QUALITY ASSURANCE REPORT TO MANAGEMENT

FY 1995 & 1996

INTRODUCTION

This report is intended to inform Ecology management of QA practices used in the programs over the past two fiscal years. The report also describes plans for new QA measures and suggestions for improving the quality of environmental measurement data.

Prog. Mgt. requested by EILS Prg. Mgt etc.

This report was prepared from information provided by Ecology programs. The entry for each program includes (1) brief statements of the types of data developed or used by program staff and the uses made of those data, (2) descriptions of QA activities, and (3) plans or recommendations for additional QA activities in the future.

The author's recommendations are presented on page 2 and the appendix contains background information on the agency quality assurance program.

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CONCLUSIONS +

RECOMMENDATIONS

? Significant progress has been made toward improving and documenting the quality of the data used to make decisions related to the protection, preservation and enhancement of Washington's environment. Ecology staff must continue to receive current training if they are to keep up with changing technologies and regulations.

There have been significant improvements in the clarity and completeness of the QA project plans reviewed by the QA Section over the past two years. The improved plans have promoted better communication among those responsible for collecting environmental data. As a result, project managers are collecting more useful data and there is better understanding of the information they receive from analytical laboratories.

Communication/Training on QA/QC is deficient.

Agency staff would benefit from better communication among the programs on QA issues. The executive policy and QA Management Plan encourage program managers to designate a QA Coordinator. These coordinators could meet or otherwise communicate on a regular basis to share the progress and benefits of the QA program and to resolve problems more effectively. This communication would also make the preparation of these reports to management easier and their content more complete and useful to managers.

The Environmental Information Management System offers several opportunities and challenges in data quality assurance. The system will facilitate access to historical data for use in project planning and for comparison with new data. Some programs will have to establish protocols for reviewing or validating data prior to its entry into the database. Data quality coding procedures will have to be developed to relate quality control information to individual results in the system. QA protocols for the security of the data in the system will be necessary. Ecology staff will need training and written procedures for evaluating the quality of the data and for assessing the relationship of the data to conditions in the environment.

AIR QUALITY PROGRAM

Program staff, with the assistance of Local Air Pollution Control Agencies (LAPCA), manage and operate the ambient air monitoring network. Air quality monitoring is federally mandated under 40 CFR 58. The EPA publishes QA Handbooks which describe the procedures used to acquire, maintain, and document air quality data. Standard Operating Procedures (SOP's) for monitoring the criteria pollutants have been developed and approved by the QA Coordinator and the Program Manager.
designated

The program operates under an approved comprehensive Air Monitoring Quality Assurance Plan.

New staff receive extensive training on the operation, maintenance, and siting of air monitoring stations from experienced senior staff. Program and LAPCA staff receive training through EPA's Air Pollution Training Institute in conjunction with QA staff and the University of Washington.

According to their quality check criteria.
The program continues to generate high quality data. During the last two years, 98% of the monitored parameters met the program's objectives for accuracy, and data completeness.

A 1 FTE cut in the program's QA Unit resulted in a decrease in the frequency of performance audits of the network from four to three times per year (although data quality remains high). This cut has also limited the ability to assist program and LAPCA staff in the development of QA Project Plans for special studies.

In the Future

SOPs for monitoring efforts utilizing non-equivalent or reference method instrumentation (special projects) are being prepared.

System audits of the operation of the air monitoring network will be conducted.

To ensure the continued collection of quality data from an expanded network, it may be necessary to add additional staff.

Individual QA Plans should be prepared for projects not covered by the program QA Plan.

CENTRAL PROGRAMS

Program staff conduct criminal investigations, spill response activities, and inspections of industrial dischargers. They review sediment chemistry data for archival in the SEDQUAL database and monitoring data from industrial dischargers or their contractors for permit compliance.

Data are used for environmental damage assessments, permit compliance decisions and criminal prosecutions, all of which have the potential for litigation.

Sediment Management Unit staff adopted a policy for ensuring the quality of sediment data which streamlined the data QA review process. Selected program staff received training in conducting QA reviews of sediment chemistry data prior to entry in the SEDQUAL database. ?

