



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

MAY 03 2011

DEQ
✓ C: Sara (cover letter)

MAY - 6 2011
OFFICE OF
THE REGIONAL ADMINISTRATOR

Sara Parker Pauley, Director
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

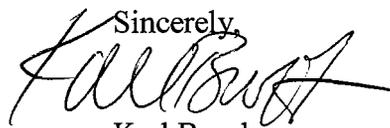
Dear Ms. Parker Pauley:

We have completed the review of the March 31, 2011, version of the Quality Management Plan (QMP), Revision 3 for the Missouri Department of Natural Resources. The document complies with *EPA Requirements for Quality Management Plans* (EPA QA/R-2, March 2001) and is approved. The original approval page and copy of the QMP are enclosed.

The review did identify one recommendation regarding the QA Coordinators' periodic assessment of program staff that review and approve external QAPPs as described in Section 9.2.4 of the QMP. It is recommended the MDNR QA Manager be notified any time one of these periodic assessments occurs. Currently, the process includes contacting the MDNR QA Manager only when corrective actions are needed.

The anniversary date for the QMP is April 2016 and the QMP must be updated appropriately and submitted on or before the anniversary date to the Regional Quality Assurance Manager for review and approval. If there are significant changes to your quality system before the anniversary date, a revised QMP must be submitted to EPA for review and approval at the time the changes occur. Any minor revisions made to the QMP should be submitted to the Regional Quality Assurance Manager as a report when those changes occur.

If you have any questions, please call Diane Harris, Regional Quality Assurance Manager at (913)551-7258.

Sincerely,

Karl Brooks
Regional Administrator

RECEIVED
MAY 10 2011
DEQ ADMIN

Enclosure

cc: Keith Bertels, Quality Assurance Manager, MDNR

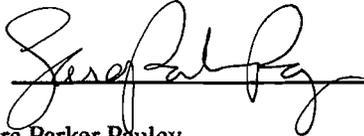




QUALITY MANAGEMENT PLAN
FOR
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES CENTER,
DIVISION OF GEOLOGY AND LAND SURVEY
AND
DIVISION OF ENVIRONMENTAL QUALITY

2011174
RECEIVED
APR 26 2011

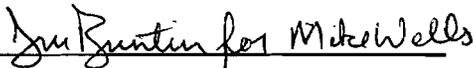
Concurrences

Signature: 

Date: 4-12-11

Name: Sara Parker Pauley

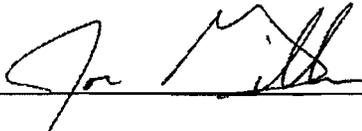
Title: Director, Missouri Department of Natural Resources

Signature:  for Mike Wells

Date: 4-6-11

Name: Michael D. Wells

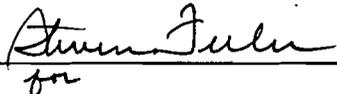
Title: Deputy Department Director, Water Resources

Signature: 

Date: 4-5-11

Name: Joe Gillman

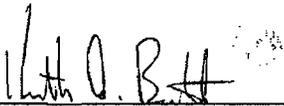
Title: Director, Division of Geology and Land Survey

Signature:  for

Date: 4/8/11

Name: Leanne Tippett Mosby

Title: Director, Division of Environmental Quality

Signature: 

Date: April 5, 2011

Name: Keith Bertels

Title: Quality Assurance Manager

Approval for EPA

Signature: Diane Harris

Date: 04/26/2011

Name: Diane Harris

Title: EPA Region VII, Regional Quality Assurance Manager

Approval for Implementation

Signature: Karl Brooks

Date: 5/3/11

Name: Karl Brooks

Title: EPA Region VII, Regional Administrator

TABLE OF CONTENTS

	<u>Page</u>
QUALITY MANAGEMENT PLAN	5
1. MANAGEMENT AND ORGANIZATION	6
1.1 Introduction	6
1.2 Quality Assurance Goal and Policy	6
1.3 Organizational Chart and Functional Statements	8
1.4 Responsibilities of the QA Manager	10
1.5 Responsibilities of the QAPP Coordinator	10
1.6 Responsibilities of Quality Assurance Coordinator	10
1.7 Responsibilities of the Quality Assurance Project Officer	11
1.8 Technical Activities or Programs Supported by the Quality System	11
1.9 QA/QC Roles and Responsibilities of Line Management	11
1.10 Types of Environmental Programs To Which the Quality System Will Be Applied	11
1.11 How Management Will Ensure That Applicable Elements of the Quality System Are Understood	12
1.12 Dispute Resolution	12
2. QUALITY SYSTEM AND DESCRIPTION	12
2.1 Quality Management Plan	12
2.2 Management Systems Reviews	13
2.3 Data Quality Objectives	14
2.4 Quality Assurance Project Plans	14
2.5 Site Sampling Plans/QAPP Addendums	16
2.6 Standard Operating Procedures	17
2.7 Data Quality Assessments	17
3. PERSONNEL QUALIFICATIONS AND TRAINING	18
4. PROCUREMENT OF ITEMS AND SERVICES	19
4.1 Procurement	19
4.2 Contracts, Subgrants, and Acquired Data	20
5. DOCUMENTATION AND RECORDS	20
6. COMPUTER HARDWARE AND SOFTWARE	21
7. PLANNING	22
8. IMPLEMENTATION OF WORK PROCESSES	23
9. ASSESSMENT AND RESPONSE	23
9.1 Review of the Quality Management Plan	23
9.2 Assessments/Evaluations	23
10. QUALITY IMPROVEMENT	26
APPENDICES	27
A. Department Organization Chart	27
B. Map of the Regional Offices and Satellite Offices	28
C. List of Typical Quality Assurance Project Plans for Environmental Data Operations	29
D. Glossary of Quality Assurance Terms and Acronyms	31
E. Requirements for Field Services and Water Quality Monitoring Standard Operating Procedures	34
F. Reference Documents	35

QUALITY MANAGEMENT PLAN

Document Title: Quality Management Plan, Missouri Department of Natural Resources, Water Resources Center, Division of Geology and Land Survey and Division of Environmental Quality

Organization Title: Missouri Department of Natural Resources

Responsible Officials: Sara Parker Pauley
Title: Director, Department of Natural Resources
Phone: (573) 522-6221

Michael D. Wells
Title: Deputy Department Director, Water Resources Center
Phone: (573) 751-4732

Joe Gillman
Title: Director, Division of Geology and Land Survey
Phone: (573) 368-2101

Leanne Tippet Mosby
Title: Director, Division of Environmental Quality
Phone: (573) 751-0763

Quality Assurance Manager: Keith Bertels
Title: Environmental Manager
Phone: (573) 526-4227

Plan Coverage: The Missouri Department of Natural Resources (MDNR), Water Resources Center (WRC), Division of Geology and Land Survey (DGLS), and Division of Environmental Quality (DEQ) receive consolidated grant funds and enter into cooperative agreements with the United States Environmental Protection Agency (EPA) to operate, at the state level, programs under the following federal laws: The Clean Water Act; The Clean Air Act; The Safe Drinking Water Act; The Resource Conservation and Recovery Act (RCRA); The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and The Toxic Substance Control Act (TSCA). All of these program elements are covered under this Quality Management Plan (QMP) and it is the intent of the divisions to apply the QMP to all programmatic activities on a routine basis including those activities not supported by federal funds.

