U.S. Environmental Protection Agency (EPA)
Region III
701 Mapes Road
Fort Meade, Maryland 20755-5350

Site-Specific

Sampling and Analysis Plan

Template

Draft Interim Final

August 1999

This EPA Site-Specific Sampling and Analysis Plan (SAP) Template is a generic format to be used for generating a SAP. Prior to environmental data collection, a site-specific Sampling and Analysis Plan must be submitted to EPA Region III for review and approval. This template is not to be used as a project planning tool for performing Superfund National Priorities List (NPL) investigations.

The technical specifications in this SAP Template do not supercede state, local and/or site-specific Applicable, Relevant and Appropriate Requirements (ARARs).

This document has been derived from the US EPA Quality Assurance Guidance for Conducting Brownfields Site Assessments, EPA Region 2 Brownfields Project Planning Guidance and US EPA QA/R-5: EPA Requirements for Quality Assurance Project Plans.

Title and Approval Page

_____
Document Title

_____
Prepared by: (Preparer's Name and Organizational Affiliation)

_____
Address and Telephone Number

_____
Day/Month/Year

Cooperative Agreement Recipient:_____
Signature

_____
Printed Name/Date

Project QA Officer:_____
Signature

_____
Printed Name/Date

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This Site-Specific Sampling and Analysis Plan is a companion document to the Quality Assurance Project Plan for {*input site name*}. All of the policies and procedures specified in the {*input site name*} Quality Assurance Project Plan will be followed for this project.

PROJECT MANAGEMENT

A1 SITE INFORMATION/BACKGROUND

Briefly state the problem that the data collection project is designed to solve and/or the decisions to be made (i.e., the project objectives). Include relevant characteristics of the site, such as site location, site use history, suspected locations and identification of contaminants, range of contaminant concentrations, media that may be affected, likely migration routes, the surrounding zoning area (rural, residential, industrial) and regulatory history. When applicable, cite previous studies that indicate why the project is needed.

A2 PROJECT DESCRIPTION

Provide a description of the work to be performed, identify the media to be sampled, Applicable or Relevant and Appropriate Requirements (ARARs), proposed action levels.

Provide a brief summary of the DQO process: identify the decision(s) to be made; identify what information is needed to make informed, defensible decisions; define the boundaries of this investigation (geographical extent and time/budget constraints); state the decision rule ("if...then" statment(s) that relate the data to the decision to be made; provide an estimate of how much uncertainty will be tolerated in the site decision(s).

A3 PROJECT TIME LINE

The progress of this project will be tracked from its inception through implementation to ensure all sampling and analytical activities are performed in a correct and cost effective manner. Each step in this process will be scheduled in an objective and realistic time frame to assure that adequate attention is devoted to the minimization of effort and the maximization of information. Table I provides a project time line for this project.

A4 MEASUREMENT QUALITY INDICATORS

Table 2 provides the measurement quality indicators for this project.

MEASUREMENT/DATA ACQUISITION

B1 SAMPLING DESIGN

Describe the design of the sampling network and the rationale for the design. Also, include a list of sampling locations and frequencies and sample matrices.

Table 3 provides the types and number of samples and analyses required for this project. Figure(s) ____ {*provide copies of site maps with sample locations*} are site maps with specific sample locations.

B2 SAMPLING METHODS REQUIREMENTS

Table 3 provides information about the geophysical and sampling techniques that will be used for this project. For specific details about the sampling procedures referenced in Table 3, refer to the appropriate section of the Quality Assurance Project Plan. All samples will be collected and preserved in accordance with procedures found in Table 1 of the Quality Assurance Project Plan. Field Quality Control Requirements for this sampling activity are found in Table 2 of the Quality Assurance Project Plan.

B3 ANALYTICAL METHODS REQUIREMENTS

Table 3 provides information about the analytical methods (including any extraction or digestion methods) being used for this project. Additional information about analytical methods requirements (MDL, PQL, etc.), laboratory quality control requirements and laboratory equipment calibration procedures can be found in Appendix A.