A guidance document for the preparation of sediment sampling and analysis plans (SAP) was published as an appendix to the Source Control Standards User Manual. The guidance included an extensive chapter on quality assurance. This guidance assists those required to collect sediment data with the planning of efficient, cost-effective projects which will yield accurate and useful data. Do we have?

Is SAP req. of their regulat.

Sediment Management Unit staff review SAPs prepared by consultants and other contractors and provide technical assistance needed to ensure that permitted dischargers provide Ecology with reliable data to document compliance with Sediment Management Standards.

Alex Coleman's O&R Program

In the Future

If a QA project plan is not prepared, the sampling and analysis plan (SAP) should address QA requirements to ensure that data quality objectives are developed and met.

Technical assistance will be required from EILS staff with the development and documentation of sampling and analytical procedures and with data interpretation and evaluation.

ENVIRONMENTAL INVESTIGATIONS & LABORATORY SERVICES

total maximum daily load

Program staff design and conduct most of the environmental assessment projects for Ecology, including long-term monitoring, TMDL studies, investigations of contaminated sites, and watershed assessment studies. The Manchester Laboratory conducts most of the chemical and biological analyses in house and contracts the remainder to private labs. EILS staff review and evaluate data before they are used by agency staff.

Data are used by agency staff to make decisions on conditions in ecosystems, on compliance with federal and state environmental regulations, and on the need for further study of specific sites or watersheds. Data are also used for trend analysis and for modeling ecosystems to predict fate and impact of contaminants.

An SOP for review and approval of QA project plans has been adopted. Project plans are reviewed by QA Section staff and by key participants in the project and their approval is required before field work begins. This practice 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 collected.

The number of environmental laboratories accredited for analytical methods used to report environmental data to Ecology increased from 275 to 452 during the past two years. In addition to verifying the capability of these laboratories to analyze water and sediment samples, QA Section auditors offer assistance to laboratory staff to improve and document the quality of their data. In recent EPA national performance evaluation studies, laboratories accredited by Ecology performed better on nearly all of the analytes for which they reported results than their counterparts who are not accredited. This suggests that Ecology is receiving more accurate data as a result of the Environmental Laboratory Accreditation Program.

Professor Jake Uhrich of South Puget Sound Community College presented a course on basic statistics to EILS staff. This was followed by classes on the statistical aspects of quality assurance by QA Section staff, on detection limits by Bill Kammin, and on regression statistics by Bill Ehinger. These classes are available on video tape from the library. Quality control is based on the statistical analysis of results from replicate samples, blanks, check standards and spiked samples. Also, statistical methods are frequently used to summarize and interpret environmental results. After taking these courses, EILS staff are better able to apply statistical concepts to planning, collection and analysis of the results of environmental measurements.

QA Section staff presented a course on analytical quality control to the analysts at the Manchester Laboratory. The course described the application of statistical concepts to maintaining and documenting control of chemical measurement systems. After taking the course, lab staff have a better understanding of the principles behind mandatory QC procedures and the ability to apply additional QC procedures when they are required or useful.

Manchester Lab implemented a new Laboratory Information Management System (LIMS) which automates data reduction and expedites transmittal of analytical results to clients. The format of the LIMS reports facilitates archival of data in various data management systems used by Ecology staff.

The Washington Total Petroleum Hydrocarbon (WTPH) methods for analysis of soil and water from underground storage tank (UST) sites were improved. The revised methods are more complete, easier to use and contain examples of chromatograms for most of the petroleum products encountered at UST sites. Analysts should be able to produce better data using the revised methods.

Several EILS staff contributed to major revisions of the Puget Sound Estuary Program Guidelines. Chapters on Quality Assurance, Sampling, Metals Analyses and Organics Analyses were updated. The new versions of the guidelines reflect the latest available analytical technologies and address issues which not adequately covered in the original guidelines. The revised guidelines will contribute to more accurate, comparable and representative data.

Watershed Assessments Section (WAS) staff published Guldance for Conducting Water Quality Assessments and Watershed Characterizations Under the Nonpoint Rule (Chapter 400-12 WAC). This document describes water quality assessment methods for evaluating the effectiveness of watershed action plans in achieving water quality objectives.

WAS staff prepared the Stream Temperature Module for the Timber-Fish-Wildlife Ambient Monitoring Program manual. The module describes temperature monitoring methods for forest streams. Data are used to develop forest management strategies.