This QMP has been prepared in accordance with *EPA Requirements for Quality Management Plans* (EPA QA/R-2).

1. MANAGEMENT AND ORGANIZATION

1.1 Introduction

Quality Assurance (QA) is one of the EPA's highest priorities in the area of environmental data. In accordance with 40 CFR 31.45, 40 CFR 35.6055 or 35.6105 whichever is applicable, and EPA Order 5360.1, if a project involves environmentally related measurements or data generation, QA practices consisting of policies, procedures, specifications, standards, and documentation which will produce data of quality adequate to meet project objectives must be developed and implemented.

All environmental data generated, processed and used by the Department in this QMP include:

- Air
- Drinking Water
- Water Quality
- Water Resources
- Geology
- Solid and Hazardous Wastes
- Toxic Substances
- Radiation

This document is the QMP for Missouri. The MDNR-WRC/DGLS/DEQ are implementing the Quality System on a state-wide basis and will ensure that the Quality System will have sufficient resources and authority to support the national EPA effort. The QMP is a formal document describing the management policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan for ensuring quality in its environmental data. It covers all intramural and extramural monitoring and measurement activities that generate and process environmental data for use by the MDNR-WRC/DGLS/DEQ.

1.2 Quality Assurance Goal and Policy

1.2.1 Goal

The goal of the Department's Quality System is to ensure that all environmental data used by the Department is scientifically valid, defensible, and of known and documented quality. This goal can be achieved by ensuring that adequate QA steps and procedures are used throughout the entire data collection process (from initial study planning through data usage).

1.2.2 Policy

It is the policy of the MDNR-WRC/DGLS/DEQ that:

- (a) All environmental data generated for the EPA will be of known quality and will meet the needs of each MDNR-WRC/DGLS/DEQ program's intended uses of the data. The data quality information developed with all environmental data will be documented and will be available to the EPA, other data users and the public.
- (b) The intended use(s) of the data (and associated level of needed data quality) will be defined before the data collection effort begins, when feasible, and will take into account the needs of secondary data users, as appropriate. The intended data uses, level of quality, project specific QC activities, and data acceptance criteria to meet the Data Quality Objectives (DQO) of these uses will be defined in a Quality Assurance Project Plan (QAPP).
- (c) Acceptable and cost-effective QC activities will be developed and implemented at the onset of each data collection effort to help ensure that the necessary level of data quality is achieved.
- (d) Each MDNR-WRC/DGLS/DEQ program which generates environmental data will develop a QAPP following the current version of EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5) and will ensure that adequate resources (both monetary and staff) are provided to support the QA effort, and will be responsible for implementation of the QAPP.

The MDNR-WRC/DGLS/DEQ programs are responsible for ensuring that subgrantees and contractors develop QAPPs or other appropriate quality management tools. If regulated entities provide environmental data for the Department's use, the MDNR-WRC/DGLS/DEQ programs are responsible for ensuring that the environmental data is acquired using QAPPs or other appropriate quality management tools. QAPPs or other appropriate quality management tools are required when site representatives use environmental data to recommend cleanup options for the Department's decision. For examples, sites undergoing corrective action under RCRA are typically required to have QAPPs, as are facilities that do ambient air monitoring as part of a New Source Review or an enforcement action, while monitoring requirements in wastewater treatment permits reference methods found in rules.

The QAPP will specify the mechanism by which timely corrective action can be taken when data quality becomes degraded. The plan will also specify the detailed procedures to be followed to assure quality data.

- (e) Each MDNR-WRC/DGLS/DEQ program generating environmental data will designate a person who is responsible for coordinating QA activities within the program. This QA Coordinator (QAC) will provide assistance to Project Managers on QA/QC issues as needed. Each regional office may designate a staff member to act as a QAC for the purpose of coordinating data generation within the regional office.

1.3 Organizational Chart and Functional Statements

Organizational charts, which identify all components of the MDNR-WRC/DGLS/FSD/DEQ are included in Appendix A. The Quality Assurance (QA) Manager is independent from the divisions' programs and reports directly to the divisions' directors.

The functions of the programs and regional offices are:

Air Pollution Control Program – responsible for all air quality issues related to acid rain, air quality standards, asbestos removal, construction and operating permits, emissions inventory, emissions testing, gasoline vapor recovery, incineration, non-attainment areas, open burning permits, pollutant modeling, stack testing, toxic air emissions, and other air related issues.

Environmental Services Program – includes the state environmental laboratory and field staff assigned to environmental emergency response, air monitoring, air quality assurance, water monitoring, landfill gas and groundwater monitoring, and hazardous waste site sampling.

Geological Survey Program – provides geologic and hydrologic support to other environmental programs in the Department, in support of EPA programs and the general public. Activities involve sampling of soil, bedrock, gas, vegetation, and water for chemical and microbial analysis, site characterization, and mineral evaluations. Staff also drill boreholes, install and plug wells, conduct borehole geophysical and video logging, conduct surface geophysical surveys and conduct water traces and spectrofluorometric analyses in characterizing hydrology and geology of waste disposal sites, spill sites, and the state of Missouri in general. They also regulate all well drilling activities in the state, including water wells, monitoring wells, heat pump wells, oil and gas wells and mineral exploration test holes.

Hazardous Waste Program – responsible for the treatment, storage, disposal and transportation of wastes that are classified as hazardous, petroleum above ground and underground storage tanks, registry of abandoned and uncontrolled sites, state and federal superfund sites, voluntary cleanup of hazardous substances, brownfields, and other hazardous substance related issues.

Water Protection Program/Public Drinking Water Branch – responsibilities include backflow prevention, boil orders, construction permits, cross connections, drinking water standards, lead contamination, public water supplies (census), public water supply testing, wellhead vulnerability assessments, and other drinking water related issues.

Solid Waste Management Program – responsibilities include the permitting and regulation of landfills and other facilities, enforcement of solid waste violations at permitted facilities and illegal dumps, addressing dumping issues, groundwater and gas monitoring, solid waste management planning, financial assistance, promoting recycling, waste reduction, and market development, and other solid waste related issues.

Water Protection Program/Water Pollution Control Branch – responsibilities include animal wastes, compliance review, land application, National Pollutant Discharge Elimination Systems (NPDES) Permits, wastewater pretreatment, non-point pollution sources, storm water permits, water quality standards, and other water-related issues.