DATA VALIDATION AND USABILITY

C1 RECONCILIATION WITH USER REQUIREMENTS

Describe how the results obtained from the project will be reconciled with the project's data quality objectives. Describe how issues will be resolved and discuss how the limitations on the use of the data will be reported to decision makers.

Site Name:
Revision Number:

Revision Date:
Page ____ of ____

TABLE I
PROJECT TIME LINE

Create an overall project timetable that outlines beginning and ending dates for the entire project, as well as, specific activities and products within the project as follows:

Activities *(Includes Products and/or Services)*	Dates *(MM/DD/YY)*	
	Activity Start Date	Activity End Date

TABLE 2
MEASUREMENT QUALITY INDICATORS

Compound	Matrix	Action Limit[1]	Precision	Accuracy	Completeness

[1]Include the concentration units

TABLE 3
SAMPLING AND ANALYTICAL METHODS REQUIREMENTS

Matrix	Parameter[1]	Number of Samples	Sampling Procedure2	Sample Preparation/Extraction Method Number	Analytical Method Number
	Volatile Organics (VOCs)				
	Semi-volatile Organics				
	Pesticides/Aroclors (PCBs)				
	Total Metals				
	Cyanide				
	Add Additional Parameters				

[1]May include other categories of analyses or individual analyses
[2]Insert the QAPP page number or the SOP number from the QAPP's Appendix A

APPENDIX A

Laboratory Qualifications Package

(The proposed laboratory's Laboratory QA Manual may be included in this appendix, in lieu of completion of the following sections)

Title and Approval Page

_____

Name of Laboratory

_____

Address and Telephone Number

_____

Day/Month/Year

Laboratory Director:_____

Signature

_____

Printed Name/Date

Laboratory QA Officer:_____

Signature

_____

Printed Name/Date

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ORGANIZATION AND MANAGEMENT

A1 QUALITY POLICY

Include a quality policy statement, that includes objectives and commitments by top management.

A 2 PROJECT ORGANIZATION AND RESPONSIBILITY

Develop an organizational chart that identifies the chain of command of each person in the bulleted list. Include titles and responsibilities of all laboratory personnel. Attach the laboratory's organizational chart. The organizational chart should be labeled Figure 1.1.

The organizational chart provided in Figure 1.1 identifies the individuals responsible for:

- Laboratory Management
  - Quality Management
  - Systems auditing (on-site evaluations).
  - Performance auditing.
  - Laboratory analyses.
- Sample Custody
  - Laboratory QC.
  - Data processing activities.
  - Data processing QC.
  - Data quality review.

Certain key individuals may be responsible for more than one of the aforementioned project functions. The organizational chart provides sufficient evidence that the lines of authority for all personnel is appropriate to accomplish the QA objectives of this project. All personnel have the necessary education, training, technical knowledge and experience for their assigned functions. Records on the relevant qualifications, training, skills and experience of the technical personnel are available upon request.

LABORATORY FACILITIES

B1 ACCOMMODATION AND ENVIRONMENT

Laboratory accommodations, calibration and test areas provide sufficient energy sources, lighting, heating and ventilation to facilitate proper performance of instrument calibrations and tests. The environment in which these activities occur are monitored and controlled to ensure that the accuracy of the measurements are sufficient to meet project requirements. Access to and use of all areas affecting the quality of these activities are controlled. *Include a copy of the laboratory floor plan. Label the floor plan as Figure 1.2.* The laboratory floor plan is included in Figure 1.2.

B2 EQUIPMENT

The laboratory is furnished with all equipment (including reference materials) required for the correct performance of calibrations and tests. . Any equipment which gives suspicious results, or has been shown by verification or otherwise to be defective, shall be taken out of service, clearly identified and wherever possible stored at a specified place until it has been repaired and shown by calibration, verification or test to perform satisfactorily.

Records shall be maintained of each item of equipment and all reference materials significant to the calibrations or tests performed. The records shall include:

- the name of the item of equipment;
- the manufacturer's name, type identification and serial number
- date received and data placed in service;
- current location, where appropriate;
- copy of the manufacturer's instructions, where available;
- details of maintenance carried out to date and planned for the future;
- history of any damage, malfunction, modification or repair.

A list of all laboratory equipment which will be used during this project is found in Table 1.

