



DEPARTMENT OF
ECOLOGY
State of Washington

Quality Management Plan

Washington State Department of Ecology

December 2015 – Version 4

Publication No. 15-03-030

Publication Information

This report is available on the Department of Ecology's website at <https://fortress.wa.gov/ecy/publications/SummaryPages/1503030.html>

The three previous versions of Ecology's *Quality Management Plan* are available at:

2010 - <https://fortress.wa.gov/ecy/publications/SummaryPages/1003056.html>

2005 - <https://fortress.wa.gov/ecy/publications/SummaryPages/0503031.html>

1983 - <https://fortress.wa.gov/ecy/publications/SummaryPages/8303001.html>

Website

Ecology's Quality Assurance website: <http://www.ecy.wa.gov/programs/eap/quality.html>

Contact Information

For more information contact:

William R. Kammin
Quality Assurance Officer
Washington State Department of Ecology
Email: wkam461@ecy.wa.gov
Phone: 360-407-6964

Publications Coordinator
Environmental Assessment Program
P.O. Box 47600, Olympia, WA 98504-7600
Phone: (360) 407-6764

Washington State Department of Ecology - www.ecy.wa.gov

- Headquarters, Olympia (360) 407-6000
- Northwest Regional Office, Bellevue (425) 649-7000
- Southwest Regional Office, Olympia (360) 407-6300
- Central Regional Office, Union Gap (509) 575-2490
- Eastern Regional Office, Spokane (509) 329-3400

Accommodation Requests: To request ADA accommodation including materials in a format for the visually impaired, call Ecology at 360-407-6764. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

Quality Management Plan

Washington State Department of Ecology

Authored and edited by

William R. Kammin, Ecology Quality Assurance (QA) Officer

Washington State Department of Ecology
Environmental Assessment Program
300 Desmond Drive, P.O. Box 47710
Olympia, Washington 98504-7710

Table of Contents

	Page
Approvals by Ecology Director and QA Officer	3
Concurrences by Ecology Program Managers.....	4
Concurrences by EPA Region 10 Quality Manager	5
Purpose of This Document.....	6
Acknowledgements.....	6
Chapter 1. Introduction	7
1.1 Background.....	7
1.2 Graded Approach to Quality Management.....	7
1.3 Intended Audience	8
1.4 Period of Applicability.....	8
1.5 Supersession.....	8
1.6 Legal Basis for Ecology Authorities and Requirements.....	8
Chapter 2. Requirements of the Quality Management Plan	11
2.1 Policy	11
2.2 Purpose.....	11
2.3 Applicability	12
2.4 General Content and Management.....	12
2.5 Preparation	12
2.6 Submittal and Approval	12
2.7 Revisions.....	12
Chapter 3. Elements of the Quality Management Plan.....	13
3.1 Content Requirements.....	13
3.2 Management and Organization.....	13
3.3 Quality System Components.....	18
3.4 Qualifications and Training	19
3.5 Procurement of Goods and Services	20
3.6 Documents and Records	20
3.7 Information Management.....	21
3.8 Planning	23
3.9 Implementation of Work Processes	23
3.10 Quality System Assessment and Response.....	24
3.11 Quality Improvement	26
References and Readings	27
Appendices.....	31
Appendix A. Ecology QA Organizational Chart	32
Appendix B. QA Coordinators for Ecology Programs	33

Approvals by Ecology Director and QA Officer

Approved:

Maia Bellon, Director

Date

Approved:

William R. Kammin, Quality Assurance Officer

Date

Signatures are not available on the web version of this document.

Concurrences by Ecology Program Managers

Approved:

Polly Zehm, Deputy Director	Date
-----------------------------	------

Approved:

1. Stuart Clark, Manager, Air Quality Program	Date
---	------

Approved:

2. Carol Smith, Manager, Environmental Assessment Program	Date
---	------

Approved:

3. Darin Rice, Manager, Hazardous Waste and Toxics Reduction Program	Date
--	------

Approved:

4. Jane Hedges, Manager, Nuclear Waste Program	Date
--	------

Approved:

5. Gordon White, Manager, Shorelands and Environmental Assistance Program	Date
---	------

Approved:

6. Laurie Davies, Manager, Waste 2 Resources Program	Date
--	------

Approved:

7. Dale Jensen, Manager, Spill Prevention, Preparedness, and Response Program	Date
---	------

Approved:

8. Jim Pendowski, Manager, Toxics Cleanup Program	Date
---	------

Approved:

9. Heather Bartlett, Manager, Water Quality Program	Date
---	------

Approved:

10. Tom Loranger, Manager, Water Resources Program	Date
--	------

Concurrences by EPA Region 10 Quality Manager

Approved:

Ann Williamson, Acting Director
EPA Region 10, Office of Environmental Assessment

Date

Purpose of This Document

This *Quality Management Plan* is the Washington State Department of Ecology “blueprint” for applying the quality system to environmental programs.

The quality system is a structured and documented management system that provides the framework for (1) planning, implementing, documenting, and assessing environmental data operations, and (2) carrying out required quality assurance and quality control activities.

The quality system encompasses both managerial and technical activities. The active participation of all employees is required.

Acknowledgements

The author would like to thank Tom Gries, Ecology National Estuary Program Quality Coordinator, for reviewing the document and providing very useful comment. Also, thanks to Will Kendra for his review and comment. Fu Shin Lee, of the Toxics Cleanup Program, also provided useful comments. Finally, many thanks to Sarah Burdick, of the Washington State Department of Transportation, for peer-review of this document and providing many useful suggestions for improvements.

Thanks to Carol Smith, Environmental Assessment Program Manager, for providing support and also reviewing the document.

Thanks to Joan LeTourneau for editing and reformatting the entire document.

Chapter 1. Introduction

1.1 Background

- 1.1.1 The Washington State Department of Ecology (Ecology) develops this *Quality Management Plan* as a cornerstone of its participation in the U.S. Environmental Protection Agency (EPA) quality system. Ecology's quality system is defined in the agency's *Quality Management Plan* (Ecology, 2010 and 2015, this document) and is formally established in Ecology Policy 22-01 (Ecology, 2006). The *Quality Management Plan* is based largely on requirements set out by the EPA in their *Requirements for Quality Management Plans* (EPA, 2001, 2006).
- 1.1.2 The Ecology Quality Assurance (QA) Officer, who is designated by the Ecology Director, coordinates and manages QA activities throughout the agency and also is the chief QA liaison for extra-agency QA activities. The QA Officer is responsible for the preparation of this document and the periodic *Quality Report to Management*. Currently, the QA Officer is based in the Environmental Assessment Program.
- 1.1.3 All Ecology environmental programs have designated one or more QA Coordinators, who have a maximum commitment of 0.25 FTE/program. The program QA Coordinators oversee QA and quality control (QC) activities within their respective programs and have a wide range of potential responsibilities, which are defined in this document. The QA Coordinators also contribute to the *Quality Report to Management*.
- 1.1.4 Manchester Environmental Laboratory (MEL) has an integral role in the quality system at Ecology. MEL is the in-house laboratory and provides lab services for general chemistry, metals, organic chemistry, and microbiology. Laboratory QA practices are discussed in this *Quality Management Plan* and are formally described in the MEL *Quality Assurance Manual* (Ecology, 2014, internal publication).
- 1.1.5 The Laboratory Accreditation Unit provides accreditation services to help establish and document laboratory proficiency for the reporting of data to Ecology. Accreditation requirements for data produced by and submitted to Ecology are detailed in Ecology Policy 22-02 (Ecology, 2008a). The Lab Accreditation Unit maintains a procedural manual (Ecology, 2010) and several standard operating procedures (SOPs) (Ecology, 2015) documenting the QA practices and procedures of the unit.

