WASHINGTON STATE
DEPARTMENT OF ECOLOGY

QUALITY ASSURANCE REPORT

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APPROVALS

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GLOSSARY

EXECUTIVE SUMMARY
AND
RECOMMENDATIONS

Ecology staff rely on physical, chemical and biological data to make decisions which affect our environment. The agency data quality system helps staff collect and use data of sufficient quality to support sound environmental decisions.

This report from the agency Quality Assurance (QA) Officer discusses the status of the agency data quality system, describes ongoing QA activities, and makes the following recommendations for improvements:

Revise Ecology's QA Management Plan to conform to EPA's new format and requirements and to align Ecology's plan with the current EPA approach to environmental data quality.

Revise Ecology's Policy on Quality Assurance to require the preparation, review and approval of QA project plans for all environmental data collection activities and to require that all programs have designated a QA Coordinator.

Once all programs have designated QA Coordinators, **plan and schedule QA-related training** directed to the specific needs of program staff in coordination with QA staff and other Environmental Assessment Program (EAP) staff as appropriate.

Update Ecology Document 91-16, ***Guidelines and Specifications for Preparing Quality Assurance Project Plans***, to incorporate improvements from EPA's latest guidance and from experience of Ecology staff in preparing and reviewing QA project plans.

EAP QA staff work with NPDES permit managers and permittees to **ensure 100% participation in DMR-QA performance evaluation studies.**

Maintain Manchester Lab accreditation for all procedures required by Executive Policy 1-22 and other program requirements.

At this time, no audits of Ecology projects are being conducted. **Designate an EAP team to audit selected projects.**

INTRODUCTION

Data Quality Assurance principles apply to the processes of acquiring, evaluating and using environmental data. They include:

- A systematic approach to **planning** for the collection of useful data culminating in the preparation, review and approval of a **QA project plan**
- Use of **documented procedures** for the collection, assessment and archiving of environmental data **and** preparation of **guidance documents** to assist others in the selection and use of appropriate procedures
- Adequate **training** in the application of data QA principles and practices
- Use of appropriate **quality control (QC)** procedures to document data quality
- **Review and validation of results** before they are used, published or archived
- **Data assessment** to determine whether results can be used for their intended purpose
- Internal **audits** of selected projects to ensure that QA project plans are being followed

Data Quality Assurance Is Important

Ecology staff make decisions on strategies for protecting the environment. These decisions are only as good as the information on which they are based. Physical, chemical and biological data play a major role in many of these decisions and the quality of those data is of considerable importance. Ecology staff want their data to be accurate, representative, complete and comparable to other data. Data must also be timely and carefully documented so they can be used to support decisions that may be challenged. The quality system helps ensure that data will be suitable for making these important decisions.

The potential consequences of inadequate data quality include:

- incorrect decisions leading to successful legal challenges
- unnecessary regulation
- adverse environmental conditions
- loss of credibility
- wasted resources

AGENCY ORGANIZATION AND PROGRAM RESPONSIBILITIES

Ecology Programs That Acquire And Use Environmental Data

Ecology Programs	Program Management Responsibilities
Air Quality	Ambient Air Monitoring Network Annual Emissions Inventory
Environmental Assessment	Ambient Monitoring of Surface Waters and Sediments Investigations of Contaminated Sites Watershed Assessments and TMDL Studies Outreach/Support to Local Governments/Organizations Manchester Environmental Laboratory
Spill Prevention, Preparedness & Response	Accidental Spills Illegal Releases and Dumping Drug Lab Cleanups
Water Quality	Inspections of Permitted Facilities Effluent and Receiving Water Data Management Administration of Water Quality Grants and Loans
Shorelands & Environmental Assistance	Contaminated Sediments Data Management Wetlands Assessments Padilla Bay National Environmental Research Reserve Watershed Planning Grants
Water Resources	Stream Flow and Groundwater Inventory
Solid Waste/ Financial Assistance	Disposal Site Leachate and Groundwater Data
Toxics Cleanup	Contaminated Site Data Management Assessments of Marine and Estuarine Habitats Underground Storage Tank Projects
Hazardous Waste & Toxics Reduction	Waste Container Characterization Contaminated Soil Investigations Data Review
Nuclear Waste	Oversight of Nuclear and Mixed Waste Management

