Quality Management Plan

for
Surface Water Monitoring and Assessment

Water Quality Control Division
Colorado Department of Public Health and Environment

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ACRONYMS

DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
EPPMO	Enterprise Portfolio Project Management Office
EQuIS	Environmental Quality Information System
IPG	Individual Performance Goal
IT	Information Technology
LSD	Laboratory Services Division
OIT	Office of Information Technology
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QMC	Quality Management Council
QMP	Quality Management Plan
SAP	Sample Analysis Plan
SDWP	Safe Drinking Water Program
SOP	Standard Operating Procedure
WAP	Waste Analysis Plan
WWTP	Wastewater Treatment Plant

1.0 EXECUTIVE SUMMARY

This Quality Management Plan (QMP) was prepared in accordance with the Environmental Protection Agency (EPA) requirements specified in *EPA Requirements for Quality Management Plans*, *QA/R-2* (EPA 2001a). These specifications are defined in Federal Regulations (40 C.F.R. Part 31.45) and apply to all non-EPA organizations conducting environmental programs that are funded by EPA.

Personnel in the Water Quality Control Division (division) use quality management processes during all operations that involve the collection, manipulation, and utilization of environmental data. This QMP has been designed to define the quality assurance goals, the methodology, and criteria for attaining those goals. It is the expressed goal of the division to use only those analytical data that are both reliable and have a defined level of quality. The level of quality must be sufficient to support the division's mission and individual program/project objectives.

The guidelines presented in this document apply to all division efforts during which chemical/physical/biological samples and field measurements are taken for the purpose of conducting tests and generating environmental data. The standards apply to activities that are conducted directly by division personnel, activities performed under contracts, activities performed under EPA grants, and activities performed under any intergovernmental agreement when resulting environmental data is intended for use in EPA funded programs. The guidelines are intended to be applicable to all programs operating in the division.

The division defines in this document the mandatory use of Quality Assurance Project Plans (QAPPs) with a minimum number of acceptable elements. The order of these elements is insignificant, but a plan must address all of the elements. Sampling plans for projects actively in place and generating data should not be rewritten, but need to be examined to verify compliance with the guidelines and goals presented in this QMP.

This plan recognizes there are times when sampling activities cannot be planned in advance. However, environmental data generated during these times must withstand review and meet the same quality rigor presented in this plan.

The division will utilize Standard Operating Procedures (SOPs) as a primary tool in implementing this QMP. This QMP is intended to be a flexible and dynamic tool, which evolves as the division's mission and goals change. This document will be revised every five years.

2.0 DOCUMENT PURPOSE AND ORGANIZATION

A quality system describes the policies and procedures for ensuring that processes, products, or services meet stated expectations or specifications. According to EPA, "*all EPA and non-EPA organizations conducting environmental work on behalf of EPA which acquire, generate, compile, or use technical data and technology are required to establish and implement a quality system*". For non-EPA organizations, such as the division, this requirement applies to all environmental programs that are funded by EPA and is defined in Federal Regulations (40 C.F.R. Part 31.45).

A QMP documents an agency's quality system. This QMP describes the quality management process the division will use to maintain a quality system consistent with the EPA

requirements and the division's requirements. EPA has listed the following activities that require a QMP:

- Characterization of environmental or ecological systems and/or the health of human populations.
- Direct measurements of environmental conditions or releases, including sample collection, analysis, evaluation, and reporting of environmental data.
- Use of environmental data collected for other purposes or from other sources (also termed "secondary data"), such as published literature, industry surveys, compilations from computerized data bases and information systems, or results from computerized or mathematical models of environmental processes and conditions, which are used for decision making purposes.
- Collection and use of environmental data pertaining to the occupational health and safety of personnel in EPA facilities (i.e., indoor air quality measurements) and in the field (i.e., chemical dosimetry, radiation dosimetry).

This QMP was prepared in accordance with *EPA Requirements for Quality Management Plans*, *QA/R-2* (EPA 2001a). EPA has identified ten elements that must be addressed in a QMP:

- Management and organization.
- Quality system description.
- Personnel qualifications and training.
- Procurement of items and services.
- Documentation and records.
- Computer hardware and software.
- Planning.
- Implementation of work processes.
- Assessment and response.
- Quality improvement.