1.2 Graded Approach to Quality Management

- 1.2.1 The graded approach to quality management is straight-forward. Projects of different sizes, levels of risk, and rigor call for differing approaches to QA documentation. Generally speaking, the larger the project and the more risk the project carries, the more detailed and rigorous the quality documentation must be. Notwithstanding these differences, Ecology Policy 22-01 and Environmental Assessment Program Procedure 1-14 call out the development of Quality Assurance Project Plans (QAPPs) for all projects generating environmental data, including those projects utilizing or evaluating secondary data. Ecology also requires that all field sampling, field

analytical, and laboratory activities be documented using formally approved SOPs. To this end Ecology has developed over 300 SOPs applicable to field, laboratory, data management, and accreditation activities. See Ecology (2015b) for a comprehensive listing of agency and program SOPs.

1.3 Intended Audience

- 1.3.1 The intended audience for this document is diverse. Ecology staff and management fulfill the noted responsibilities and authorities stated herein. Ecology's partners in grants, contracts, and loans have a vital interest in adhering to the requirements of the plan. Ecology develops and maintains the plan to meet the requirements of the EPA quality system. Finally, the general public and public and private environmental organizations may be interested in Ecology's plan to continuously improve quality in data generation activities, record-keeping and documentation, standardization, and quality assessment.

1.4 Period of Applicability

- 1.4.1 The period of applicability for this *Quality Management Plan* is five years from the date of publication. At the end of that period, the plan will be reissued without changes, revised and reapproved, or rewritten.
- 1.4.2 Notwithstanding the five-year review cycle, the *Quality Management Plan* may be revised anytime EPA policies change or the Ecology quality system is modified.

1.5 Supersession

- 1.5.1 This document supersedes all previous Ecology *Quality Management Plans*.

1.6 Legal Basis for Ecology Authorities and Requirements

- 1.6.1 EPA requires Ecology to document its quality system in an approved *Quality Management Plan*. This requirement, and other quality system requirements, can be found in the following regulations, orders, and policies.
- 48 CFR Part 46, Federal Acquisition Regulations, for contractors.
 - 40 CFR Parts 30, 31, and 35 for assistance agreement recipients.
 - EPA Order 5360.1 CHG 1, which establishes a mandatory agency-wide quality system that applies to EPA, as well as to all organizations performing work for EPA.
 - EPA Science Advisor Policy on Lab Competency EPA, 2004.
<http://www2.epa.gov/sites/production/files/2015-03/documents/labdirective.pdf>
 - EPA Order 2105.0, on a Mandatory Agency-Wide Quality System, EPA, 2000.
<http://www.epa.gov/quality/qs-docs/policies/21050.pdf>

- EPA Lab and Field Competency Policy, 2011.
<http://www2.epa.gov/sites/production/files/2015-03/documents/fem-lab-competency-policy.pdf>
- Other relevant EPA orders and policies regarding quality system requirements can be found in the References section of this document in EPA 2000, 2000a, 2002a, 2004, 2008, 2008a, 2011, 2012, 2012a, 2012b, and 2012c.

This page is purposely left blank

Chapter 2. Requirements of the Quality Management Plan

2.1 Policy

- 2.1.1 Several aspects of the Ecology *Quality Management Plan* are required by either EPA or Ecology policy. *EPA Requirements for Quality Management Plans* (EPA, 2001) states that any environmental data generation funded by EPA must be performed using an appropriate quality management plan. EPA requirements include QAPPs for environmental data generation, secondary data (generated by others), and modeling projects, which may include secondary data and direct generation. Ecology Policy 22-01 (Ecology, 2006) requires the development of QAPPs for all environmental data generation performed by Ecology or performed by Ecology grantees, contractors, or loan recipients, when that data are submitted to Ecology. Policy 22-02 (Ecology, 2008a) requires the use of laboratories accredited by Ecology when Ecology performs the environmental data generation or when any entity submits environmental data to Ecology. Labs must maintain a general accreditation, and also be accredited for the specific parameter and method used to generate the data.
- 2.1.2 Standard operating procedures (SOPs) are required for all Ecology sampling, field analytical, and laboratory analytical operations. Additionally, SOPs may be required for processes involving data acquisition, entry, analysis, and interpretation. An example of this type of SOP is the MEL SOP for contract lab data review, 770005. See EPA (2011) for the EPA Policy requiring demonstration of lab and field competency, which also requires full implementation of SOPs for field work.

2.2 Purpose

- 2.2.1 The ultimate purpose of the *Quality Management Plan* is to ensure, to the extent possible, that data generated by Ecology or submitted to Ecology are of known quality and usable for intended purposes. To this end, the Ecology quality system touches many aspects of agency operations including:
- 2.2.1.1 Project planning (QAPPs).
 - 2.2.1.2 Document development (SOPs and reports), document control, and document standardization.
 - 2.2.1.3 Internal laboratory operations.
 - 2.2.1.4 Laboratory accreditation.
 - 2.2.1.5 Data management.
 - 2.2.1.6 Field sampling and analytical procedures, field auditing, and field proficiency.
 - 2.2.1.7 Other activities as appropriate.

2.3 Applicability

2.3.1 The *Quality Management Plan* is applicable to all staff in Ecology, as required.

2.4 General Content and Management

2.4.1 General Content

The required contents of all *Quality Management Plans* are defined in EPA (2001). Every effort has been made to conform with these requirements with regard to both content and format.

2.5 Preparation

2.5.1 Preparation of the *Quality Management Plan* is the ultimate responsibility of Ecology's Executive Management Team (EMT). In practice, preparation is delegated to the Ecology QA Officer, who may also involve the Program QA Coordinators and other staff as required or appropriate.