STATUS OF QUALITY ASSURANCE IN THE AGENCY

Quality Assurance Policy

Executive Policy 1-21, *Establishing Quality Assurance*, was adopted in 1993 and contains the following salient features:

- Ecology's QA Officer is the manager of the QA Section in the EILS Program.
- Program managers may designate a QA Coordinator to support their staff.
- Program managers may require the preparation, review and approval of QA project plans (QAPPs) for activities that generate environmental data.
- The EILS QA Section provides technical assistance and training on data QA.

Deficiencies In The Current Policy

- Communication on QA issues between the QA Officer and Ecology programs is difficult due to lack of designated QA Coordinators in most programs. No one in these programs is responsible for QA-related activities or deficiencies and for communicating with the agency QA Officer about them.
- Data are being acquired without approved QA project plans due to lack of a requirement for use of QAPPs in some programs.

Environmental Assessment And Air Quality Programs Have QA Functions

Ecology's QA Officer reports to the manager of the Environmental Assessment Program. A QA specialist assists in providing support for Ecology and is designated program QA Coordinator. The Environmental Laboratory Accreditation Program is now administered through the new Program Systems and Lab Accreditation Section.

The QA support function includes review of project plans, training and technical assistance in QA principles and practices and preparation of guidance documents on data QA. The QA Officer is also responsible for the agency QA Policy and Management Plan.

The Manchester Environmental Laboratory (MEL) performs most of the chemical and microbiological analyses for agency projects. The supervisor of the Analytical Management Unit is designated the lab QA Officer and reports to the lab director.

The Air Quality Program Quality Assurance Unit consists of four staff who document and evaluate the quality of air monitoring data. The QA unit prepares reports on the quality of the data from the Ambient Air Monitoring Network and other air monitoring projects. The unit supervisor is designated program QA coordinator.

Other programs do not have formal QA functions or designated QA Coordinators.

EPA Revised Its QA Requirements And Guidance

Ecology's QA Management Plan was last revised in December of 1993. Since then, EPA has altered their approach to quality assurance by adopting the American National Standard ANSI/ASQC E4-1994, *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs.* EPA document QA/R-2, *EPA Requirements for Quality Management Plans,* was prepared to conform to the ANSI document and describes the content of a Quality Management Plan (QMP) for an organization such as Ecology. The QMP includes elements from the old QA Management Plan along with some new ones related to the acquisition, management and use of environmental data. QA/R-2 is presently in "Draft Final" form at this writing.

EPA is changing the requirements for QA project plans. Document QA/R-5, *EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations,* is in "Draft Final" form at this writing. Several elements from the previous requirements have been altered and some new elements added to the QAPP.

QA Staff Conducted A Survey Of QA Practices In Ecology Programs

The numbers of responses from Ecology's environmental programs* were:

Air Quality	2	Shorelands/Environmental Assistance	7
Water Quality	2	Spills Prevention, Preparedness and Response	1
Water Resources	0	Hazardous Waste and Toxics Reduction	0
Toxics Cleanup	2	Solid Waste and Financial Assistance	0
Nuclear Waste	0		

The response to the survey was not complete and points up the need for program QA Coordinators to facilitate communication on data quality issues.

*Environmental Assessment Program staff were not surveyed since the QA Officer works closely with them and is aware of the status of QA in the program.

Survey Results

Most respondents indicated that **QA project plans are not required and are not** usually **prepared** in their programs.

Respondents indicated that **SOPs and written protocols are generally available and followed** in the collection, evaluation, use and storage of their data.