These elements are addressed in the remaining sections of this QMP.

3.0 MANAGEMENT AND ORGANIZATION

3.1 STATEMENT OF QUALITY ASSURANCE POLICY

The division will have a policy to implement, operate, and maintain a quality assurance and quality control (QA/QC) program to ensure that all environmental data collected, generated, and released is scientifically valid, defensible, and is of acceptable precision and accuracy. This policy is to apply to all data whether it is for internal or external use. The division will adhere to the requirements of this QMP in order to assure that all projects undertaken meet QA/QC expectations. This QA/QC program will be implemented largely through:

- Mandatory QA/QC training for certain identified job functions.
- Mandatory use of program specific QAPPs.
- Mandatory use of Sampling and Analysis Plans (SAPs) for program-specific projects.
- Implementation of SOPs.

No project that generates environmental data will be undertaken until approved plans (QAPP and SAP) meeting all elements of this QMP are in place. This QMP is to be reviewed annually and revised as necessary to ensure the continued generation of quality data.

3.1.1 DEFINITION OF QA/QC

Quality Assurance (QA) is an integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process, item, or service is of a type and quality needed and expected. With respect to this QMP, the production of reliable, accurate, and verifiable data will be expected.

Quality Control (QC) is defined as those activities that are performed to document that a process, item, or service is meeting defined standards and verify that stated requirements have been met. The defined standards and requirements of this QMP will be the generation of quality data.

3.1.2 IMPORTANCE OF QA/QC

The division is involved in collecting environmental data or overseeing environmental data collection in six general categories:

1. Identify the presence of environmental contaminants in areas of potential exposure to humans or the environment.
2. Determine impacts of environmental contaminants on human health and ecosystems.
3. Determine whether, how, and by whom such threats to human health and the environment should be remedied.
4. Set stream standards and monitor compliance with the Colorado Water Quality Control Act.
5. Verify compliance with the Colorado Primary Drinking Water Regulations.
6. Evaluate the impacts, if any, of efforts to mitigate natural or man induced impacts on the water resource.

QA/QC is crucial to the functions of this division and is critical to maintaining the scientific credibility of the data on which informed decisions are based.

3.1.3 GOALS

- To assure that sampling activities are well planned and designed to address the needs and goals of the individual project.
- To assure the production of reliable and accurate data.
- To support decisions made on the basis of analytical data.
- To facilitate the timely identification of problems and implement corrective actions.
- To provide for continuous improvement in division operations.
- To provide a point of focus within the division for QA/QC activity.

3.2 ORGANIZATION AND RESPONSIBILITIES

The division is divided into two major programmatic areas; the Clean Water Program and the Safe Drinking Water Program (see Section 15.0 for an organizational chart). These programs

are further divided into sections and units. Additionally, there are five units within the division's Administration Program.

Generally, quality system, QA management, and QMP coordination are the responsibility of the QA Officers (QAOs) and require ultimate approval of the two Program Managers. Within the Watershed Program, the Environmental Data Unit has assigned a portion of one FTE in the unit as its QAO. This staff position oversees the data generated primarily by the unit and for the data generated by the other units within the Watershed Program. This data is utilized primarily by units within the Watershed Program and Permits Section. The Field Services Section also has an assigned QAO. This staff position oversees the data generated by the Field Services Section. This data is utilized primarily by units within the Clean Water Program and Safe Drinking Water Program.

Implementation of the QMP and ensuring that data quality objectives are met is performed within each program or section as part of its project implementation. Review and approval authority of program QAPPs and SAPs are also conducted within each program or unit by the project manager. Unit specific activities will be performed by designated staff within each unit, **with guidance from either the Environmental Data Unit's QAO or the Field Services Unit's QAO, depending on the activity, to ensure** QMP objectives are being met.

3.2.1 MANAGEMENT AND STAFF RESPONSIBILITY

The QAOs will advise Program Managers, Unit Leaders, and staff on technical issues associated with analytical methods, sampling, and QAPP design and implementation. Knowledge and familiarity with facilities, projects, and program mission are necessary for realistic implementation of this QMP. Through a review and approval process the Program Managers, Unit Managers and staff are individually responsible for assuring that QAPPs are capable of producing reliable work, which meet stated project needs.

