		