2.6 Submittal and Approval

2.6.1 The *Quality Management Plan* must be approved by the following managers:

2.6.1.1 Ecology Agency Director

2.6.1.2 Ecology Deputy Director

2.6.1.3 Ecology Quality Assurance Officer

2.6.1.4 Ecology Environmental Program Managers:

2.6.1.5 Air Program

2.6.1.6 Environmental Assessment Program

2.6.1.7 Hazardous Waste and Toxics Reduction Program

2.6.1.8 Nuclear Waste Program

2.6.1.9 Shorelands and Environmental Assistance Program

2.6.1.10 Waste 2 Resources Program

2.6.1.11 Spill Prevention, Preparedness and Response Program

2.6.1.12 Toxics Cleanup Program

2.6.1.13 Water Quality Program

2.6.1.14 Water Resources Program

2.6.1.15 EPA Region 10 Quality Assurance Manager

2.7 Revisions

2.7.1 The *Quality Management Plan* is revised or rewritten, at a minimum, on a five-year cycle. The Plan may be revised more frequently, if required by quality system changes or changes in EPA requirements. It is reviewed on an annual basis.

Chapter 3. Elements of the Quality Management Plan

3.1 Content Requirements

3.1.1 EPA, 2001, *Requirements for Quality Management Plans*, contains requirements for *Quality Management Plan* content and format. This Ecology document strictly aligns with the stated topic areas in EPA, 2001.

3.2 Management and Organization

3.2.1 The mission of Ecology is to protect, preserve, and enhance Washington's environment, and to promote the wise management of our air, land, and water for the benefit of current and future generations.

3.2.2 Ecology Policy 22-01, *Establishing Quality Assurance*, was adopted on August 25, 1993 and revised in October 1999 and in 2006. The policy applies to environmental data-collection studies conducted or funded by Ecology. It is the responsibility of agency management to promote the consistent application of QA and QC principles to the planning and execution of these studies and activities. The link to this policy is provided in the references.

3.2.3 It is the intent of the policy that (1) the quality of all environmental data be documented, (2) the data satisfy the requirements for their intended use, and (3) the data are legally defensible. The policy is implemented by Ecology managers and staff. Appropriate QA and QC practices are used in all phases of environmental studies and activities, from developing the initial plan through sampling, measurement, assessment, and use of the data. The QA/QC requirements should be commensurate with the importance of the work, available resources, unique needs of Ecology, and the consequences of potential decision errors.

3.2.4 The Ecology QA Officer reports to both the Manager of the Environmental Assessment Program and the agency Deputy Director. The QA Officer does not have any direct responsibility for sampling or analysis (i.e., data acquisition).

3.2.5 Ecology programs with responsibilities for environmental data are listed in section 2.6.1. The following *Quality Management Plan* elements list the QA/QC roles, authorities, and responsibilities of the personnel involved in Ecology QA activities.

3.2.6 QA/QC Responsibilities:

3.2.7 Management

3.2.7.1 Several Ecology managers are accountable for accomplishing the mission and conducting overall operations of Ecology. These managers are the signatories of this document and are listed in section 2.6.1 of this document. The resources necessary to

implement the Ecology QA policy are identified and budgeted by the Program Managers. The agency Director is responsible for designating the QA Officer, and Program Managers are responsible for designating QA Coordinators. In addition, delegated management is responsible for:

- Preparing and revising this *Quality Management Plan*. Preparation may be assigned to staff, with senior managers participating in and supporting the effort and also signing approval.
- Understanding fully the content of this plan and concurring with its implementation.
- Allocating resources to implement the QA policy and this plan.
- Ensuring that Ecology QA policy and this plan are implemented.
- Delegating responsibilities for implementing a quality system at appropriate levels of the agency.
- Building success measures into the quality system to determine when it is working well.
- Assessing the adequacy of the quality system.
- Deciding whether to employ peer review in particular instances in order to ensure that technical documents provide credible science and are reliable and readable.

3.2.8 **Quality Assurance Officer**

3.2.8.1 The QA Officer is responsible for:

- Reviewing and approving QAPPs prepared by and for Ecology staff. QAPPs submitted to the EPA must be approved by the QA Officer. Approval means that the QA Officer determines that the QAPP reflects adequate planning and contains sufficient information to allow competent staff to acquire and document the quality of data necessary to meet the objectives of the project.
- Providing technical support to agency programs and often working with the QA Coordinators to provide this support.
- Acting as the liaison between Ecology and other agencies on QA/QC matters.
- Informing Ecology management of QA/QC issues and problems.
- Assisting management, as requested, in preparing QA/QC documents, including this agency *Quality Management Plan*.
- Providing technical assistance to Ecology staff in implementing QAPPs and assessing the quality of the results obtained.
- Preparing and maintaining guidance for the preparation of QAPPs.
- Assisting Ecology staff with preparing documents involving the application of QA and QC principles.
- Coordinating training on QA and QC principles and practices to meet the needs of Ecology staff.

- Preparing a *Quality Report to Management* every three years.
- Coordinating and conducting, when necessary, audits of Ecology QA operations and project reports. The QA Officer has stop-work authority when reports contain demonstrable errors, or when field or laboratory QA processes are insufficiently documented or implemented.
- Reviewing and concurring on technical reports issued by the Water Quality Program and other programs when requested or required.
- Identifying Ecology needs regarding SOPs; coordinating development of those SOPs; and reviewing and approving those SOPs.
- Maintaining the QA website and producing content for the QA website.

3.2.9 **Quality Assurance Coordinators**

3.2.9.1 Program QA Coordinators are responsible for:

- Acting as point of contact within their programs for data quality issues.
- Coordinating with the agency QA Officer to identify needs related to QAPP preparation, SOP preparation and maintenance, and QA/QC training.
- Reviewing and approving QAPPs submitted by and for their program staff.
- Coordinating the development of program field sampling and field analytical SOPs.
- Assisting project managers who review and approve QAPPs prepared within the program.
- Assisting project managers who oversee the preparation of QAPPs submitted to Ecology by responsible parties, contractors, and grant recipients.
- Providing technical assistance to program staff who implement QAPPs and assess the quality of the results obtained.
- Assisting with preparing and presenting QA/QC training for program staff.
- Assisting program staff and grant recipients in meeting QA/QC requirements.
- Providing information to the QA Officer for the *Quality Report to Management*.

Additional responsibilities may be defined in program-specific QA plans. For example, the *Air Monitoring Quality Assurance Plan* specifies some responsibilities of the QA Coordinator for the Ecology Air Quality Program.

3.2.10 **Project Managers and Project Leads**

3.2.10.1 Ecology project managers and project leads have overall responsibility for (1) specific environmental studies and (2) activities conducted through grants or contracts. They are responsible for:

- Preparing QAPPs.

- Assisting contractors, grant recipients, and the regulated community with preparing QAPPs.
- Reviewing and approving QAPPs prepared by grant recipients and contractors.
- Implementing QAPPs.
- Assessing and reporting the quality of data, based on the quality objectives.