Staff, functioning as project leaders, is assigned projects by the appropriate Program Manager or Unit Manager, consistent with the unit work plan. Project leaders are responsible for SAPs meeting the minimum requirements outlined in this QMP. Project leaders will be required to report back to Program Managers or Unit Managers, who will be required to report QMP activities to the QAO.

For dispute resolution when data or procedures are called into question, the QAO will serve as the first step to resolve a dispute internally. The Colorado Department of Public Health and Environments (department) Environmental Programs Quality Management Council (QMC) will serve as the first line for dispute resolution should a program be unable to determine a satisfactory path to resolve a dispute internally regarding, data, samples, sample analysis, external laboratories, or any facility, or personnel involved with environmental data collection or analysis then the QMC will serve as the mediator in such disputes. The protocol for calling into question environmental data collection or analysis will involve referencing the appropriate regulations, then referencing the SOP for the matrix or analysis. Should a resolution be unattainable at the QMC level, the matter may be escalated up the proper chain of command, including referral to the Director of Environmental Programs.

3.3 GENERAL DATA GENERATION POLICY

All analytical data collection plans must be adequately addressed in a QAPP, which may

include specific SAPs, SOPs, or Waste Analysis Plans (WAPs). The programs allow the use of modular SAPs, SOPs, and components of a QAPP to cover multiple operations of a similar nature at a particular site or multiple operations of a similar nature at different sites. Any reference to a QAPP in this document shall be construed to also pertain to any of the programs' associated analytical data acquisition plans. Each separate analytical data acquisition plan must have review and approval for the specific data collection activities to which it relates.

Analytical data generated to comply with applicable sections of the Colorado Water Quality Control Act (Colo. Rev. Stat. section 25-8-101 et seq., 2006), The Basic Standards and Methodologies for Surface Water, Regulation No.31 (5 CCR 1002-31, 2016), Colorado Discharge Permit System Regulations, Regulation No. 61 (5 CCR 1002-61, 2015), or the Colorado Primary Drinking Water Regulations, Regulation No. 11 (5 CCR 1002-11, 2015), require that the analytical methodology will be carried out in accordance with requirements as specified within the regulations.

For other activities where there is not a required analytical method, the program may utilize or allow the use of any applicable, appropriate, and verifiable analytical methodology which meets the data quality requirements of the project, provided that the method has been determined to be adequate. For those analytical problems undefined by guidance, the program may use or approve any analytical approach, which produces usable data with known performance characteristics.

3.3.1 THE USE OF QAPPs AND SAPs

QAPPs describe the activities of programs involved with the collection of data or acquisition of environmental information generated from direct measurements, such as sampling. Whenever these activities are undertaken they must be adequately addressed in a QAPP. The scope and required elements for QAPPs are discussed in the Quality System and Description section of this document.

An important feature of the division's quality management system is the use of modular SAPs, as a component of a QAPP. SAPs address a subset of the required QAPP elements and form a self contained study plan for specific projects, or multiple operations of a similar nature. Any reference to a QAPP in this document shall be construed to also pertain to any associated SAP. Each separate SAP must have review and approval for the specific data collection activities to which it relates.

3.4 POLICY ON SAMPLES OF OPPORTUNITY

Sampling events may not always be a planned activity. Some sampling events do not allow for a formal analytical data acquisition plan. These events may be driven by public health concerns, or genuine emergencies in which case the collector has determined that an immediate threat to human health or the environment exists and/or the situation may not be apparent or accessible after time is taken for planning activities. Such samples are collectively referred to as "samples of opportunity". In order to conserve resources, maximize information, account for the stated purpose of the sample in a reasonable time, and allow for the safe gathering of these samples the division reserves the right to employ expertise within the division to formulate such plans. Prior to collection of samples, field activities will be defined. If necessary, a QAPP or SAP, will be filed within 30 days of the sampling, and

reviewed for approval by the appropriate project manager or Unit Manager. All data will be examined relative to QC criteria and corrective measures will be initiated where and when the QC criteria are exceeded. The data quality objectives or reasons for the collection of data will be reconciled with data gathered.