WAS staff provided technical assistance to six Ecology Programs on 200 monitoring projects. Most were conducted by local jurisdictions supported by Ecology grants. Sharing their expertise with other investigators helps ensure that data from these projects are of high quality and are useful in evaluating the conditions in the environment.

WAS staff published guidance describing significant considerations to be included in the design of a dairy waste best management practices (BMP) evaluation study. The guidance emphasizes the importance of comprehensive project planing and of evaluating both the BMP implementation as well as the water quality affected by the BMPs. The guidance was presented to a statewide audience of Conservation District staff as part of a teleconference sponsored by the Conservation Commission.

WAS staff gave presentations to about 100 wastewater discharge permit managers at an in-house training workshop. Topics included fostering technical information exchange and tips for reviewing mixing zone study plans and reports.

In the Future

Guidelines and Specifications for Preparing Quality Assurance Project Plans will be updated this year. Since this guidance was prepared in 1991, EPA has improved their guidance for project planning and the author has reviewed numerous project plans. The revised guidelines will incorporate improvements from EPA's guidance and from the author's experience which will make them more useful to project managers planning for the collection of environmental data.

WAS staff will develop two new guidance documents. One will provide technical consistency guidelines for Total Maximum Daily Load (TMDL) studies. The second describes the evaluation of point source discharge plume studies. In addition, staff are planning to extend their technical assistance outreach to local governments, tribes, and citizen monitoring groups, and develop tools for these groups to facilitate their data collection and quality assurance procedures.

There is a need for data on non-chemical parameters. Specialized QA procedures will be needed for studies involving macroinvertebrate taxonomy and biological assessments.

In some cases, there should be independent, third party review of MEL data.

Some EILS projects require uncensored data (data reported as a value rather than as "not detected"), which has not been available from the lab. Provisions should be made for the lab to provide uncensored data when requested by the project managers.

When measurement procedures are changed, new data may not be comparable to existing data. All changes in procedures should be supported with comparison studies to demonstrate comparability of results or to document any bias or changes in precision.

All analytical data should be accompanied by the QC data which relate to them.

WATER QUALITY PROGRAM

Program staff administer wastewater discharge permits and grants for water quality projects conducted by tribes and local governments. Responsibilities include inspecting permitted facilities and reviewing effluent and receiving water data reported by permittees. Sampling and analytical methods and QA requirements are listed in 40 CFR 136. Program staff also review QA project plans and data from grant recipients.

The quality of the data reported to Ecology is ensured through

a requirement for permittees to use accredited labs,
a manual and QA project plan for inspections of permitted facilities,
written procedures for acceptance of data for the WPPLCS database,
a requirement for the preparation of QA project plans by grant recipients,
review and approval of those project plans by program staff, and
on-site technical assistance to waste treatment plant operators.

Program staff also coordinate the whole effluent toxicity (WET) testing program. Their responsibilities include

training staff of commercial laboratories on WET testing procedures,
providing technical assistance for permittees,
reviewing WET test reports submitted by permittees,
providing a written evaluation of each test to the permit manager,
maintaining a database of test results,
providing permittees and permit managers with a summary of test performance.

About 900 tests were processed over the last two years.

Standards for review of WET data have been published and distributed to the labs for review. Data reviews are necessary because labs occasionally make significant errors or a test produces an anomalous result.

Program staff at each of the four regional offices participated in a two-day course on receiving water sampling presented by EILS. This training included the latest procedures for collecting accurate and representative data on a variety of surface water quality parameters and procedures for submitting samples to the Manchester Lab. As a result of this training, regional investigators have the knowledge and skills to conduct studies with the confidence that their data will be comparable to those from other agency studies.

(No information on plans for future improvements was provided)

SHORELANDS & WATER RESOURCES PROGRAM

Program staff conduct research studies at Padilla Bay, some of which involve field measurements and the collection and analysis of environmental samples.

? detail

Data are used to support the conclusions of the research studies and must be of very high quality.

Staff may require consultation on contracting analytical services and data review.