3.2.11 **Field Staff**

3.2.11.1 Ecology staff collecting samples or data in the field have a vital role in the success of the projects. They are responsible for:

- Understanding and following the QAPP.
- Checking all equipment and supplies in advance of field operations.
- Ensuring that samples are properly collected, preserved, labeled, packaged, and shipped.
- Ensuring that all field data are recorded and preserved according to the QAPP.
- Following required chain-of-custody procedures and standard operating procedures (SOPs).
- Participating in any necessary training, side-by-side comparisons, and/or field audits on SOP use and performance, in order to document proficiency using those SOPs (EPA 2011)

3.2.12 **Manchester Environmental Laboratory (MEL) Director**

3.2.12.1 Ecology's MEL Director is responsible for:

- Directing and overseeing QA/QC for the laboratory.
- Designating the laboratory QA Coordinator.
- Approving QAPPs that involve laboratory services.
- Participating in and approving the preparation and revision of the MEL *Quality Assurance Manual* and the MEL *Lab Users Manual*.
- Ensuring that MEL participates in all required external system assessments and proficiency testing studies.
- Ensuring that MEL maintains accreditation for all parameters and methods used to produce environmental data.

3.2.13 **MEL QA Coordinator**

3.2.13.1 The QA Coordinator for MEL is responsible for:

- Reviewing QAPPs to ensure that the procedures specified for sampling and analysis are appropriate and that the number, type, and schedule of analyses required can be accommodated.
- Coordinating the preparation and revision of the MEL *Quality Assurance Manual* and the *Lab Users Manual*.
- Directing the preparation and maintenance of the administrative and technical SOPs.
- Reviewing data produced by the laboratory for compliance with QA/QC requirements.
- Performing internal system and performance audits, to identify and correct problems affecting data quality.
- Coordinating the laboratory's participation in all external system and proficiency testing studies, including those required for accreditation.

3.2.14 **MEL Staff**

3.2.14.1 Laboratory staff provides analytical services, support services, and technical consultation, each of which includes QA responsibilities. Laboratory staff responsibilities include:

- Following the administrative and technical SOPs.
- Analyzing samples according to methods specified in the QAPPs and documenting any necessary changes in the methods.
- Analyzing QC samples according to guidance provided in the MEL *Quality Assurance Manual* and the QAPPs.
- Assuring that samples are analyzed within specified holding times and also providing complete and accurate data reports in a timely manner.
- Contributing to the preparation of their *Quality Assurance Manual*, the *Lab Users Manual*, and SOPs in their area of expertise.
- Reviewing, verifying, and/or validating the results of analyses, including results from other laboratories when arrangements have been made for this service.
- Operating and maintaining the Laboratory Information Management System (LIMS).

3.2.15 **Laboratory Accreditation Unit**

3.2.15.1 Laboratory Accreditation Unit staff administer Ecology's Environmental Laboratory Accreditation Program. This program is authorized by law in RCW 43.21A. Applicable rules are presented in WAC 173-50. Accreditation is granted to laboratories after assessing them to determine that they have a demonstrated capability to accurately analyze environmental samples. Details of the responsibilities for accrediting laboratories are given in the *Procedural Manual for*

the Environmental Laboratory Accreditation Program (Ecology, 2010) and also in Ecology Policy 22-02, Requiring Use of Accredited Environmental Laboratories (Ecology, 2008).

3.2.16 **Dispute Resolution**

- 3.2.16.1 Oversight responsibilities for QA/QC may result in disagreements between the oversight group and the program reviewed. Such disputes may occur in situations involving technical issues (e.g., quality requirements, assessments, audits, surveillance, data quality [usability] assessments, reports and other publications) and management issues (e.g., *Quality Management Plan* reviews, management system reviews).
- 3.2.16.2 Disputes should be resolved at the lowest management level possible.
- 3.2.16.3 All parties should make every effort to resolve disputes through discussion and negotiation.
- 3.2.16.4 If the parties are unable to resolve the dispute, the following dispute resolution process should be followed:
 - 3.2.16.4.1 The process begins when either disagreeing party declares an issue to be irresolvable and sends a memorandum to the other party (1) invoking this dispute resolution process, (2) defining the disputed issue, and (3) presenting supporting arguments for the first party's position on the issue.
 - 3.2.16.4.2 Within 15 days, the second party must send a draft dispute resolution package to the first party. As soon as possible after this, the two parties, working together, must submit a dispute resolution package to the Environmental Assessment Program (EAP) Program Manager and the Agency QA Officer. This package should contain all relevant arguments, relevant rebuttals, and any supporting materials.
 - 3.2.16.4.3 The EAP Program Manager and the agency QA Officer shall schedule a meeting for resolving the dispute within 15 days from receipt of the dispute resolution package, and notify both parties of this date. Both parties are invited to attend the resolution meeting to present arguments and answer questions. Management may get advice from a third party. If the issue cannot be resolved at this level, the agency Deputy Director, in consultation with the EAP Program Manager and the Ecology QA Officer, will make the final decision on disposition of the issue. If the quality dispute involves the QA Officer, he will not participate in the final management decision. The final decision of management shall be binding on both parties.

3.3 **Quality System Components**

- 3.3.1 The quality system is a structured and documented management system that provides the framework for (1) planning, implementing, documenting, and assessing environmental data operations, and (2) carrying out required QA and QC activities.
- 3.3.2 The quality system encompasses both managerial and technical activities; the active participation of all employees is required.

- 3.3.3 QA is primarily a management activity; QC is primarily a technical activity. However, there is no sharp division between these two functions.
- 3.3.4 QA is a system for assuring the reliability of measurement data and by definition also includes Ecology QC activities. QC involves applying statistical procedures to evaluate and control bias and precision for measurement data.
- 3.3.5 The principal components of Ecology's quality system and the corresponding tools for implementing them include:
- Quality Assurance policy (Ecology Policy 22-01)
 - Lab Accreditation policy (Ecology Policy 22-02)
 - Water Quality Data Act and associated policies
 - EAP QAPP and SOP procedures (EAP procedures 1-04, 1-08, and 1-14)
 - Ecology field and laboratory standard operating procedures (SOPs)
 - Ecology stormwater-related SOPs
 - Ecology Air Program SOPs
 - Ecology Spills Program SOPs
 - Project-specific quality documentation (QAPPs) reference
 - Quality system documentation (*Quality Management Plans*)
 - Periodic reviews and planning (*Quality Report to Management*)
 - QA/QC Training
 - Systematic planning for projects (QAPPs and/or Data Quality Objectives Development Process)
 - Project and data assessments (Data Verification and/or Validation and Data Quality Assessment)
 - Management assessments (Quality Systems Assessments or Audits)
- 3.3.5.1 Other tools for implementing Ecology's quality system include:
- *Air Monitoring Quality Assurance Plan*
 - *Manchester Environmental Laboratory Quality Assurance Manual*
 - *Manchester Environmental Laboratory Lab Users Manual*
 - *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies*
 - *Procedural Manual for the Environmental Laboratory Accreditation Program*
 - Spills Program sampling SOPs
 - HWTR Program generic QAPP