3.5 TYPES OF ACTIVITIES SPECIFICALLY COVERED BY QMP

- Data generated by field sampling and laboratory analysis.
- Data generated to determine compliance status of drinking water or wastewater treatment facilities or for enforcement actions.
- Data generated by non-point source projects.
- Data generated through modeling efforts.
- Data generated by the SDWP Local Assistance Unit for special studies for optimization and improvement, sampling to determine type of source water, and other operational sampling.
- Data generated from sources outside of the division, such as existing data.

Field activities that would be covered include not only the collection of samples, but observed and recorded field observations, performing analyses in the field and in field laboratories. Physical measurements and observations in the field would include flow measurements, chlorine residual, pH, temperature, specific conductance, nitrate, dissolved oxygen, and turbidity.

Biological and physical monitoring and sampling activities, such as habitat evaluations and species identification/diversity assessments are also covered. The QAPP must describe methods of collection, preservation, transportation, and documentation for each of these activities.

3.5.1 SECONDARY/EXISTING DATA

This document requires that all environmental data used by the division must be known and documented quality. The terms “secondary data” and “existing data” are used interchangeably to describe environmental data previously collected from other projects, including external to the division. The purpose of this section is to describe project information that should be included in a quality assurance plan (i.e. QAPP) for environmental projects based partly or solely on secondary data.

For instance, project teams within the division may use secondary data to develop sampling designs while planning their own investigations, such as a QAPP for surface water monitoring. Data that may be used in the development of such QAPPs may originate from a number of sources, including other studies, government database, etc.

Therefore, before using secondary data, project team members should evaluate external data to identify any limitations on their usage. It is important to ensure transparency in decision making and reasons for including or even excluding certain data from use.

4.0 QUALITY SYSTEM AND DESCRIPTION

4.1 MANDATORY USE OF QAPPs AND SAPs

All data collection conducted by or on behalf of the division or acquisition of environmental information generated from direct measurements, such as sampling, must be addressed in a QAPP and associated SAPs. These plans should be developed per the requirements specified in *EPA Requirements for Quality Assurance Project Plans*, QA/R-5 (EPA 2001b).

The use of QAPPs and modular SAPs is intended to allow for multiple SAPs to be used within a single QAPP. Each QAPP thus serves as an umbrella document that addresses the common elements of the programs, projects, and organizational units that collect data or samples. SAPs provide details of one-time or stand alone project sampling plans and only address a subset of the elements. Thus, the content of each SAP does not have to repeat information already covered in the QAPP and only needs to reference the elements or when appropriate it can add specifics or more detail to information in the QAPP.

The division, consistent with EPA Region 8 guidance, requires that at least 16 of the 24 elements required by EPA be addressed adequately before a QAPP and associated SAPs may be approved. A brief summary of each is provided here, but a full description of each element may be found in *Guidance for Quality Assurance Project Plans*, EPA QA/G-5 (EPA 2002).

These 16 elements are:

Project Management

These elements define who is responsible for implementation and approval of a sampling plan. The purpose of sampling, the measurements needed, quality standards, criteria, and objectives are included in these elements. Clearly stated project objectives, or Data Quality Objectives are required to be developed.

- **A1** Title and Approval Sheet
- **A2** Table of Contents
- **A4** Project/Task Organization
- **A5** Problem Definition/Background
- **A6** Project/Task Description
- **A7** Data Quality Objectives for Measurement Data

Measurement/Data Acquisition

These elements outline experimental design and anticipated project activities. These elements define the sampling matrix, guidelines in selecting samples, sampling equipment, decontamination requirements, forms/labels needed, and custody requirements. The parameters of interest, the performance requirements of analytical methods, and discusses the quality control necessary are identified in these elements. Acceptance criteria for precision and accuracy are defined.