Water Resources Center – responsibilities include administering the development, conservation and utilization of the state's water resources. The center's primary role is to provide technical advice and assistance on water use, planning, groundwater and surface water hydrology, and it also regulates dams to ensure they meet minimum safety requirements. Issues involve interstate water availability and usage; public water well locations; water quality and quantity determinations; drought and flood response and planning; coordination and resolution of river basin issues; major water users data collection; wetlands research, conservation, and protection; groundwater and surface water contamination potential and prevention; water use registration; and the safety of regulated dams.

Division of Environmental Quality Regional Offices – These include the Kansas City Regional Office, Northeast Regional Office, Southeast Regional Office, St. Louis Regional Office, and Southwest Regional Office and satellite offices. The regional offices provide field inspections, complaint investigations, first line troubleshooting on environmental issues for air pollution, drinking water, hazardous waste, solid waste,

technical assistance, and water pollution. Environmental Emergency Response staff of the Environmental Services Program also operate out of the regional offices. Regional offices supervise activities in a number of satellite offices that do similar work with shorter travel times. A map of the regional offices and satellite offices is included as Appendix B.

1.4 Responsibilities of the QA Manager

The QA Manager is responsible for the divisions' overall QA System. The QA Manager reports directly to the MDNR-WRC/DGLS/DEQ Directors on all matters pertaining to QA.

The QA Manager has the following responsibilities:

- Overall QA operations of the divisions;
- In cooperation with other line managers, develop and ensure that the QMP is current and revisions are made as necessary;
- Review and approve all internal QAPPs;
- Review and approve or assist in the review and approval of external QAPPs as needed, in coordination with the QACs; and
- Prepare program QA status reports to EPA based on requests by EPA.

1.5 Responsibilities of the QAPP Coordinator

The QAPP Coordinator is responsible for coordinating the planning and development of QAPPs and QAPP Work Plans. The QAPP Coordinator reports directly to the Environmental Services Program Director, and may also receive assignments from the QA Manager on matters pertaining to QA.

The QAPP Coordinator has the following responsibilities:

- Track and disseminate the ESP's progress in meeting QAPP and QAPP work plan commitments;
- Consult with the planning staff in client programs to prepare recommendations on QAPP and QAPP Work Plan issues.

1.6 Responsibilities of Quality Assurance Coordinator

Each program within the MDNR-WRC/DGLS/DEQ which generates environmental data will have at least one designated QAC. The QAC is the main point of contact for all QA issues within each program. If multiple QACs are designated within a program, each will be assigned an area of responsibility within the program.

The QAC is responsible for:

- Coordinating all QA activities within their respective program;
- Assisting QAPP Project Officers in the development of DQOs and the development of internal QAPPs;

Serving as QAPP project officer when needed;
Assisting Project Managers in the review of external QAPPs;
Approving external QAPPs, including the designation of others, who have sufficient QA training to act on behalf of the QAC for the approval of external QAPPs. A QAC may obtain assistance from other QACs or the QA manager for the review of QAPPs for which the QAC is the project officer, if the QAC determines that additional review would benefit the project; and keeping the QA Manager informed of QA needs, problems, and overall status.

Each regional office may designate a staff member to act as a QA contact for the purpose of coordinating data generation or sampling equipment management within the regional office. In certain circumstances, the regional offices may acquire responsibilities for project management that would require the designation of QA project officers, a QA Coordinator or other related staff roles.

1.7 Responsibilities of the Quality Assurance Project Officer

A QA Project Officer is identified for each QAPP. This person is responsible for preparing the draft QAPP and any addenda, amendments or subsequent revisions needed and ensuring that all QA requirements of the QAPP are met. This person normally has responsibility for overseeing data collection under the QAPP. Typically, the QA Project Officer is also the Project Manager. In some instances, the Project Manager may request that their program QAC serve as the QAPP QA Project Officer.

1.8 Technical Activities or Programs Supported by the Quality System

All of the technical activities are contained in the QAPPs or are referenced in supporting documents, including Standard Operating Procedures.

1.9 QA/QC Roles and Responsibilities of Line Management

MDNR-WRC/DGLS/DEQ Program Directors, as line managers, have overall responsibility for the implementation of all QA requirements within their respective programs.

1.10 Types of Environmental Programs to Which the Quality System Will Be Applied

Normally, the quality system is applied to the following programs within the MDNR-WRC/DGLS/DEQ:

- Air Pollution Control Program
- Environmental Services Program

Geological Survey Program
Hazardous Waste Program
Water Protection Program/Public Drinking Water Branch
Solid Waste Management Program
Water Protection Program/Water Pollution Control Branch
Water Resources Center

Occasionally, environmental data may also be collected in support of the Land Reclamation Program within the MDNR-DEQ. Also, on occasion, environmental data may be collected in support of the Department's Division of State Parks or other agencies such as the State Emergency Management Agency, Missouri Department of Agriculture, U.S. Fish and Wildlife Service, Missouri Department of Conservation, the U.S. Natural Resources Conservation Service, and the U.S. Geological Survey. In these cases, the data is collected to support the natural resource and environmental statutory authority of one or more of the programs identified above.

The MDNR-WRC/DGLS/DEQ will develop and implement a "quality assurance program" as required by 40 CFR Part 58. The requirements of 40 CFR Part 58, Appendix A are used in the development of the *Quality Control Manual for Ambient Air Monitoring*. This document conforms with the requirements of the above cited federal regulation.

1.11 How Management Will Ensure That Applicable Elements of the Quality System Are Understood

Each program within MDNR-WRC/DGLS/DEQ will have a copy of, or Intranet access to, the QMP and will be familiar with the requirements of the document. All QAPPs will be in conformance with the QMP, and those signing QAPPs will have a copy of, and be familiar with, the QMP. In addition, in cooperation with EPA Region VII, periodic training courses and management sessions on QA will be offered for management and technical staff. The Department may further develop training that is specific to the Department's needs including QA refresher courses.

1.12 Dispute Resolution

For those situations in which issues regarding quality assurance are in dispute, resolution should be sought at the lowest management level practicable. Such disputes may occur in situations involving technical issues and management issues.

All parties should make every effort to resolve disputes through discussion and negotiation. Disagreement should be resolved at the lowest administrative level possible. Should agreement not be reached at this level, the issue will be resolved by the senior management team, consisting of affected Program Directors and Division Directors. The Department Director or her designee has final dispute

resolution authority on all department quality assurance issues.

2. QUALITY SYSTEM AND DESCRIPTION

2.1 Quality Management Plan

The QMP will be prepared and revised by the QA Manager in cooperation with other line managers and the QACs. The QMP documents how the MDNR-WRC/DGLS/DEQ plan, implement, and assess the effectiveness of QA/QC operations applied to environmental programs. This process is part of the divisions' overall quality system.

The QMP includes data directly generated by the MDNR-WRC/DGLS/DEQ programs as well as data generated by contractors and subgrantees, and data acquired from outside sources. This includes field and laboratory data gathering activities or investigations that involve the determination of chemical, physical, or biological characteristics related to the environment.