Several of the respondents indicated that **staff** in their program **had not received QA-related training recently** and most indicated that **they and their colleagues would benefit from training** related to their needs.

Survey respondents indicated that **quality control information accompanied** most of the **environmental data** they collected and/or used **and**, in most cases, **that information is reviewed by the staff using the data.**

Respondents indicated that, **when environmental data are archived in a database, the associated QC information** usually **is not maintained in the database.**

Respondents indicated that **they rarely prepare reports on the quality of their data.**

QA Project Plans Are Not Always Prepared

Manchester Laboratory estimates that 15-20% of samples submitted to the lab are not associated with QA project plans. Many of these samples arrive at the lab with little or no prior notification with the expectation that they can be easily fit into the existing schedule. Without a QA project plan, there is no assurance that appropriate laboratory procedures have been requested since lab staff are unaware of the history of the samples, the objectives of the project or the requirements for data quality.

Samples that arrive without notice can cause serious scheduling conflicts at Manchester Lab since EPA and Ecology staff share work space for sample preparation (extractions, digestions, etc.) and analyses. Management often become involved as priorities are redefined and other work must be set aside. Employees may have to work overtime on short notice, which impacts the lab budget and the employee's personal life.

Lab staff must often spend time tracking down the project manager to obtain the information necessary to proceed. For samples with short holding times, they may have to use their best judgement as to what the project manager wants. The lab may not have the capability to carry out the procedures requested for the samples. This poor communication impacts their ability to do their best work.

QUALITY ASSURANCE ACTIVITIES

QA Project Plans Are The Foundation Of An Effective QA System

In the Environmental Assessment Program, QA project plans are prepared for all environmental data collection activities. They are reviewed and approved by unit or section managers, QA Staff, Manchester Lab staff and key participants in the project. Approval of the plans is required before field work begins, **although this requirement is often not implemented** due to time constraints.

Th use of QAPPs has significantly improved communication among clients, lab staff and project managers which, in turn, helps ensure that data from the project serve the purposes for which they are acquired.

EAP QA Staff reviewed 55 QA project plans, provided technical assistance on 23 projects and conducted one training session during FY 97 & 98. Of the 55 project plans reviewed, 51 were for projects conducted by EAP staff. The others were conducted by recipients of Ecology grants.

Toxics Cleanup Program staff reviewed and approved Sampling and Analysis Plans for site investigations prepared by contractors to the responsible parties.

The Air Quality Program compiles information on data quality for the statewide Ambient Air Monitoring Project and publishes quarterly and annual summary reports on compliance with data quality criteria in 40 CFR 58. These projects are covered by a comprehensive Air Monitoring Quality Assurance Plan approved by EPA.

Ecology Policy 1-22 Requires Data From Accredited Laboratories

The Environmental Laboratory Accreditation Program accredits about 450 environmental laboratories for water quality and selected sediment analytical methods. Program staff conducted 260 system audits of environmental labs in the last two fiscal years.

Accredited Labs Participate In National Performance Evaluation Studies

Laboratories accredited by Ecology participated in at least two performance evaluation studies each year as a requirement of accreditation. Most participated in the semiannual Water Pollution (WP) studies conducted by EPA and coordinated by the EAP QA Staff for laboratories in Washington State. About 415 laboratories accredited by Ecology participated in each of the last four WP Studies.

An average of 93.5% of their results for each study were acceptable.

About 2,790 laboratories not accredited by Ecology participated in these four studies. An average of 89.9% of their results were acceptable. This suggests that labs that participate in our accreditation program produce more accurate results than those that do not.

All major NPDES permittees and selected minor permittees are required to participate in EPA's annual Discharge Monitoring Report Quality Assurance (DMR-QA) studies, which are conducted in conjunction with alternate WP studies. **In the last two DMR-QA Studies, several of the permittees (13 and 9, respectively) failed to report results.**

Manchester Laboratory Maintains Accreditation

Manchester Laboratory achieved the following results in the last four WP Studies:

	WP036	WP037	WP038	WP039
No. of Results Reported	73	72	74	71
Acceptable Results	70(95.9%)	72(100%)	74(100%)	70(98.6%)

Labs Will Have To Be Accredited For Sediment Analyses

The State Sediment Management Standards are being revised to require that labs providing sediment data to Ecology be accredited.