- **B1** Sampling Process Design
- **B2** Sampling Methods Requirements
- **B3** Sample Handling and Custody Requirements
- **B4** Analytical Method Requirements
- **B5** Quality Control Requirements
- **B7** Instrument Calibration and Frequency

Assessment/Oversight

This element identifies assessments of the project. The unit may elect to conduct inspections, surveillance, reviews, or performance audits. This element also defines who will do assessment activities and when. Activities may be defined when there is non-compliance or failures. The element defines the authority for such assessments and response.

- **C1** Assessments and Response Actions

Data Validation and Verification Methods

These elements define when to accept, reject, or qualify data. They describe the process for detecting errors in sampling and analytical processes. They also define the process for calculating precision, accuracy, representativeness, and completeness. This element should determine whether the data satisfies the project.

- **D1** Data Review, Validation, and Verification Requirements
- **D2** Validation and Verification Methods
- **D3** Reconciliation with Data Quality Objectives

It will be the policy of the division to encourage the "team approach" in developing QAPPs and SAPs. The division employs technical experts in multiple disciplines. Each project leader is encouraged to involve as many of the professionals on his/her team as is relevant to project issues.

4.1.1 QUALITY SYSTEM FOR CONTROL OF DATA GENERATED BY FIELD SAMPLING AND LABORATORY ANALYSIS

The standards presented in this QMP apply to all division activities during which physical samples and measurements are taken for the purpose of performing chemical, physical or biological tests and generating environmental data. These standards apply to activities that are conducted directly by division personnel, activities performed for the division by other entities, activities performed under EPA grants, and activities performed under any intergovernmental agreement when those environmental data are intended for use in division funded programs.

QAPPs and associated SAPs must be critically reviewed for technical adequacy and compliance with EPA guidance and approved by appropriate division staff prior to scheduling sampling or laboratory services.

QAPPs for long-term programs must be reviewed at least annually for continued relevancy and revised as needed. However, a QAPP may be revised at anytime, if necessary. Revisions to a previously approved QAPP must undergo the same review and approval process as the original version.

The division specifically permits the use of multiple modular SAPs as components of a QAPP to cover multiple operations of a similar nature. Any reference to a QAPP in this document shall be construed to also pertain to any associated SAPs. Each separate SAP must be individually reviewed and approved by staff, as identified in the QAPP, for the specific data collection activities to which it relates.

Every field investigation must be conducted in accordance with an approved QAPP to ensure that Data Quality Objectives (DQOs) will be met. Data collection plans for activities currently in place or preceding this QMP should not be immediately rewritten, but need to be examined to determine compliance to the requirements herein.

4.1.2 QUALIFICATIONS OF STAFF FOR APPROVAL AUTHORITY

Division staff that approve QAPPs and SAPs are required to have sufficient QA/QC training. This training requirement may be fulfilled by attending QA courses, which are offered by EPA. These courses are typically "Data Quality Objectives" and "Regional QA Planning and Requirements", but may include other courses pertaining to QA. These courses are offered periodically through the EPA Region 8 QA Office.

Additionally, approving staff, such as program QAOs, should actively participate in monthly and/or quarterly QMC meetings in order to remain active with broad or evolving QA/QC subject matter that may impact future iterations to this QMP and division level QAPPs.

4.1.3 USE OF SOPs

It is the policy of the division that all program activities will incorporate the use of a SOP if a task is to be repeated frequently. The use of SOPs promotes reproducible work products and long-term consistency in program operations. SOPs may be developed by a specific program, but will be subject to review and approval by the QAO within the Environmental Data Unit. The EPA document, *Guidance for the Preparation of Standard Operation Procedures for Quality-Related Documents" EPA QA/G-6* (EPA 2007) will be used as a guide in developing SOPs. SOPs will be referenced in QAPPs and/or SAPs, when appropriate.

4.2 MANDATORY CONTROL OF DATA COLLECTION ACTIVITIES

Certain practices are mandatory to control environmental data collection activities. These practices are described in Sections 4.2.1 to 4.2.4.

4.2.1 DEVELOPMENT AND APPROVAL OF QAPPs AND SAPs

The preparation, review, and approval of a QAPP and associated modular SAPs, as described in previous sections, is mandatory.