3.4 Qualifications and Training

- 3.4.1 The QA Officer and staff, supported by the QA Coordinators and other designated staff, are responsible for QA/QC training of Ecology personnel. Those responsible for training must maintain competence in QA/QC principles and practices through

- (1) the literature, (2) training offered by outside sources, and (3) participating in relevant regional and national conferences.
- 3.4.2 Ecology staff must have sufficient education and training in QA/QC practices to carry out their assigned responsibilities. Training is designed to raise the awareness of and competence in good QA/QC practices. Training is provided on subjects such as sampling, statistics, the data quality objectives process, preparing QAPPs, environmental measurements, and analytical QC.
- 3.4.3 The QA Officer and staff identify and make use of resources from inside and outside of Ecology in providing training. Many Ecology staff have extensive experience in their areas of specialization that can be incorporated into the training.
- 3.4.4 Ecology programs may have unique requirements for QA and QC training, and program QA Coordinators help identify training needs. They arrange for training by using resources within their programs or by securing assistance from the QA Officer or external resources.
- 3.4.5 At the agency level, training resources are primarily directed toward “Core” requirements. Technical training is addressed program by program, on an as-needed basis.

3.5 Procurement of Goods and Services

- 3.5.1 The Purchasing Office, located in the Fiscal Section of Financial Services, is responsible for procuring all supplies, equipment, and services used by the agency statewide. Chapter 13 of the *Ecology Policy and Procedure Manual* includes the policies and procedures on purchasing/inventory/payables.
- 3.5.2 Ecology’s MEL contracts with other laboratories to perform analyses that MEL is unable to perform. Such laboratories must be accredited by Ecology, in accordance with Ecology Policy 22-02. Analyses of samples are contracted in accordance with RCW 39.26, with state procurement policies initiated by the state Department of Enterprise Services (DES), and with Ecology’s procurement policies. Laboratory SOPs related to contracting include SOP 770003, *Purchasing Analytical Services*, and SOP 770005, *Review of Contract Lab Data*. Data from analyses performed by contracted laboratories are reviewed by MEL to determine if the quality of data meets agency needs and conforms to the contract requirements.

3.6 Documents and Records

- 3.6.1 Chapter 20 of the *Ecology Policy and Procedure Manual* includes the policies and procedures on records/forms/public disclosure.
- 3.6.2 Two principal forms of quality system documentation are required by the EPA quality system: an agency *Quality Management Plan* and QAPPs.

- 3.6.3 MEL prepares a *Quality Assurance Manual* and a *Lab Users Manual*.
- 3.6.4 Standard operating procedures (SOPs) are prepared for laboratory and field activities. See Ecology (2015b) for a comprehensive listing of current program and agency SOPs.
- 3.6.5 EPA QA requirements documents are used to supplement the information in Ecology publications when preparing quality system documents. QA requirements for both *Quality Management Plans* and QAPPs can be found at EPA's Quality System website, www.epa.gov/quality/qa_docs.html.
- 3.6.6 Documents and records, including revisions, must be reviewed for conformance with the EPA quality system requirements and be approved by authorized Ecology staff.

3.7 Information Management

Chapter 16 of the Ecology *Policy Manual* contains guidance documents and procedures for many aspects of the Information Technology (IT) infrastructure at Ecology. Some of the covered topics include:

- Software development
- Computer security
- Software piracy
- Phone and voicemail services

3.7.1 Environment Information Management (EIM) System

- 3.7.1.1 Ecology's EIM database is the agency repository for the great majority of environmental information generated by Ecology. The database is a robust and powerful web-based, GIS-friendly reporting tool for analysis and production of reports and maps detailing environmental conditions throughout Washington State.
- 3.7.1.2 The EIM database implements two levels of QA. First, each project is evaluated and assigned a QA planning level. This is a numerical score representing the rigor of the quality planning process: from no QAPP (a common occurrence in pre-1980 work) to an approved QAPP implemented before any field work. Secondly, there is a QA assessment level, which evaluates the level of assessment finished projects attained: from no assessment to full verification, validation, and data usability determination.
- 3.7.1.3 Result qualifiers submitted by MEL are incorporated into the results stored in the EIM system. Contract data validated by MEL are assessed for usability and qualified per EPA functional guidelines before submittal into EIM.
- 3.7.1.4 MEL maintains an extensive data review and verification process for MEL-generated data. These exist of several levels of peer review and supervisory review. There is an extensive data verification process, followed by issuance of a Case Narrative, which

is a report discussing an assessment of the dataset QC sample results and any non-conformance with method quality criteria.

3.7.1.5 Data entry standardization is an important concern for EIM managers and staff. Trainings on the EIM system, for both Ecology staff and external users, are conducted periodically. Ecology also uses an inter-program agreement which commits all EIM user programs to QA protocols for EIM data-entry processes. This agreement is provided as Appendix H in Ecology, 2010a.

3.7.2 Lab Information Management System (LIMS)

MEL has a long history and involvement with data management. The lab maintains a commercial-off-the-shelf (COTS) LIMS system with electronic interfaces to both lab instrumentation and the EIM system.

3.7.3 Lab Accreditation Database

The Lab Accreditation Unit maintains a database to track accreditation status of the labs in the program. This database tracks accredited parameters and status and also issues renewals and accreditation certificates.

3.7.4 Quality Assurance Website

The *Quality Assurance* website is a key component of the Ecology quality system. The website helps ensure transparency of the Ecology quality operations. A number of key documents are found here, including:

- Ecology *Quality Reports to Management*
- Ecology *Quality Management Plans*, current and historical
- Ecology QAPP Guidance
- Ecology's QA Glossary
- Ecology Air Program SOPs
- Ecology Environmental Assessment Program (EAP) HQ SOPs
- Ecology Field Sampling and Field Analytical SOPs
- Ecology Water Quality Program stormwater SOPs
- Ecology Spills Program SOPs
- Ecology Lab Accreditation SOPs
- Various EPA SOPs and Requirements Documents
- Several EPA guidance documents on quality-related topics
- QAPP templates, guidance, and review checklists for the National Estuary Program, Ecology's Water Quality Program grantees, and general use by Ecology staff.