Each of the divisions' programs will have a copy of the approved QMP on file. Implementation of the quality system will be incorporated into the performance planning documents for each program director as part of the directors' performance review to ensure that these expectations are met. Implementation of the quality system will also be included in the performance planning documents for the QACs and the QA Project Officers.

The QMP will be reviewed annually to ensure that all information in the QMP is relevant. Any revisions will be forwarded to the EPA for its consideration. Within five years from the date of approval of this QMP, the QMP will go through a complete review process and be submitted to the EPA for approval.

The review process for any QMPs, which must be prepared by an external party (contractors, subgrantees, etc.) conducting environmental data collection, will be the same as the review process for QAPPs described in Section 2.4.1(b).

2.2 Management Systems Reviews

2.2.1 Quality System Review and Audit

Several activities are necessary to ensure the Department's quality system is effective and is achieving the goals outlined in this QMP. These are Management Systems Reviews (MSR), Technical System Audits (TSA), performance evaluations, internal and external audits, self-audits, peer reviews and the QAPP review and approval process. These are outlined below:

(a) Review of the Quality System and QA Project Plans:

Part of each QAC's responsibility for implementation of the

Department's Quality System is to conduct self-audits, MSR, and TSA in their respective programs and report findings to the QA Manager. This function may be limited by staff training and capacity, and may as an alternative rely on EPA oversight through audits. The QA manager will make recommendations to correct or modify any problems identified. It is the responsibility of each QA Project Officer or Project Manager to ensure thorough review of all internal and external QA project plans and sampling and analysis plans associated with environmental data collection activities. These audits and reviews will help ensure that acceptable QA/QC activities and requirements are included, that DQOs are established prior to the project's inception and that the project will be able to produce data of the type, quantity and quality desired in a documented and cost-effective manner.

(b) External Reviews and Performance Audits:

Effective implementation of the Department's Quality System requires periodic external MSR and performance audits to assess its effectiveness. The results of these reviews and audits will be used to revise the QMP as appropriate. Therefore, all programs will allow their internal and external environmental data collection activities to be subject to external reviews and/or audits of performance.

2.3 Data Quality Objectives

As discussed in Sections 1.2.2(b) and (c), the intended use of the data will be defined before the data collection effort begins. The DQO process will be used for any new data collection efforts initiated. In large part, the extent of the DQO process used is determined by the quality of data needed. However, the MDNR-WRC/DGLS/DEQ will use the basic elements of the DQO process for all data collection efforts. The graded approach will be used in determining the level of QA required. Environmental Services Program staff and the QACs are available to assist in the DQO process. DQOs will be prepared following the current version of *Guidance on Systematic Planning using the Data Quality Objectives Process* (EPA QA/G-4).

2.4 Quality Assurance Project Plans

Each QAPP documents the data quality objectives process and describes how QA/QC is applied to an environmental data operation to assure that the results obtained are of the type, quantity and quality needed and expected.

As stated in Section 1.2.2(d), any environmental data collection effort will require a QAPP. The QAPP will be prepared following the current versions of *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5) and *Guidance for Quality Assurance Project Plans* (EPA QA/G-5).

2.4.1 QAPP Review, Approval and Dissemination Process

- (a) QAPPs for Data Collection by the MDNR-WRC/DGLS/DEQ Programs - The MDNR-WRC/DGLS/DEQ program that indicates the need to collect environmental data is responsible for the initial development of the QAPP utilizing EPA QA/R-5. The program will assign a QA Project Officer(s), who will have this responsibility. The QA Manager, the laboratory and field personnel within the Environmental Services Program and the QACs are available to provide assistance to the Project Officer in preparing the QAPP. The draft QAPP is normally reviewed internally within the respective environmental program by the QA Project Officer's supervisor and by that program's QAC. The draft QAPP is then reviewed by the staff in the Environmental Services Program if that program will analyze samples or conduct other work on the project, and then the QA Manager.

Once the QAPP has been finalized, the approval and signature process occurs in the following order; the QA Project Officer, who will have overall responsibility for the data collection; the QAC; and then the Director of the respective MDNR-WRC/DGLS/DEQ program that will use the environmental data; the Director of the Environmental Services Program, who will collect the data and/or provide any chemical analyses associated with the project; and finally by the QA Manager. Copies of each final QAPP will be available in paper or electronically to each signatory, as well as to each staff member, involved in collection or management of the projects environmental data. All QAPPs will be reviewed annually by the QAPP project officer and revised as needed. At a minimum all QAPPs will be revised and go through the formal approval process every five years.

- (b) QAPPs Where the Data Collection Occurs Externally - When the environmental data is to be collected externally (e.g. contractors, subgrantees, owners and operators of permitted facilities, etc.), a similar review and approval process is used. However, personnel from the external party would serve as the QA Project Officer. The MDNR-WRC/DGLS/DEQ program that will use the environmental data will have the responsibility to ensure that the QAPP is prepared using the requirements of *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5) and the guidance of *EPA Guidance for Quality Assurance Project Plans* (EPA QA/G-5). The QA Manager and the laboratory and field personnel of the Environmental Services Program and the program QAC will be available to provide assistance in reviewing the draft QAPP. The MDNR-WRC/DGLS/DEQ program will also require the external party to utilize an accredited laboratory or submit adequate documentation to the program's QAC or the Project Manager designee to support subsequent data quality assessments. The QAC or designee will sign and/

or approve the external QAPPs, and may request assistance from the QA Manager as needed. Copies of each final QAPP will be available in paper or electronically to each signatory, as well as to each staff member, involved in collection or management of the projects environmental data.

Because of resource constraints and to facilitate the Brownfields process, EPA Region VII may request assistance from Missouri for the review and approval of QAPPs for non-state EPA grantees. The state program is authorized by the EPA to review and approve QAPPs in lieu of the Regional Quality Assurance Manager as signified by the approval of this QMP. Review and approval of non-state EPA Brownfields grantee QAPPs by a state program will be limited to those instances where there is mutual agreement among the parties involved (the state, EPA Region VII, and the grantee), and a relationship has been established between the state program and the non-state EPA grantee following the guidelines established by the state for its Brownfields program. The request for such assistance will be made through the EPA Project Officer in consultation with the Regional QA Manager as necessary. Oversight of the state's QAPP approval process for Brownfields will be part of the MSR process as described in section 11.2.1.2 of EPA's QMP. For Brownfields projects, once the QAPP has been finalized, the approval and signature process occurs in the following order: the QA Project Officer from the external party, who will be responsible for the data collection; the Department's project manager; the Director of the HWP; and finally by the QA Manager. Copies of each final QAPP will be available in paper or electronically to each signatory, as well as to each staff member, involved in collection or management of the projects environmental data.