4.2.2 DEVELOPMENT OF DQOs

The development of DQOs is mandatory under *EPA Requirements for Quality Assurance Project Plans, QA/R-5* (EPA 2001b). DQOs may be a simple statement of why data is being collected and what data outputs will be considered significant. Others will require a complete statistical approach as described in *Guidance on Systematic Planning Using the Data Quality Objectives Process QA/G-4* (EPA 2006). QAPP reviewers must assure that the QAPP specifically addresses the technical adequacy of DQOs.

Data Quality Objectives are intended to accomplish the following:

- Clarify the objectives.

- Define the types of data to collect.
- Determine the conditions under which data is collected.
- Specify the level of uncertainty that is acceptable as the basis for establishing the quantity and quality of data needed.

4.2.3 REPORT DOCUMENTING RECONCILIATION WITH DQOs

Elements D1, D2 and D3 of *EPA Requirements for Quality Assurance Project Plans, QA/R-5* (EPA 2001b), require that QAPPs identify data assessment procedures. These elements specifically include items on how data will be reviewed, validated, and qualified. Element D3 requires reconciliation with stated DQOs. An assessment of the usability and limitation of the field and analytical data collected, with respect to the original DQOs, must be documented after completing the data collection activities.

4.2.4 SATISFACTION OF MINIMUM ANALYTICAL QA AND DELIVERABLE REQUIREMENTS

Analysis of samples performed by laboratories must be as specified in a program QAPP and its associated SAPs. This analysis must meet minimum standards as defined in that laboratory's SOPs and QA plan. Any additional QA/QC and deliverable requirements that are contained in the technical specifications of a project QAPP must also be performed, documented, and provided to the division. Failure to comply with these requirements may result in rejection of data.

4.3 PRACTICES FOR CONTROL OF DATA COLLECTED FROM MODELING, ELECTRONIC AND DATABASE SOURCES

4.3.1 FIELD AUDITS

These are observations, review, and critical appraisal of field sampling activities. Field audits consist of an on-site visit to the sampling location, observation of sampling practices, review of project records and sampling SOPs, and the documentation of findings. The primary intention of such audits is to determine if QAPP and SAP specified practices are being followed.

4.3.2 LABORATORY AUDITS

These are audits of laboratory operations while project samples are under analysis or performed after analysis is completed.

4.3.3 DATA INSPECTION

When results of laboratory analyses are received, an inspection of analytical deliverables may be performed to determine if the work performed is consistent with the laboratories directives as defined in fiscal contract or Memorandums of Understanding.

4.4 QUALITY SYSTEM FOR DATA COLLECTED FROM MODELING, ELECTRONIC AND DATABASE SOURCES

4.4.1 MODELING DATA

Division staff often makes use of mathematical and computer-based environmental models for the prediction of certain environmental events and effects. The reliability of the outputs of such modeling efforts is dependent upon the accuracy of the input data, on the suitability of the model, and on the accuracy of the modeling process. It is not feasible for division staff to verify or validate all models. However, division staff is encouraged to use well-known or established models whenever those are available.

4.4.2 ENVIRONMENTAL DATABASE SYSTEMS

Database system administrators for division-generated environmental data will need to identify any major data quality weaknesses of their data system and establish a timetable and plan for improvement. This will require the development of a written QA/QC plan for all database systems for division-generated environmental data.

4.4.3 DATA OBTAINED FROM OUTSIDE SOURCES (SECONDARY DATA)

When using secondary data from other parties, it is sometimes not possible for the division to completely validate or review all of the data for quality. With this in mind, it will be division's policy that secondary data include, at a minimum, the source of the data and any QC processes that may have been undertaken to review and/or validate the data under their own QA program.

5.0 PERSONNEL QUALIFICATIONS AND TRAINING

5.1 STAFF

The State of Colorado has a civil service type personnel system which is detailed in the "State Personnel Rules and Procedures" and Colorado Statute C.R.S. 24-50-101. Job qualifications are established through the hiring process and program and unit supervisors. Staff is encouraged to pursue professional development and project specific training through individual performance goals (IPGs) stated within an individual's annual job performance plan.

When establishing personnel needs for a specific project, it will be the project manager's responsibility to review the personnel skills and expertise required to implement a project. Also, the project manager must ensure that such personnel resources are available before a project will be approved and implemented.