3.8 Planning

- 3.8.1 Data QA begins with careful planning. The goal and specific objectives for the environmental project are clearly defined, including how the data will be used. Then quality objectives, as well as qualitative and quantitative statements about the data needed to support decisions or regulatory actions, are developed. Finally, the methods to collect samples, make measurements, document data quality, and interpret and report results are selected or developed.
- 3.8.1.1 A systematic planning process is recommended. Systematic planning is a process in which you identify the problem to be studied and/or the decision to be made, and then define the project's objectives; type, quantity, and quality of information needed; technical and QC activities, and level of oversight that will ensure project criteria are satisfied. Additional information on systematic planning processes can be found in the following documents: *Guidance for the Data Quality Objectives Process* (EPA QA/G-4) and *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* (Ecology Publication No. 04-03-030, July 2004).
- 3.8.1.2 Preparing a QAPP helps ensure that the project manager follows a systematic planning process. The completed plan (1) facilitates communication among managers, field personnel, and laboratory personnel who implement the project, (2) promotes consistency in data collection activities, and (3) provides the basis for project reports.
- 3.8.1.3 *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* provides the project manager with guidance for preparing QAPPs suited to Ecology projects. The guidelines, which follow and expand upon EPA Requirements and Guidance (EPA Documents QA/R-5 and QA/G-5), describe the elements to be considered for inclusion in a QAPP.
- 3.8.1.4 QAPPs are developed in advance for emergency response situations and samples of opportunity. Templates are prepared for projects that are repetitive in nature, such as compliance inspections.
- 3.8.1.5 Program-specific guidance documents are prepared, when needed, to address the unique QA requirements of Ecology programs as well as requirements of the EPA Quality System documentation.

3.9 Implementation of Work Processes

- 3.9.1 Ecology maintains an extensive *Policy Manual* used to formalize routine work processes. The manual contains the following chapters:
- Chapter 1, Non-Discrimination
 - Chapter 2, Hiring and Appointments
 - Chapter 3, Hours of Work and Overtime
 - Chapter 4, Training and Employee Development

- Chapter 5, Leave/Payroll
- Chapter 6, Travel
- Chapter 7, Workplace Safety, Health, and Security
- Chapter 8, Discipline
- Chapter 9, Grievances and Investigations
- Chapter 10, Reasonable Accommodation
- Chapter 11, Layoff/Reduction In Force
- Chapter 12, Classification and Compensation
- Chapter 13, Purchasing and Contracts
- Chapter 14, Facilities and Vehicles
- Chapter 15, Ethics/Use of State Resources
- Chapter 16, Information Technology
- Chapter 17, Organization and Authority
- Chapter 18, Sustainability and Walking Our Talk
- Chapter 19, Rules and Legislative Information
- Chapter 20, Public Information, Records, and Publications
- Chapter 21, Financial Operations
- Chapter 22, External Environmental Operations

3.9.2 The Ecology *Policy Manual* helps standardize many work processes, and can be viewed as a set of SOP-like documents covering work activities, ranging from purchasing and contracting to environmental lab accreditation and QA at Ecology. The *Policy Manual* can be found at http://aww.ecology/pol_proc/ppm_toc.htm

3.10 Quality System Assessment and Response

3.10.1 The effectiveness of the quality system is continuously evaluated. Available assessment tools include data quality assessments, peer reviews and technical reviews, proficiency testing studies, and technical systems audits. Technical audits and assessments (1) provide management with tools to determine whether data-collection activities are implemented as planned, and (2) are the basis for taking action to correct any deficiencies that are identified.

3.10.2 The project manager is responsible for assuring that a data quality (or usability) assessment is done for each project that involves environmental data. Data quality (or usability) assessment is a statistical and scientific analysis and evaluation of data to determine if data are of the right type, quality, and quantity to support their intended use.

3.10.3 MEL is responsible for reviewing the results of sample analyses to ensure that the QC requirements, as stated in the MEL *Quality Assurance Manual* and the QAPP, have been met. Corrective actions are taken when these requirements are not met.

3.10.4 As part of its accreditation requirement, MEL participates in proficiency testing and on-site assessments. Proficiency testing studies involve the analyses of unknown

samples. On-site assessments correspond to assessments of the laboratory's managerial and technical capability by an outside assessor. Internal system assessments are also performed periodically.

- 3.10.5 The purposes of internal assessments include: (1) improving the quality systems and (2) providing valid feedback to management on the adequacy, implementation, and effectiveness of the quality system.
- 3.10.6 Prior to initiating internal assessments, Ecology management is responsible for identifying goals, choosing the assessors, defining acceptance criteria, determining the assessment procedures to be used, and approving checklists. Senior management shall assess (at least annually) the adequacy of the quality system.
- 3.10.7 The Laboratory Accreditation Unit is responsible for performing on-site assessments and tracking the results of proficiency-testing studies from participating laboratories.
- 3.10.8 Reports of assessments are prepared and submitted to Ecology management. When the assessment findings identify conditions needing corrective action, management responds promptly and appropriately. Corrective actions are documented by the responsible persons in order to confirm the implementation and effectiveness of the response action. Senior management is responsible for addressing any disputes concerning the assessments.
- 3.10.9 The QA Officer keeps the Program Manager for the Environmental Assessment Program informed of QA accomplishments and any problems that arise. The QA Officer discusses any relevant QA issues or problems with the appropriate Program Manager and/or program QA Coordinator.
- 3.10.10 The QA Officer prepares a status report, *Quality Report to Management*, every two years. This report contains, as a minimum, the following information:
- A description of QA/QC training received by Ecology staff.
 - A description of technical assistance and QA/QC support provided to Ecology staff.
 - Significant problems related to data quality and recommended corrective actions.
 - The accreditation status of Manchester Environmental Laboratory (MEL).
 - A description of the status and needs of documented information on QA/QC.
 - A description of the status and needs of human resources to implement the quality system.
 - A review of the Ecology *Quality Management Plan* to determine if the approved quality management practices continue to be both suitable and effective.
 - Other information specifically requested by management.

3.10.11 Environmental Assessment Program (EAP) side-by-side comparisons

The EAP Freshwater Technical Coordination Team conducts, on occasion, side-by-side comparisons for field measurement techniques. These comparisons are used to assess both Ecology and external organizations and usually occur in the field at an actual sampling location. These assessments provide important data regarding the technical competence of various sampling organizations in Washington State.

3.11 Quality Improvement

- 3.11.1 The QA/QC responsibilities of Ecology management and staff are specified in the *Management and Organization* section of this document. Quality improvement requires the active participation of all employees. Continuous quality improvement is an integral part of the quality system.
- 3.11.2 Quality improvement is achieved by assessing the effectiveness of the processes for collection and use of environmental data, and by taking preventive and corrective actions to improve those processes.
- 3.11.3 A triennial *Quality Report to Management* provides an assessment of the effectiveness of the quality system. Program and laboratory specific assessments evaluate the effectiveness of quality improvement activities. This helps ensure that conditions adverse to quality are:
- Prevented
 - Identified promptly, including determination of the nature and extent of the problem
 - Corrected as soon as possible
- 3.11.4 All corrective actions will be documented and tracked until closure. A new form, which documents corrective and preventive actions, is in development. The form has been used in the National Estuary Program's QA grant oversight process since 2012.