EPA Is Privatizing All Of Their PE Studies

As of January 1999, private vendors will offer the WP and DMR-QA PE studies to environmental laboratories and NPDES permittees required to participate. The vendors will each operate their own program following EPA guidelines. Vendors will be accredited by the National Institute for Standards and Technology (NIST). **The variety of programs offered by the vendors may make the administration and coordination of the privatized studies much more difficult for EAP QA staff.**

A National Lab Accreditation Program Is In Place

EAP Lab Accreditation Staff are initiating changes to the WAC to allow participation in the National Environmental Laboratory Accreditation Program (NELAP).

QA Staff Attended Two National Meetings On QA Issues

QA Officer Cliff Kirchmer attended the 16th Annual National Meeting on Managing Environmental Quality Systems in Kansas City in 1997. Stew Lombard attended the pre-conference training course and the 17th EPA National Meeting in Denver in 1998.

GLOSSARY

Accreditation – a program for assuring that environmental analytical laboratories have the facilities, equipment and staff to carry out specific analytical methods successfully.

Accurate – data characterized by good precision and low bias indicated by quality control results

Audit – a systematic, independent examination of a facility or process to determine whether required procedures are being followed or data are accurate

Comparable – data acquired by procedures that are equivalent to those used to acquire other data

Complete – data necessary to achieve project objectives are acquired successfully

Data Quality System – a management system of policies, objectives, principles, responsibilities and an implementation plan for ensuring that data acquired by the organization are suitable for their intended uses

Data Assessment –evaluation of data to determine whether they are adequate for their intended use. Data assessment is performed by the project manager and the findings are presented in the project report.

Data Quality – characteristics of data that relate to their ability to meet the needs of the user. These include accuracy, representativeness, completeness, comparability, timeliness and documentation

Data Validation – evaluation of quality control results and other supporting information to determine whether requirements for data quality have been met. Data validation is conducted by independent experts in the procedures used to acquire the data and the findings are presented in a written report to the project manager.

Holding Time – the recommended or mandated limit on the time between collection of an environmental sample and analysis of that sample. The characteristics of samples change during shipment and storage. Holding times are established to limit those changes so that the sample that is analyzed is still representative of the population from which it was collected.

Performance Evaluation Studies – distribution of blind reference samples to analytical laboratories and evaluation of the reported results. Results are "Acceptable" if they fall with a specified confidence interval around the mean value reported by selected "reference" laboratories. EPA has conducted studies semiannually (WP Studies) for any lab that wishes to participate and annually (DMR-QA Studies) for major NPDES permittees through 1998. These studies will be conducted by private providers starting in 1999.

GLOSSARY (continued)

Project Manager – the individual with responsibility for planning, coordinating and reporting the results of an environmental study

Quality Assurance (QA) – a collection of functions including training, planning, oversight, quality control, assessment and reporting designed to ensure that the data acquired and used by agency staff and management are of known, acceptable and documented quality.

Quality Assurance Coordinator – an individual responsible for oversight of QA practices within the program The QA Coordinator assesses needs for training or other support of program staff and arranges with the agency QA Officer to meet those needs.

Quality Assurance Project Plan – a document describing the background, objectives, design and procedures relating to the acquisition of environmental data. Guidelines for preparing QA Project Plans are prepared and maintained by the agency QA Officer.

Quality Control – statistical procedures used to evaluate the effects of random and systematic error on data

Quality Management Plan – the document which describes the agency Data Quality System

Representative – data that correctly characterize the population being studied

Technical Assistance – help with planning, execution and/or interpretation of data in connection with an environmental study.