MEASUREMENT /DATA ACQUISITION

C1 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

Sample labels will be securely affixed to each sample container. Sample labels will clearly identify the particular sample, and delineate the following information:

Site name and designated project number.
Sample identification number.
Date and time the sample was collected.
Sample preservation method.
Sample pH.
Analysis requested.
Sampling location.

All samples will be maintained in accordance with the following chain of custody procedures. A sample is under custody when it is:

In a person's physical possession
In view of that person after he/she has taken possession
Secured by that person so that no one can tamper with the sample
Secured by that person in an area which is restricted to authorized personnel.

A chain-of-custody record will always be maintained from the time of sample collection until final deposition. An example of an internal chain of custody form is found in *Figure 1. (Attach a copy of a blank chain of custody form and label as Figure 1)*. Every transfer of custody will be noted and signed for with a copy of the record being kept for each individual which endorsed it. At a minimum, the chain-of-custody record will include the following information:

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

Describe how sample custody will be maintained within the laboratory. Specify the procedures for sample handling, storage, disbursement of samples for analysis and disposal.

C2 ANALYTICAL METHODS REQUIREMENTS

Table 2 details the analytical methods that will be used to analyze samples for this project. *EPA considers most methods developed by ASTM, NIOSH and APHA/AWWA/WEF (Standard Methods for the Examination of Water and Wastewater) EPA approved methods.* The laboratory will comply with the technical holding time requirements specified in Table 1 of the generic QAPP for this Investigation.

C3 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Measurement Quality Objectives are typically assessed by evaluating PARCC (Precision, Accuracy, Representativeness, Completeness, and Comparability). PARCC is defined as:

- Precision; a measure of the reproducibility of analyses under a given set of conditions.

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

To assess if environmental monitoring measurements are of an appropriate quality, the general PARCC requirements found in Section D.3 of the generic Quality Assurance Project Plan and site-specific Measurement Quality Objectives (MQOs) for precision, accuracy and completeness will be compared to the measurement performance criteria. The precision and accuracy of the proposed analytical methods is found in Table 2.

C4 QUALITY CONTROL REQUIREMENTS

Analytical quality control requirements found in Table 3 will be followed for all samples analyzed for this investigation.

C5 INSTRUMENT/EQUIPMENT MAINTENANCE REQUIREMENTS

All analytical equipment will be maintained in accordance with each respective instrument manufacturer's operating instructions. All maintenance activities will be recorded in a log book. The preventive maintenance information found in Table 4 will be used. When the acceptance criteria is not met, the corrective action found in Table 4 will be implemented.

Describe the availability of spare parts identified in the manufacturer's operating instructions. Identify the source of routine maintenance and repair.

C6 INSTRUMENT CALIBRATION AND FREQUENCY

All laboratory equipment will be calibrated following the procedures found in Table 5. When the acceptance criteria is not met, the corrective actions found in Table 5 will be implemented.

C7 DATA MANAGEMENT

1.0 Laboratory Records

The results of each calibration and test method carried out by the laboratory shall be reported accurately, clearly, unambiguously and objectively. The records shall include the identity of personnel involved in sampling, preparation, calibration or testing. The records for each calibration and test shall contain sufficient information to permit their repetition. The laboratory will retain all original observations, calculations and derived data, calibration records and test reports for a period of *(include number of years)* ___ years. All records shall be stored, held secure and in confidence to the client.

1.2 Standard Operating Procedures (SOPs)

Copies of SOPs for all EPA approved analytical methods that have been modified and/or non-EPA approved methods are included in Section A. Copies of other SOPs are available upon request.

1.3 Analytical Data Deliverable Requirements

At a minimum, analytical data deliverable packages for screening and definitive data will include the following:

- Sample documentation (location, date and time of collection and analysis, etc.)
- Chain of custody
- Initial and continuing calibration
- Determination and documentation of detection limits
- Analyte(s) identification
- Analyte(s) quantitation
- QC blanks
- Matrix spike recoveries

- Quality Control sample results
- Duplicate results

Prior to the submission of laboratory data, the laboratory's Quality Assurance Officer will review the data for accuracy, precision and completeness.