References and Readings

APHA, 2005. Standard Methods for the Analysis of Water and Wastewater, 21st Edition. Joint publication of the American Public Health Association, American Water Works Association, and Water Environment Federation. www.standardmethods.org

APHA, 2012. Standard Methods for the Analysis of Water and Wastewater, 22nd Edition. Joint publication of the American Public Health Association, American Water Works Association, and Water Environment Federation. www.standardmethods.org

ASQ/ANSI E4-2014. Quality management systems for environmental information and technology programs - Requirements with guidance for use. American Society for Quality/American National Standards Institute. www.ansi.org

Ecology, 1983. Quality Management Plan. Washington State Department of Ecology, Olympia, WA. <https://fortress.wa.gov/ecy/publications/SummaryPages/8303001.html>

Ecology, 2001. Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. Washington State Department of Ecology, Olympia, WA. Publication No. 01-03-003. <https://fortress.wa.gov/ecy/publications/SummaryPages/0103003.html>

Ecology, 2004. Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. Washington State Department of Ecology, Olympia, WA. Publication No. 04-03-030.html. <https://fortress.wa.gov/ecy/publications/SummaryPages/0403030.html>

Ecology, 2005. Quality Management Plan, 2005. Washington State Department of Ecology, Olympia, WA. Publication No. 05-03-031. <https://fortress.wa.gov/ecy/publications/SummaryPages/0503031.html>

Ecology, 2006. Executive Policy 22-01, Establishing Quality Assurance. Washington State Department of Ecology, Olympia, WA. <http://www.ecy.wa.gov/programs/eap/qa/docs/pol22-01.pdf>

Ecology, 2008a. Executive Policy 22-02, Requiring Use of Accredited Environmental Laboratories. Washington State Department of Ecology, Olympia, WA. <http://www.ecy.wa.gov/programs/eap/qa/docs/pol22-02.pdf>

Ecology, 2008b. Lab Users Manual. Manchester Environmental Laboratory. Washington State Department of Ecology, Olympia, WA.

Ecology, 2009. Quality Report to Management, November 2006 through June 2009: Quality System Structure, Activities, and Assessment. Washington State Department of Ecology, Olympia, WA. Publication No. 10-03-009. <https://fortress.wa.gov/ecy/publications/SummaryPages/1003009.html>

Ecology, 2010a. Quality Management Plan, 2010. Washington State Department of Ecology, Olympia, WA. Publication No. 10-03-056.

<https://fortress.wa.gov/ecy/publications/SummaryPages/1003056.html>

Ecology, 2010b. Laboratory Accreditation Procedural Manual. Washington State Department of Ecology, Manchester, WA. Publication No. 10-03-048.html

<https://fortress.wa.gov/ecy/publications/SummaryPages/1003048.html>

Ecology, 2012. Quality Report to Management, July 2009 through June 2012. Washington State Department of Ecology, Olympia, WA. Publication No. 12-03-043.

<https://fortress.wa.gov/ecy/publications/SummaryPages/1203043.html>

Ecology, 2014. Manchester Environmental Laboratory Quality Assurance Manual. Washington State Department of Ecology, Olympia, WA.

Ecology, 2015a. Quality Management Plan (*this document*). Washington State Department of Ecology, Olympia, WA. Publication No. 15-03-030.

<https://fortress.wa.gov/ecy/publications/SummaryPages/1503030.html>

Ecology, 2015b. Quality Report to Management, July 2012 through June 2015. Washington State Department of Ecology, Olympia, WA. Publication No. 15-03-031.

<https://fortress.wa.gov/ecy/publications/SummaryPages/1503031.html>

Ecology, 2015c. Quality Assurance Webpages. Washington State Department of Ecology, Olympia, WA. <http://www.ecy.wa.gov/programs/eap/quality.html>

EPA. 2000a. Policy and Program Requirements for the Mandatory Agency-wide Quality System. EPA Order Classification No. CIO 2105.0 (formerly 5360.1A2). May 2000.

<http://www.epa.gov/quality/qs-docs/policies/21050.pdf>

EPA. 2000b. EPA Quality Manual for Environmental Programs. Section 1.3.1. EPA Classification No. CIO 2105-P-01-0 (formerly 5360.A1). May 2000.

<http://www.epa.gov/quality/qs-docs/policies/2105P010.pdf>

EPA, 2001. EPA QA/R-2. EPA Requirements for Quality Management Plans.

U.S. Environmental Protection Agency. <http://www.epa.gov/quality/qs-docs/r2-final.pdf>

Re-issued by EPA in 2006 without changes.

EPA, 2002a. Guidance for Quality Assurance Project Plans (QA/G-5). U.S. Environmental Protection Agency. <http://www.epa.gov/quality/qs-docs/g5-final.pdf>

EPA. 2002b. Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity, of Information Disseminated by the Environmental Protection Agency. Publication No. EPA/260R-02-008. October 2002; Last updated May 2005.

<http://epa.gov/quality/informationguidelines/index.html>

EPA, 2004. Science Policy Council Policy Directive on Assuring and Documenting the Competency of Agency Laboratories. EPA Agency Policy Directive approved February 2004. U.S. Environmental Protection Agency.

<http://www2.epa.gov/measurements/internal-measurement-competency-documents>

EPA, 2006a. Statistical Methods for Practitioners. U.S. Environmental Protection Agency.

www.epa.gov/quality/qs-docs/g9s-final.pdf

EPA, 2006b. Requirements for Quality Assurance Project Plans. U.S. Environmental Protection Agency. <http://www.epa.gov/quality/qs-docs/r5-final.pdf>

EPA, 2006c. Guidance on Systematic Planning using the Data Quality Objectives Process (QA/G-4). U.S. Environmental Protection Agency.

<http://www.epa.gov/quality/qs-docs/g4-final.pdf>

EPA, 2008a. EPA Quality Program Policy. EPA Order Classification No. CIO 2106.0. October 2008; last reviewed October 2011. U.S. Environmental Protection Agency.

<http://www.epa.gov/quality/qs-docs/policies/21060.pdf>

EPA, 2008b. EPA Procedure for Quality Policy. EPA Classification No. CIO 2106-P-01.0. October 2008; last reviewed October 2011. U.S. Environmental Protection Agency.

<http://www.epa.gov/quality/qs-docs/policies/2106p01.pdf>

EPA, 2011. U.S. EPA Policy to Assure Competency of Organizations Generating Environmental Measurement Data under Agency Funded Acquisitions. Agency Policy Directive FEM-2011-01. March 28, 2011. <http://www2.epa.gov/measurements/documents-about-measurement-competency-under-acquisition-agreements>

EPA, 2012a. Handbook for Preparing Quality Assurance Project Plans (12/2012-draft). USEPA 2012. U.S. Environmental Protection Agency Guidance on Quality Assurance Project Plans. CIO 2106-G-05 QAPP. U.S. Environmental Protection Agency, Washington D.C. December 2012.