2.4.2 Certification and Approval of Quality Assurance Project Plans

With the approval of this QMP, the EPA is also approving the MDNR-WRC/DGLS/DEQ to certify and approve all QAPPs both intramural and extramural with the exception of QAPPs developed in support of a Superfund Cooperative Agreement. When the environmental data is to be collected in support of a Superfund Cooperative Agreement, the QAPP will be developed and submitted to the EPA for approval in accordance with 40 CFR Part 35, Subpart O.

Brownfields and State Response Program activities are now funded through State Technical Assistance Grants and no longer funded through the Superfund Trust. They are not subject to 40 CFR Part 35, Subpart O. QAPPs for this work will be reviewed and approved through the same process as other QAPPs and subject to appropriate review by the EPA.

Copies of the QAPPs for federally funded activities will be available for

inspection as part of the EPA's on-site program evaluation activities or upon request.

2.5 Site Sampling Plans/QAPP Addendums

As part of the DQO and QAPP process, a QAPP Addendum and/or a site sampling plan may be prepared for specific environmental data collection efforts that are conducted under generic QAPPs. The QAPP Addendum will identify project specific DQOs and quality control criteria that are different or deviate from what's specified in the generic QAPP. The site sampling plan defines the specific locations of samples to be collected and the specific analyses to be performed on those samples.

The site sampling plan is normally prepared by the field staff in the ESP or a staff member in the MDNR-WRC/DGLS/DEQ program requesting the sampling. If the site sampling plan is prepared by the field staff in the ESP, the QA Project Officer from the MDNR-WRC/DGLS/DEQ program reviews and approves the plan. If the site sampling plan is prepared by a staff member in a MDNR-WRC/DGLS/DEQ program other than the QA Project Officer, a field staff member in the ESP reviews and comments on the plan and the QA Project Officer has final approval. If the Sampling Plan is prepared by the QA Project Officer, a field staff member in the ESP reviews and comments on the plan and the QA Project Officer's Supervisor or program QAC has final approval.

2.6 Standard Operating Procedures

Standard Operating Procedures (SOPs) document administrative and technical activities which are to be conducted in a standardized manner to maintain and facilitate consistency in the quality and integrity of the product. SOPs contain the main elements from the *EPA Guidance for Preparing Standard Operating Procedures* (EPA QA/G-6) and may deviate from this guidance while describing the essential elements of the state's procedures. The format for the Environmental Services Program Field Services and Water Quality Monitoring Sections' SOPs follows that contained in Appendix E. SOPs are developed and implemented for all routine QC requirements for all monitoring programs, repetitive tests and measurements, and for inspection and maintenance of facilities, equipment, and services. The appropriate SOPs are either included or referenced in each QAPP. The Director of the Environmental Services Program is responsible for maintaining the complete and up-to-date set of field and laboratory SOPs, except that DGLS and WRC may maintain SOPs unrelated to samples collected for chemical analysis.

Technical SOPs are prepared by the appropriate technical staff member. The SOP undergoes a peer review. Following a peer review, the SOP is reviewed and approved by a QAC or ESP senior technical supervisor. Administrative SOPs are reviewed and approved by the relevant Program Director.

SOPs are posted on the Department's Intranet.

2.7 Data Quality Assessments

The quality of all data must be assessed, after it is generated and before it is used, in order to ensure that it is satisfying the intended data user's needs and QA requirements. This assessment will be conducted by the program QAC or other staff who have the expertise to conduct these statistical analyses. This assessment should focus on five basic data quality indicators:

- (a) Accuracy - Can data accuracy be determined, how is it determined, and is it acceptable for the planned use?
- (b) Precision - Can data precision be determined, how is it determined, and is it acceptable for the planned use?
- (c) Completeness - Is a sufficient amount of data available for the planned use?
- (d) Representativeness - Generally, how well does the data represent actual conditions at the sampling location, considering the original study design, sampling methods, analytical methods, etc., which were used?
- (e) Comparability - Generally, how comparable is the group of data with respect to several factors, including:
 - consistency of reporting units;
 - standardized siting, sampling, and methods of analysis; and,
 - standardized data format relative to applicable criteria and standards.

All of these factors will initially be considered when designing a study, and will be addressed in all QAPPs. Where applicable, the *Guidance for Data Quality Assessment: Practical Methods for Data Analysis* (EPA QA/G-9) can be used in evaluating the data to determine if the data is of the right type, quality, and quantity to support the intended use. The following are the five steps in DQA process:

1. Review the project's objectives and sampling design
2. Conduct a preliminary data review
3. Select the statistical method
4. Verify assumptions of the method
5. Draw conclusions from the data

3. PERSONNEL QUALIFICATIONS AND TRAINING

It is the policy of the MDNR-WRC/DGLS/DEQ that all personnel performing tasks and functions related to data collection will possess adequate education, training, and experience to satisfactorily perform all technical tasks assigned. These education and training requirements will be incorporated into the Position Description Forms for each individual position. These documents define the level of expertise necessary for the particular staff position. The MDNR-WRC/DGLS/DEQ programs will develop and maintain annual training plans for staff members who are responsible for data collection. The training plans will define the training courses necessary for each staff member to attain or maintain the expertise needed to perform certain tasks associated with the position (e.g. training for field staff involved in sample collection, chemists who conduct the analyses, etc.).

To the extent practicable, recognizing limitations on training availability, budget constraints and staff turnover, all personnel involved in QA work should receive appropriate training for their specific roles.

All personnel involved in QA/QC, or primary or secondary data use should successfully complete the EPA course, *Orientation to Quality Assurance*, or its equivalent.

In addition to the above training, all personnel serving to review and approve QA documents or serving as primary data users should successfully complete the EPA courses; *Introduction to Data Quality Objectives*, *Introduction to Quality Assurance Project Plans*, and *Introduction to Data Quality Assessment* or their equivalents. The QA Manager, the QAPP Coordinator, QA Coordinators and designees who approve external QAPPs should successfully complete the EPA course, *Introduction to EPA Quality System Requirements*.

The planning and accomplishment of this training will be included in performance planning and appraisal documents or training logs maintained by the MDNR-WRC/DGLS/DEQ programs. Adequate training for Department staff will be a high priority. The Department's quality staff may assist in providing training for Department staff, recognizing that the EPA may remain the primary source of training and that the EPA provides appropriate modules for quality assurance training.

The Department has been an active participant in the EPA QA/QC training programs offered through Region VII. The Department has encouraged both its line staff and managers to attend the training program. The EPA Regional QA Manager will advise the QA Manager of available QA training opportunities for the divisions' staff. The effectiveness of QA training received by staff will be evaluated through internal and external assessments, evaluations, audits and other means.

4. PROCUREMENT OF ITEMS AND SERVICES

4.1 Procurement

The Missouri Office of Administration, Division of Purchasing and Materials Management is responsible for procurement. This agency maintains state purchasing regulations, specifications and procedures (Title 1 Code of State Regulations, Division 40, Chapter 1) which ensure the quality of contracted activities. Technical staff requesting the service provides input and are normally part of the bid evaluation team to ensure that the contract awarded meets the quality needed. The Office of Administration is responsible for ensuring the contractor meets the terms and conditions of the contract. If the contract involves the collection or analysis of environmental data, all appropriate QA requirements will be met.

