

EXECUTIVE SUMMARY

The Quality Assurance Project Plan, or QAPP, is a written document that outlines the procedures a monitoring project will use to ensure that the samples participants collect and analyze, the data they store and manage, and the reports they write are of high enough quality to meet project needs.

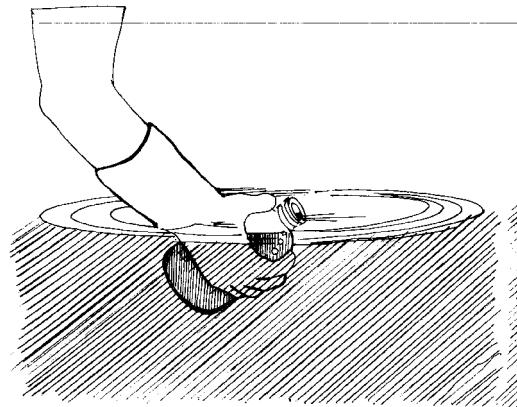
U.S. Environmental Protection Agency-funded monitoring programs must have an EPA-approved QAPP before sample collection begins. However, even programs that do not receive EPA money should consider developing a QAPP, especially if data might be used by state, federal, or local resource managers. A QAPP helps the data user and monitoring project leaders ensure that the collected data meet their needs and that the quality control steps needed to verify this are built into the project from the beginning.

Volunteer monitoring programs have long recognized the importance of well-designed monitoring projects; written field, lab, and data management protocols; trained volunteers; and effective presentation of results. Relatively few programs, however, have tackled the task of preparing a comprehensive QAPP that documents these important elements.

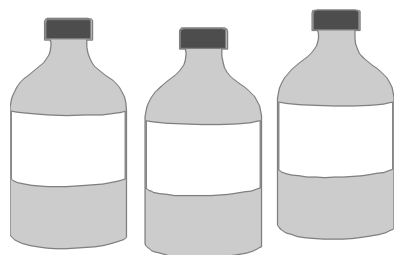
This document is designed to help volunteer program coordinators develop such a QAPP.

Steps to Developing a QAPP

Developing a QAPP is a dynamic, interactive process that should ideally involve state and EPA regional QA experts,



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potential data users, and key members of the volunteer monitoring project. There are 11 steps a volunteer monitoring project coordinator might take to prepare a QAPP. These are:

Step 1: *Establish a small team* whose members will serve as advisors in helping you develop the QAPP by offering feedback and guidance throughout the entire process.

A QAPP helps the data user and monitoring project leaders ensure that the data collected meet their needs.



Step 2: *Determine the goals & objectives of your project*--why it's needed, who will use the data, and how the data will be used.

Step 3: *Collect background information* to help you in designing your project.

Step 4: *Refine your project's goals* once you've collected more information.

Step 5: *Design your project's sampling, analytical & data requirements*--essentially, what, how, when, and where you'll be monitoring.

Step 6: *Develop an implementation plan* that lays out project logistics.

Step 7: *Draft your standard operating procedures (SOPs) & QAPP.*

Step 8: *Solicit feedback on your draft SOPs & QAPP* from state or EPA regional QA contacts and potential data users.

Step 9: *Revise your QAPP based on review comments and submit it for approval.*

Step 10: *Once your QAPP is approved, begin your monitoring program.*

Step 11: *Evaluate and refine your project over time, and reflect any major changes in a revised QAPP.*

Basic QA/QC Concepts

It is important to understand the terminology of quality assurance and quality control in order to develop a QAPP. Key definitions include:

Precision -- the degree of agreement among repeated measurements of the same characteristic. It may be determined by calculating the standard deviation, or relative percent difference, among samples taken from the same place at the same time.

Accuracy -- measures how close your results are to a *true* or expected value and can be determined by comparing your analysis of a standard or reference sample to its actual value.

Representativeness -- the extent to which measurements actually represent the true environmental condition or population at the time a sample was collected.

Completeness -- the comparison between the amount of valid, or usable, data you originally planned to collect, versus how much you collected.

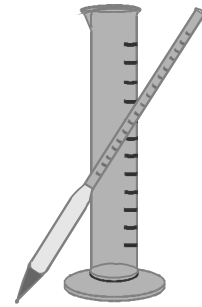
Comparability -- the extent to which data can be compared between sample locations or periods of time within a project, or between projects.

Elements of a QAPP

According to EPA guidance, 24 distinct elements can be included in a QAPP, although not all elements may be necessary for all programs. Which elements you end up including in your QAPP depends on your project's goals, objectives, scope, data uses, and on the guidance you receive from your state or

The "PARCC" Parameters

Taken together, the terms **Precision, Accuracy, Representativeness, Completeness, and Comparability**, comprise the major data quality indicators used to assess the quality of your data. It is essential to understand these terms and to address them in your QAPP. Chapter 3 of this document includes a discussion of these indicators and gives examples of how to evaluate the quality of your data in relation to these terms.



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EPA regional quality assurance contacts. The 24 elements are grouped into four overall categories and are listed below:

Project Management **(elements 1-9)**

1. Title and Approval Page
2. Table of Contents
3. Distribution List
4. Project/Task Organization
5. Problem Identification/ Background
6. Project/Task Description
7. Data Quality Objectives for Measurement Data
8. Training Requirements/Certification
9. Documentation and Records

Measurement/Data Acquisition **(elements 10-19)**

10. Sampling Process Design
11. Sampling Methods Requirements
12. Sample Handling and Custody Requirements
13. Analytical Methods Requirements
14. Quality Control Requirements
15. Instrument/Equipment Testing, Inspection, and Maintenance Requirements
16. Instrument Calibration and Frequency
17. Inspection/Acceptance Requirements for Supplies
18. Data Acquisition Requirements
19. Data Management

Assessment and Oversight **(elements 20-21)**

20. Assessment and Response Actions
21. Reports

Data Validation and Usability **(elements 22-24)**

22. Data Review, Validation, and Verification Requirements
23. Validation and Verification Methods
24. Reconciliation with Data Quality Objectives