TOXICS CLEANUP PROGRAM

Program staff oversee the identification, prioritization and cleanup of contaminated sites and conduct assessments of marine and estuarine habitats. Oversight responsibilities include review and approval of plans for site investigations and of data submitted by responsible parties. The staff also offer site-specific technical assistance to responsible parties and their contractors, administer grants to local health departments for site hazard assessments, and determine compliance with cleanup regulations. Field measurements are made at some sites. Samples are collected and submitted for analysis occasionally.

Program staff published Sampling and Data Analysis Methods as guidance for responsible parties on the collection of data at contaminated sites. The document describes procedures which contribute to the generation of quality data to facilitate decisions that are valid and defensible.

Program staff receive training in all facets of ground water monitoring from EPA, private consultants and vendors as well as formal education and on the job training. Their training provides site managers with the knowledge and skills needed to oversee groundwater monitoring by contractors and to conduct sampling projects.

Site managers receive technical assistance with review of QA project plans on an as-needed basis from the EILS QA Section and from EPA counterparts. QA Section staff also presented a three-hour class on QA principles and practices to program staff at NWRO and at headquarters.

In the Future

The Information Communication Unit was formed to facilitate conversion of data into more useable information. One focus of this unit is improvement in the quality of the program's data and information systems. Currently underway is an evaluation of the program's data and information needs and development of a strategy to help make sure those needs are met.

Ecology and EPA have a "division of labor" agreement by which TCP is the lead on certain NPL sites. As part of the agreement, EPA will conduct training for TCP site managers on EPA QA requirements and methods. This will decrease Ecology's reliance on EPA technical assistance in reviewing data quality.

Amendments to the MTCA are likely to include environmental risk assessments using results from biotoxicity tests. The agency should develop or acquire in-house expertise on these specialized procedures.

HAZARDOUS WASTE & TOXICS REDUCTION PROGRAM

Program staff generate very little data; however, they review data submitted by regulated parties or their contractors.

Data are used to designate dangerous wastes, verify closure requirements and monitor groundwater for compliance with federal and state regulations. All data have the potential for use in enforcement actions under the Dangerous Waste Regulations.

Manchester Lab staff assist program staff with QA reviews of data, consulting, training and expert witness services.

In the Future

Staff need training in sampling, sample submission, method selection, interpretation of analytical results and data quality control needed for projects. Since these skills are not used frequently, training should be provided on a recurring basis.

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NUCLEAR WASTE PROGRAM

Program staff arrange to have duplicate samples of low-level nuclear and mixed wastes collected by Hanford contractors and submit them for analysis to a contract laboratory.

Data are used to verify compliance with state and federal cleanup regulations as well as for risk analysis and site closure decisions.

Staff receive technical assistance from EILS and Toxics Cleanup Program on sampling design and procedures and data interpretation.

(No further information was provided)

LOCAL GOVERNMENT SOLID WASTE PROGRAM

Program staff collect leachate or groundwater samples very infrequently.

Data is used for potential enforcement actions.

(No further information was provided)

APPENDIX

BACKGROUND INFORMATION

Ecology's Executive Policy 1-21, "Establishing Quality Assurance", and Quality Assurance Management Plan prescribe procedures to ensure that environmental measurement data collected by Ecology support their intended uses. The Management Plan was prepared to meet a requirement of EPA programs which provide funding to Ecology.

The executive policy designates the EILS Quality Assurance (QA) Section Manager as Ecology's QA Officer and requires the preparation, review and approval of QA project plans according to protocols established by each program manager. Program managers may, at their discretion, designate a QA Coordinator to provide support for their staff. The management plan requires the QA Section to prepare a report to management on the status of data quality assurance within the agency.

Ecology staff make decisions on a wide range of strategies for protecting the environment. These decisions are only as good as the information on which they are based. Measurement data play a major role in many of these decisions and the quality of that 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 which may be challenged.

Quality assurance practices provide a means of ensuring that data can be used to make the necessary decisions. QA practices include:

- Preparation of QA project plans as a systematic approach to planning for the collection of useful data

- Use of documented procedures for the collection, assessment and storage of environmental data and preparation of guidance documents to assist others in the selection and use of appropriate procedures

- Quality control procedures to manage and document data quality

- Training in the collection, interpretation and use of data

- Technical assistance to Ecology staff and to those who submit data to Ecology

- Review and validation of results before they are used, published or archived