The Environmental Services Program Chemical Analysis Section has an SOP which applies to the procurement, receipt, and acceptance of supplies used for all procedures performed in the laboratories. Also, the ESP has procurement procedures, which include review and approval by supervisory staff of all purchases for field equipment and supplies.

4.2 Contracts, Subgrants, and Acquired Data

Any contracts for services, subgrants or agreements entered into by MDNR-WRC/DGLS/DEQ which involve the collection of environmental data will ensure that all appropriate QA requirements are met and documented. The varied responsibilities of the MDNR-WRC/DGLS/DEQ necessitate the use of data acquired by the Department that was independently managed, collected, and analyzed. To the extent possible, the Department will involve itself in these activities so that these external sources produce quality data. It is the goal of the Department that all environmental data used by the Department, including acquired data, is scientifically defensible.

External QAPPs will be developed for all data generated and reported to the Department, except where noted below. MDNR-WRC/DGLS/DEQ can develop standardized or generic QAPPs for certain types of external activities that generate data, for example:

- (a) Voluntary Cleanup projects or projects conducted under risk-based corrective action procedures,
- (b) Tank site cleanups conducted under Missouri Risk Based Corrective Action Process for Petroleum Storage Tanks,
- (c) Permitted Wastewater Treatment Plants routine compliance monitoring data,
- (d) Public Water Supply compliance monitoring data analyzed at a Certified Drinking Water Laboratory, and

- (e) Miscellaneous data acquired by the Department that can be classified for specific uses, according to its age, quantity, accuracy, precision, completeness, representativeness or comparability.

5. DOCUMENTATION AND RECORDS

Adequate precautions will be taken during the reduction, manipulation, and storage of data in order to prevent the introduction of errors or the loss or misinterpretation of data. A Laboratory Information Management System (LIMS) maintains all information and data on all environmental samples received and analyzed at the Environmental Services Program laboratory. The system is utilized to log in samples collected, record results of analyses, and generate sample analyses and management reports. The LIMS is backed up daily. All backups are sent off-site for long-term storage. System maintenance, including checking for operating system errors, LIMS system errors, and database integrity, is performed weekly.

Maintenance of records is the responsibility of the Department's Custodian of Records. Each QAC should be aware of the requirements for maintenance of records and ensure that individual project officers are sufficiently maintaining the records necessary for every QAPP. Information to maintain includes but is not limited to: significant QA problems, corrective actions, corrective action progress plans and recommendations. The QACs will provide this information to the QA Manager, who will maintain this information on file.

The development and maintenance of state QA programs will also be included in the annual discussions between the MDNR-WRC/DGLS/DEQ management and the EPA during the Performance Partnership Agreement process.

The QA Manager identifies all QA and QC documents listed in the MDNR-WRC/DGLS/DEQ Agency Records Disposition Schedule. The MDNR-WRC/DGLS/DEQ will follow the current Agency Records Disposition Schedule approved by the Secretary of State's Office for all QA and QC documents and records of environmental data.

6. COMPUTER HARDWARE AND SOFTWARE

This section describes how WRC, DGLS and DEQ manage the computer hardware and software used to support environmental programs and operations. It also describes the roles and responsibilities assigned to management and staff.

- How Hardware is Evaluated to Ensure That it is Appropriate For The Intended Application - Hardware purchases are made through a formal review process called the Data Processing Services Request System (DPSR). This process starts

with local information technology support staff. These staff members are data processing professionals who develop the annual computer hardware purchasing plans for the programs in the division. Additional levels of review are provided, as needed, by Senior Information Technology Services Division (ITSD) staff assigned to the Department.

- How Hardware Changes Are Controlled to Reduce Performance Impact - The Department's executive staff approved a policy entitled *Minimum Computer Configurations*. This policy specifies minimum standards for desktop and laptop hardware and software. The recommended configurations are periodically reviewed by ITSD staff to determine if the Department should upgrade the minimum configuration. The DPSR review process also helps to ensure that purchases meet or exceed this policy.
- How Software Developed by ITSD is Evaluated to Meet User Requirements - The ability of software developed in-house to meet user needs is based on two sources of input. First, users are asked to help develop the original specifications for their application. Secondly, users submit requests for additional features or problem corrections that are tracked in databases assigned to each major application. Users are also asked to help determine the order in which new features are added and problems should be prioritized for resolution.
- How Purchased Software is Evaluated to Meet Department Standards - The Department's executive staff approved a policy entitled *Software Standards*. This policy describes how the Department's standard software is evaluated and selected. The Information Technology Services Division staff assigned to the Department is responsible for maintaining a current list of standard software. This software standard is periodically reviewed by the ITSD to determine if it is in the interest of the Department to continue to use and support a particular software or to add software to the list.
- How Data Quality and Accuracy Standards Are Met - The computer applications that process data, include data entry edit routines and batch edits to ensure the data in the systems meet defined data quality and accuracy standards.

7. PLANNING

The primary planning documents utilized by the MDNR-WRC/DGLS/DEQ are: the budget documents; the Department's Integrated Strategic Plan; the annual planning process documents prepared by the MDNR-WRC/DGLS/DEQ programs and regional offices; the Performance Partnership Agreement and Performance Partnership Grant work plans with EPA Region VII; the work plans associated with other federal grants and cooperative agreements; the annual work plans between the MDNR-WRC/DGLS/DEQ programs and the regional offices; and the QAPPs and QAPP work plans, which are also used as a planning document to project the environmental data operations for the fiscal year.

As discussed in Sections 1.2.2(b) and (c) and Section 2.3, when an environmental data need has been identified, appropriate technical staff begin the planning process and development of a QAPP. The DQO process will be used as a tool to plan the process. MDNR-WRC/DGLS/DEQ also have ongoing environmental data operations where the data needs are relatively constant from year-to-year. The QAPPs or QAPP work plans for these data operations are reviewed and updated on an annual basis to meet the needs of the user of the environmental data.

8. IMPLEMENTATION OF WORK PROCESSES

Ultimately, the Directors of the MDNR-WRC/DGLS/DEQ are responsible for ensuring that the work is performed in accordance with appropriate planning documents. The QMP provides the framework for defining the procedures to ensure that environmental data operations are implemented in accordance with an approved QAPP. The QAPP describes in detail the necessary QA/QC, and other technical activities that must be implemented to ensure that the results of the work performed will meet the stated performance criteria. The QMP will undergo a complete review and be revised as appropriate every five years as discussed in Section 2.1. Annual changes may occur, if needed, to reflect changes in the MDNR-WRC/DGLS/DEQ policies or procedures.

9. ASSESSMENT AND RESPONSE

9.1 Review of the Quality Management Plan

As discussed in Sections 2 and 8, the QMP will be reviewed annually and changes made, if necessary. The QA Manager will be responsible for coordinating this effort and ensuring that any needed changes are made. The QMP will be revised and undergo review and approval by the EPA every five years.