<https://www.federalregister.gov/articles/2012/12/26/2012-31096/office-of-environmental-information-announcement-of-availability-and-comment-period-for-the-draft>

EPA, 2012b. Policy to Assure the Competency of Organizations Generating Environmental Measurement Data under Agency-Funded Assistance Agreements. Agency Policy Directive Number FEM-2012-02. Revision 1. Approved March 13, 2013.

<http://www2.epa.gov/measurements/documents-about-measurement-competency-under-assistance-agreements>

EPA, 2012c. Handbook for Preparing Quality Management Plans (12/2012). USEPA 2012. U.S. Environmental Protection Agency Guidance on Quality Management Plans. CIO 2106-G-02 QAPP. U.S. Environmental Protection Agency, Washington D.C. December 2012.

<https://www.federalregister.gov/articles/2012/12/26/2012-31096/office-of-environmental-information-announcement-of-availability-and-comment-period-for-the-draft>

EPA, 2012d. U.S. Environmental Protection Agency Quality Standard for Environmental Data Collection, Production and Use by non-EPA (External) Organizations. CIO 2106-S-02. U.S. Environmental Protection Agency, Washington D.C. December 2012.
<https://www.federalregister.gov/articles/2012/12/26/2012-31096/office-of-environmental-information-announcement-of-availability-and-comment-period-for-the-draft>

EPA, 2015. Quality Documentation Homepage. U.S. Environmental Protection Agency.
www.epa.gov/quality/qa_docs.html.

Information Quality Act, US Department of Treasury, 2001. Public Law 106-554, Section 515.
https://www.whitehouse.gov/omb/fedreg_reproducible

International Organization of Standards (ISO), 2015a. ISO 9001, Quality Management Systems
http://www.iso.org/iso/iso_9000

International Organization of Standards (ISO), 2015b. ISO 14001, Environmental Management Systems. <http://www.iso.org/iso/home/standards/management-standards/iso14000.htm>

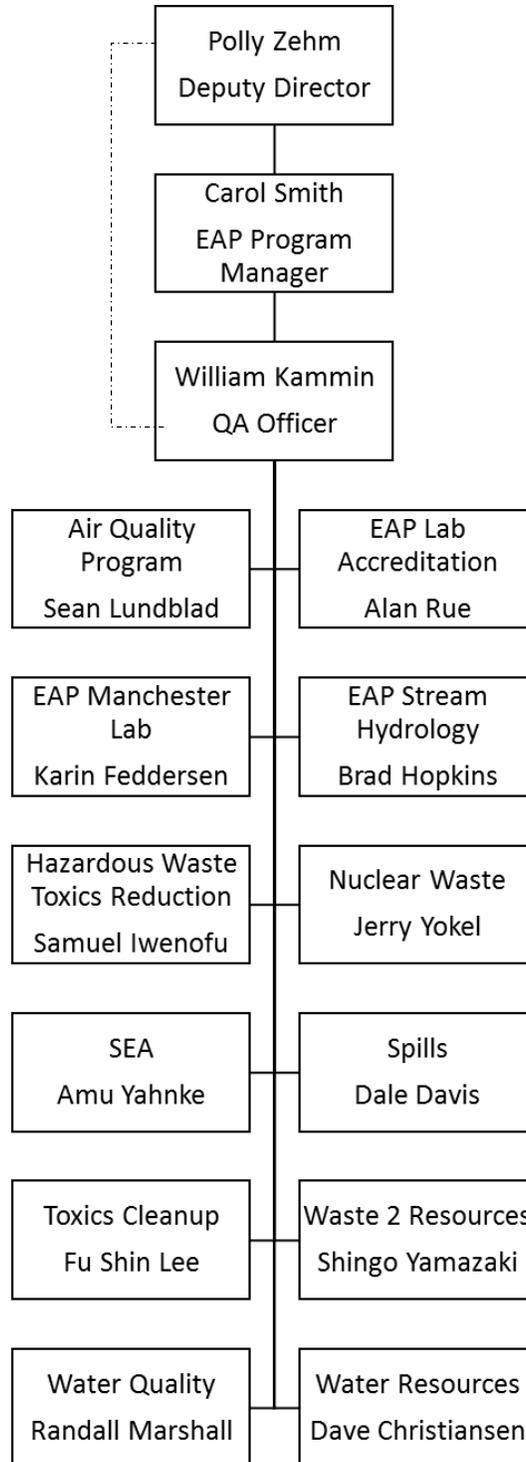
USC, 1977. Federal Grant and Cooperative Agreement Act of 1977. United States Code.
<http://www.gpo.gov/fdsys/pkg/STATUTE-92/pdf/STATUTE-92-Pg3.pdf>

USC, 1995. Paperwork Reduction Act of 1995. United States Code.
<http://www.gpo.gov/fdsys/pkg/PLAW-104publ13/html/PLAW-104publ13.htm>

Appendices

Appendix A. Ecology QA Organizational Chart

Following is a chart of Ecology's QA reporting relationships for 2015.



Appendix B. QA Coordinators for Ecology Programs

Program/ Manager	QA Coordinator	Location	Phone	Email
Air Quality/ Stuart Clark	Sean Lundblad	HQ	(360) 407-6843	sean.lundblad@ecy.wa.gov
Ecology QA Officer	Bill Kammin	HQ	(360) 407-6964	william.kammin@ecy.wa.gov
Env. Assessment/ Carol Smith	Brad Hopkins	HQ	(360) 407-6686	brad.hopkins@ecy.wa.gov
HWTR/ Darin Rice	Samuel Iwenofu	SWRO	(360) 407-6346	samuel.iwenofu@ecy.wa.gov
Laboratory (MEL)/ Joel Bird	Karin Feddersen	Manchester	(360) 871-8829	karin.feddersen@ecy.wa.gov
Lab Accreditation/ Alan Rue	Alan Rue	Manchester	(360) 871-8844	alan.rue@ecy.wa.gov
Nuclear Waste/ Jane Hedges	Jerry Yokel	Richland	(509) 736-3009	jerry.yokel@ecy.wa.gov
Shorelands/ Gordon White	Amy Yahnke	HQ	(360) 407-6527	amy.yahnke@ecy.wa.gov
Spills/ Dale Jensen	Dale Davis	HQ	(360) 407-6972	dale.davis@ecy.wa.gov
Toxics Cleanup/ Jim Pendowski	Fu-Shin Lee	HQ	(360) 407-6237	fu-shin.lee@ecy.wa.gov
Waste 2 Resources/ Laurie Davies	Shingo Yamazaki	HQ	(360) 407-7563	shingo.yamazaki@ecy.wa.gov
Water Quality/ Heather Bartlett	Randall Marshall	HQ	(360) 407-6445	randall.marshall@ecy.wa.gov
Water Resources/ Tom Loranger	Dave Christensen	HQ	(360) 407-6647	dave.christensen@ecy.wa.gov