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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1.0 Introduction

According to 40 CFR 31.45, 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 Brownfields Quality Assurance (QA) Office 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 Brownfields QA Program 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, and it must be approved before any environmental sampling and analyses begin.

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
Section 4	Project Timeline	Template #4
Measurement/Data Acquisition		
Section 5	Sampling and Analytical Requirements	Templates #5a, #5b, #5c, #5d, #5e
Section 6	Project Specific Method and SOP Reference	Template #6
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
	Assessment/Oversight (Optional)	
Section 12	Planned Project Assessments	Template #12a
Section 12	Assessment Findings/Corrective Action Responses	Template #12b
	Data Review	
Section 13	Project Verification Process (Step I)	Template #13a
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 Project Officer • EPA QA 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 samples; 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 that 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 sample identification number, matrix, 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, 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 whether the QC sample(s) are associated with sampling and/or 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.
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. SOPs can be provided on CD-ROM.
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 or not.
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, or as part of the CD-ROM). Provide a copy of the COC, sample label, custody seal.
Section 10 – Field and Analytical 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 need to be specified on the chain-of-custody (COC). Additional volume is often required for the laboratory. The information presented in the table is what will be used in the data evaluation/assessment process described in Section 13. 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 11 – a. Data Management and Documentation
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 field will be maintained and stored, and its final disposition after that period.
Section 11 – b. Project Reports
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.
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 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 verified, 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 if 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 semivolatiles, 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