9.2 Assessments/Evaluations

Several types of assessment tools are employed by the MDNR-WRC/DGLS/DEQ to ensure the effectiveness of the quality system.

9.2.1. Management Systems Reviews

A quality system audit (QSA) or management system review (MSR) is a qualitative evaluation of a data collection operation and/or organization(s) to establish whether the prevailing quality management structure, policies, practices, and procedures are adequate for ensuring that the type and quality of data needed are obtained. They are used to determine the effectiveness of, and adherence to, the quality system and the adequacy of resources and personnel provided to achieve and ensure quality in all activities.

The MSRs will be conducted by a review team with a minimum of two members according to the most current version of *Guidance for Preparing, Conducting, and Reporting the Results of Management Systems Reviews*, EPA QA/G-3 MSRs of MDNR-WRC/DGLS/DEQ programs will include a random sampling of the projects for that program (a list of the projects will be requested from the program as part of the MSR) to determine if the projects were correctly identified as including environmental data generation and/or use and if the QA requirements,

including approved QAPPs prior to environmental data generation and/or use, were applied and adequately addressed. The MSR will consist of meetings with the management of the MDNR-WRC/DGLS/DEQ reviewed program, interviews with personnel, and file reviews.

Results of the MSR will be reported to management through a Draft Findings Report. The reviewed program will be given the opportunity to respond to the Draft Findings Report and to develop a Corrective Action Plan to address any issues identified as requiring corrective action. The Corrective Action Plan must identify the corrective action, responsible staff, and the projected completion date for each finding requiring corrective action. The QA Manager will review the Corrective Action Plan and prepare any necessary responses for discussion with the management of the reviewed organization or program.

Once any outstanding issues have been addressed and the corrective actions agreed upon by the QA Manager and the reviewed program's management, a Final Report will be issued. The confirmation and implementation of the corrective actions will be done through the submittal of associated documents (e.g., a revised QAPP) to the QA Manager for review or through a follow-up evaluation.

9.2.2. Management Independent Assessments

EPA Region VII conducts annual evaluations and the Inspector General's Office conducts periodic evaluations of the state's environmental programs. These evaluations normally include some type of review of the program's quality management structure. Comments and recommendations from these evaluations are used by the environmental program and division management to take any corrective actions which may be needed. The QA Manager will respond to the EPA regarding the actions that are taken.

9.2.3. Technical System Audits

Technical systems audits (TSAs) are a thorough, systematic, on-site, qualitative audit of facilities, equipment, personnel, training, procedures, recordkeeping, data validation, data management, and reporting aspects of field and laboratory activities.

A TSA can be conducted with the assistance from Region VII, as requested. The most current version of the document *Guidance on Technical Audits and Related Assessments for Environmental Data Operations*, EPA QA/G-7, can be used to assist with the conduct of a TSA. The requirement for a TSA should be described in a project specific

or generic QAPP. A TSA will result in completion of an assessment report in a timely manner including appropriate levels of review and approval as well as how and when corrective actions are to be taken in response to the findings.

Field audits of personnel, who conduct environmental sampling activities, are conducted. The staff person assigned to conduct audits has the authority to issue a stop work order upon finding a significant condition that would adversely affect the quality and usability of the data. The field auditor has the responsibility to initiate and implement response actions associated with findings identified during the field audit. The procedures require that any response actions be properly addressed by the field personnel.

Assessment and response action for analytical data quality are outlined in the SOP Environmental Services Program (ESP)-Chemical Analysis Section (CAS)-2090 "Quality Control Procedures and Quality Control Charts," and will be conducted by the supervisor of the analytical laboratory in the ESP.

9.2.4. Technical Independent Assessment

The analytical laboratory participates in the semi-annual EPA Performance Audit Sample Program – Water Pollution (WP) and Water Supply (WS) Series. Data resulting from participation in this program are reviewed for accuracy and any problems are addressed.

EPA Region VII conducts periodic Laboratory On-Site Evaluations to assess the laboratory procedures in order to maintain certification under the requirements of the Safe Drinking Water Act and for other state operated, federally-funded programs.

EPA Region VII, at the request of the MDNR-WRC/DGLS/DEQ, conducts QA/QC oversight of field inspection activities which include sample collection. Reports of the evaluations are prepared and sent to the appropriate MDNR-WRC/DGLS/DEQ program for review. Corrective actions are taken as appropriate on any deficiencies reported.

MDNR-WRC/DGLS/DEQ program staff who have been designated to review and approve external QAPPs will be periodically assessed and evaluated by each respective programs QAC. QACs will conduct an independent review of an external QAPP being reviewed by a staff person designated to review and approve external QAPPs. Any problems or discrepancies noted in the designee's review will be corrected by the QAC.

Any necessary corrective action for the staff person to remain a designee to review and approve external QAPPs will be made by the QAC to the respective program director and the QA Manager.

10. QUALITY IMPROVEMENT

The QA Manager has the overall responsibility for identifying, planning, implementing, and evaluating the effectiveness of quality improvement activities and ensuring that corrective actions are taken to address QA issues related to environmental data operations. The project officers identified for each QAPP, field personnel, and laboratory personnel are responsible for identifying and recommending appropriate actions to correct any QA deficiencies. Periodic coordination meetings are held to address issues related to specific QAPPs and to recommend any necessary corrective actions.

EPA Region VII, in the performance of their responsibilities to conduct annual evaluations of the state's environmental programs and laboratory on-site evaluations, also identifies any QA deficiencies. Corrective actions can then be taken to maintain and improve the effectiveness of the quality system.

APPENDIX A

Department Organization Chart

<http://dnr.mo.gov/shared/orgchart.htm>

APPENDIX B

Map of the Regional Offices and Satellite Offices

<http://dnr.mo.gov/regions/regions.htm>

APPENDIX C

List of Typical Quality Assurance Project Plans for Environmental Data Operations
(current approved QAPPs are displayed on the department's Intranet)

Air Pollution Control Program

Air Toxics
IMPROVE
SNS/PM 2.5
PM 2.5 Speciation

Hazardous Waste Program

RCRA Compliance/Enforcement
RCRA Permits
LPST
TSCA-PCB
Kansas City Plant
DSMOA
FUSRAP
GSA-Federal Complex Bannister Road
Mallinckrodt C-T Decommissioning
Former USDA/CCC Grain Storage Site
FUDS Brownfields
Pre-Remedial Site Assessment (PA/SI)
WSSRAP
State Lead Registry
Jasper County Workplan
Brownfield State Response Workplan
Brownfield Mine Inventory Workplan
Lee Chemical
Natural Resources Damages
Oak Grove Village
Quality Plating
Solid State Circuits
Valley Park Wainwright
Bee Cee Manufacturing
Cooperative Program