1.4 Data Management

Describe the project data management scheme, tracing the path of the data from their generation in the field or laboratory to their final use or storage. ***A flowchart may be used.*** *Describe the record keeping procedures and the approach used for data storage and/or retrieval on electronic media. Discuss the control mechanism for detecting and correcting errors and for preventing loss of data during data reduction, data reporting and data entry. Identify and describe all data handling equipment and procedures to process, compile and analyze data. Describe the procedures that will be followed to demonstrate acceptability of hardware/software configurations required.*

ASSESSMENT AND OVERSIGHT

D1 PERFORMANCE AND SYSTEM AUDITS

The laboratory shall arrange for audits of the activities at appropriate intervals to verify that its operations continue to comply with the requirements of the laboratory's documented quality system. Audits will be carried out by *identify title of person responsible for system audits*, who is trained and qualified and independent of the activity to be audited. Audit reports will be distributed to *identify title(s) of persons who will receive the system audit reports*. When the results of a system audit indicate that the laboratory's quality system has been compromised, the laboratory will take immediate corrective action. *Describe the corrective action procedures to be followed.* If corrective action is required, the laboratory will immediately notify, in writing, the Project's QA Manager.

In addition to periodic system audits, the laboratory will also participate in proficiency testing or other inter-laboratory comparisons. The results of the laboratory's most recent EPA or equivalent Performance Evaluation Sample(s) are found in Section B. *Place a copy of the laboratory's most recent EPA or equivalent PE Sample results in Section B. Also, include copies of laboratory certifications for the compounds that will be measured during this investigation.* When the results of a performance audit indicate that the laboratory's validity of test results are questionable, the laboratory will take immediate corrective action. *Describe the corrective action procedures to be followed.* If corrective action is required, the laboratory will immediately notify, in writing, the Project's QA Manager.

DATA REVIEW AND USABILITY

E1 REVIEW OF ANALYTICAL DATA

Describe the procedures being used to review analytical data to ensure that reported results comply with the requirements found in Table 2 and 3 of this Appendix. Identify the job title(s) of persons responsible for each level of review. Also, describe the corrective action procedures that are followed when the reported results do not meet the laboratory's acceptance criteria.

E2 DATA VALIDATION

The laboratory's analytical deliverable package will include a narrative, which describes the analyses performed and discusses any problems associated with the data reported. Sufficient documentation (i.e., blank results, QC summary forms, instrument run logs, sample preparation logs, etc.) will be provided to allow the data from this project to be validated in accordance with the IM1 and M2 level of validation found in the Region III Innovative Approaches to Data Review Guidance Document. (6/95)

E3 RECONCILIATION WITH USER REQUIREMENTS

The laboratory will use the formulas included in Section D3 of the project's generic QAPP to evaluate quality control samples. *Describe other procedures (i.e., Shewart charts, standard deviation, etc.) that are being used to evaluate quality control samples.*

TABLES

TABLE 1
Laboratory Equipment List

Identify all laboratory equipment that will be used for this project

Name of Equipment	Manufacturer	Placed in Service (month/yr)	Location

TABLE 2
Analytical Methods Requirements

centration units

TABLE 3
Analytical Quality Control Requirements

QC Sample	Frequency	Acceptance Criteria	Corrective Action
Method Blank	One per twenty samples per matrix or one per day, whichever is more frequent.		
Duplicate	One per twenty samples per matrix or one per day, whichever is more frequent.		
MS/MSD	One per twenty samples per matrix or one per day, whichever is more frequent.		
Laboratory Control Samples			
Surrogates			

TABLE 4
Preventive Maintenance - Laboratory Equipment

Identify field equipment and/or systems requiring periodic preventive maintenance. Describe the activity, such as check the battery, etc.

Instrument	Activity	Frequency

Table 5
Calibration and Corrective Action -Laboratory Equipment

es, instruments, and other equipment used for data collection activities that must be calibrated to maintain performance

	Calibration Standards	Frequency Initial & Continuing Calibration	Acceptance Criteria	Corrective Action

SECTION A

Standard Operating Procedures

SECTION B

Performance Evaluation Results