The prerequisites for staff to perform the assigned duties are technical education, training and experience with the program/project goals. An understanding of analytical water chemistry, statistical procedures, field sampling, and QC are developmental objectives for staff. Specifically with regards to approval authority for QAPPs and SAPs, staff will be encouraged to complete the following QA training classes when available:

- EPA "Data Quality Objectives"
- EPA "Developing and Reviewing Quality Assurance Project Plans"

In addition, approving staff, such as program QAOs, should actively participate in monthly and/or quarterly QMC meetings in order to remain active with broad or evolving QA/QC subject matter that may impact future iterations to this QMP and division level QAPPs.

5.2 QUALITY ASSURANCE OFFICERS

Professional level staff positions in the Environmental Data Unit and the Field Services Section will serve as the QAOs. These positions report to the Environmental Data Unit Manager and the Field Services Section Manager. The prerequisites for the QAOs are education, training, and experience in analytical water chemistry, laboratory QA/QC, field sampling, microbiology, and statistical procedures.

6.0 PROCUREMENT OF ITEMS AND SERVICES

6.1 SELECTION OF CONTRACTORS FOR ANALYTICAL SERVICES

Procurement of items and services must be done within the guidelines presented in the State of Colorado "Procurement Code and Rules" and "Fiscal Rules". These guidance documents, including technical and quality resources, can be found at: https://www.colorado.gov/osc.

Contractors may be chosen by open competition and bid system implemented by the Procurement and Contracts Section within the department, or by their ability to provide a needed service as described in a project QAPP and SAP. QA/QC services will typically be included in a contract. Deliverables received from contractors are reviewed by the project leader to ensure objectives of a QAPP and SAP are met. Unsatisfactory work is noted, and if the condition cannot be corrected, the project manager is notified. Requirements addressing the QA/QC needs will be based on the QAPP. It will be the responsibility of the project leader to review and approve a contractor's (or supplier's) quality-related documentation and reference the review process in the associated QAPP.

Laboratory services are generally provided through two sources:

- By laboratory agreement with the Laboratory Services Division (LSD). LSD provides analytical laboratory services through an intra-department budgetary arrangement.

- By purchase agreement with private laboratories and other governmental entity laboratories (i.e., local WWTP facilities). Labs for bacteriological analysis are selected based on their proximity to sampling locations around the state which allow samples to be delivered within holding time requirements. Other labs (i.e., macroinvertebrate analysis) are selected based on lowest cost to perform requested analysis.

7.0 DOCUMENTATION AND RECORDS

The division's policy for handling, storing and archiving documents and records are described in the Records Management website here: https://www.colorado.gov/pacific/archives/RecordsManagement. This policy is guided by the State of Colorado's records retention policies and any applicable retention requirements of delegated Federal environmental laws.

All documents in state government, with limited exceptions, are covered by the Colorado Open Records Act. Each program manager or project manager is responsible for records relevant to their programs or projects.

All project records shall be kept in an official project file by the project manager. Project records shall be, at a minimum, retained by the department until they have met their approved retention timeframe, have been updated, or made obsolete. They may then be disposed of or transferred to Colorado State Archives. Each program or project manager shall determine its own records retention and disposal schedule for each project with the approval of the State Archivist.

Documents are stored in hardcopy in permanent files. Depending on available file space on site, documents are archived in permanent files off-site, after seven years. Technical and QA documents are prepared by staff responsible for project completion. Most documents are reviewed by other staff or internal stakeholder with final review by the Program or Unit Managers.

Hardcopy documents are kept for a minimum of seven years before being archived in permanent files off-site or disposed of.

7.1 QAPPs AND SAPs

Each program is responsible for maintaining files that may contain all quality documents (QAPPs, SAPs, and SOPs).

7.2 QA/QC REPORTS

Quality assurance and quality control reports will be submitted at the completion of all projects or quarterly for on-going projects. This report will include, but is not limited to, the following information:

- Brief project summary.
- Summary of DQOs and whether they were met.
- If DQOs were not met, the corrective action(s) taken and if problems were resolved (explanation of how problem data will be qualified or thrown out).
- Report of satisfaction of minimum analytical QA deliverable requirements.
- Results of audit activity, if performed.
- Explanation of other problems which could impact meeting QA/QC goals.