Solid Waste Management Program Quality Assurance Project Plans

Water Sampling and Methane Gas Monitoring at Solid Waste Disposal Facilities

Water Protection Program/Public Drinking Water Branch

Public Drinking Water Systems Monitoring

Water Protection Program/Water Pollution Control Branch

Bioassessment Monitoring

Complaint Sampling

Compliance Monitoring/Wastewater Sampling

Fish Tissue Monitoring

Herbicide Monitoring of Public Drinking Reservoirs

Inspection Sampling

Low Flow Surveys

Sediment Monitoring Network

Volunteer Water Quality Monitoring

Wadeable Streams Network

Hinkson Creek

Wasteload Allocations/Special Studies

Water Resources Center

Pesticides Study

Division of State Parks

E.Coli Monitoring

Environmental Services Program

Environmental Emergency Response

Department of Health and Senior Services

Methamphetamine Sampling

APPENDIX D

Glossary of Quality Assurance Terms and Acronyms

Terms

Assessment – the evaluation process used to measure the performance or effectiveness of a system and its elements. As used here, assessment is an all-inclusive term to denote any of the following: audit, performance evaluation, management system review, peer review, inspection, or surveillance.

Audit – a systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.

Data quality assessment – a statistical and scientific evaluation of the data set to determine the validity and performance of the data collection design and statistical test, and to determine the adequacy of the data set for its intended use.

Environmental data operations – work performed to obtain, use, or report information pertaining to environmental processes and conditions.

Inspection – examination or measurement of an item or activity to verify conformance to specific requirements.

Management – those individuals directly responsible and accountable for planning, implementing, and assessing work.

Management system – a structured, non-technical system describing the policies, objectives, principles, organizational authority, responsibility, accountability, and implementation plan of an organization for conducting work and producing items and services.

Management system review – the qualitative assessment of a data collection operation and/or organization(s) to establish whether the prevailing quality management structure, policies, practices, and procedures are adequate for ensuring that the type and quality of data needed are obtained.

Peer review – a documented critical review of work by qualified individuals (or organizations), who are independent of those who performed the work, but are collectively equivalent in technical expertise. A peer review is conducted to ensure that activities are technically adequate, competently performed, properly documented, and satisfy established technical and quality requirements. The peer review is an in-depth assessment of the assumptions, calculations, extrapolations, alternate interpretations, methodology, acceptance criteria, and conclusions pertaining to specific work and of the documentation that supports them.

Performance audit (measure) – a type of audit in which the quantitative data generated in a measurement system are obtained independently and compared with routinely obtained data to evaluate the proficiency of an analyst or laboratory.

Process – a set of interrelated resources and activities which transforms inputs into outputs. Examples of processes included analysis, design, data collection, operation, fabrication, and calculation.

Quality - the totality of features and characteristics of a product or service that determine its ability to meet stated or implied needs and expectations of the user.

Quality assurance (QA) – an integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process item, or service is of the type and quality needed and expected by the client.

Quality assurance project plan (QAPP) – a formal document describing in comprehensive detail the necessary QA, QC, and other technical activities that must be implemented to ensure that the results of the work performed will satisfy the stated performance criteria.

Quality control (QC) – the overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the state requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality.

Quality improvement – a management program for improving the quality of operations. Such management programs generally entail a formal mechanism for encouraging worker recommendations with timely management evaluation and feedback or implementation.

Quality management plan – a document that describes the quality system in terms of the organizational structure, functional responsibilities of management staff, lines of authority, and required interfaces for those planning, implementing, and assessing all activities conducted.

Quality system – a structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, documenting, and assessing work performed by the organization and for carrying out required QA and QC activities.

Record – a completed document that provides objective evidence of an item or process. Records may include photographs, drawings, magnetic tape, or other data recording media.

Scientifically defensible data – information of known and documented quality that is qualified to be used for specified purposes.

Self-assessment – assessments of work conducted by individuals, groups, or organizations directly responsible for overseeing and/or performing the work.

Standard operating procedure (SOP) – a written document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps, and that is officially approved as the method for performing certain routine or repetitive tasks.

Technical system audit (TSA) – a thorough, systematic, on-site, qualitative audit of facilities, equipment, personnel, training, procedures, recordkeeping, data validation, data management, and reporting aspects of a system.

Acronyms

CERCLA	Comprehensive Environmental Response, Compensation and Recovery Act
DEQ	Division of Environmental Quality
DGLS	Division of Geology and Land Survey
DPSR	Data Processing Services Request System
DQO	Data quality objectives
EER/FSS	Environmental Emergency Response and Field Services Section
EPA	Environmental Protection Agency
ESP	Environmental Services Program
LIMS	Laboratory Information Management System
MDNR	Missouri Department of Natural Resources
MSR	Management Systems Reviews
NPDES	National Pollutant Discharge Elimination System
QA/QC	Quality Assurance/Quality Control
QAC	QA Coordinator
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
RCRA	Resource Conservation and Recovery Act
SOP	Standard Operating Procedure
TSA	Technical System Audit
TSCA	Toxic Substance Control Act
WP	Water Pollution
WRC	Water Resources Center
WS	Water Supply

APPENDIX E

Requirements for Field Services and Water Quality Monitoring Standard Operating Procedures

<http://n-nr1ntra.ads.state.mo.us/env/esp/SOP/MDNR-ESP-400%20WritingSOP.pdf>

APPENDIX F

Reference Documents

- EPA Requirements for Quality Management Plans (EPA QA/R-2), March 2001
- EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5), March 2001
- Guidance for Developing Quality Systems for Environmental Programs (EPA QA/G-1), November 2002
- Guidance on assessing the adequacy and effectiveness of an environmental quality system (EPA QA/G-3), March 2003
- Guidance on Systematic Planning for Data Quality Objectives Process (EPA QA/G-4) February 2006
- Guidance on Quality Assurance Project Plans (EPA QA/G-5), December 2002
- Guidance on Choosing a Sampling Design for Environmental Data Collection (EPA QA/G-5S), December 2002
- Guidance on Quality Assurance Project Plans for Models (EPA QA/G-5M), December 2002
- Guidance for Preparing Standard Operating Procedures (EPA QA/G-6), March 2001
- Guidance on Technical Audits and Related Assessments (EPA QA/G-7), January 2000
- Guidance on Environmental Data Verification and Validation (EPA QA/G-8) November 2002
- Guidance on Data Quality Assessments: Practical Methods for Data Analysis (EPA QA/G-9), July 2000
- Guidance for Developing a Training Program for Quality Systems (EPA QA/G-10), December 2000
- Guidance on Basic Quality Assurance and Quality Control Procedures, and Good Engineering Principles/Practices That may be Used in the Design, Construction, or Operation of Environmental Technologies. (EPA QA/G-11), January 2005
- Overview of the EPA Quality System for Environmental Data and Technology (EPA/240/R-02/003), November 2002
- Quality Management Plan for Region 7, September 2000