7.3 FIELD DOCUMENTATION

Documentation of field activities establishes procedures, identifies written records, enhances and facilitates sample tracking, standardizes data entries, and identifies and establishes authenticity of the sample data collected. Proper documentation ensures that all essential information is consistently acquired and preserved. Timely and complete documentation establishes the chain-of-custody for samples, which is a general requirement for data intended for use in regulatory settings.

Field records shall be generated and stored as specified in project QAPPs, SAPs, and SOPs.

7.4 UTILIZATION OF EQuIS AS A DATABASE FOR DIVISION ENVIRONMENTAL DATA

It is the policy of the division that all surface water data collected by or for the division, in particular the Watershed Section, will be of adequate quality to be entered into the

Environmental Quality Information System (EQuIS). Reviewing of data to meet this goal will be the responsibility of the Environmental Data Unit. It will be the responsibility of each program that DQOs met the requirements necessary to enter data into EQuIS. Electronic data submittals received from the laboratory is entered into spreadsheet files, reviewed, and then are uploaded to EQuIS. Hardcopy data records are received and used for data validation.

The Field Services Section will maintain data in sanitary survey letters, acute drinking water response files, spill response files, and SAP files.

Hard copy data records are filed on site and after 7 years are archived in permanent files.

7.5 OTHER DATABASES IN USE BY THE DIVISION

The database that tracks permittees self-monitoring compliance data for discharge permits is maintained in the Integrated Compliance Information System National Pollutant Discharge Elimination System by the Data Management Group in the Permits Section. The Safe Drinking Water Information System database tracks public drinking water facilities self-monitoring compliance data for the SDWP and is maintained by the Compliance Assurance Section. The quality of this data is the responsibility of the permittees/suppliers of water and facility operators that provide the data. Any other databases in use by the division which utilize environmental data generated by the division will be subject to the standards outlined in this QMP.

8.0 COMPUTER HARDWARE AND SOFTWARE

Information technology (IT) professionals employed by the Governor's Office of Information Technology (OIT) are responsible for maintaining information systems. The Enterprise Portfolio Project Management Office (EPPMO) is responsible for setting policies and procedures related to project, program and portfolio management within OIT and for Executive Branch agencies that embark on projects that include an IT component. Policies and standards are located here: http://www.oit.state.co.us/about/policies.

This section outlines the processes for developing, installing, testing, using, maintaining, controlling, and documenting computer hardware and software. The processes for assessing and documenting the impact of changes to user software and hardware are also found in this document.

The department uses a computer architecture including multiple systems, servers and digital storage, with Local Area and Wide Area Networks including Internet providing interconnectivity of local, State, and Federal computing resources. Access onto the networks and systems require the use of user credentials, including (at least) user name and security password. The OIT professionals maintain the systems, servers, storage, and the network. Technology professionals perform back-up functions on a pre-defined periodic schedule.

The OIT establish policies and standards for the purchase of network hardware and software. Development and adoption of policies regarding data management is conducted pursuant to a policy adoption SOP.

Computer hardware and software installation, support, and maintenance are provided by OIT. Staff from OIT install new computers and software and provide performance checks and

verification with test data. All computers are accessed through the departments Local Area Network, which is password protected. Computer software for completing basic office tasks is made available and maintained by OIT staff. This software provides word processing, database, geographic information system, and internal communication function.

The division utilizes EQuIS software for environmental database system needs and is maintained by division staff. Access to EQuIS is controlled by the assigned systems administrator. The systems administrator will determine system updates and backup schedules.

9.0 PLANNING

This QMP for environmental data incorporates the planning requirements for the approval of QAPPs in the Quality System and Description section**.**

It is the division's policy to employ the DQO process, as discussed earlier in this QMP document and in greater detail in the QAPP, as its primary planning tool for data collection. This will ensure that environmental data will be sufficient for their intended use. It will be the responsibility of the Unit Managers to complete this process or delegate this task to an appropriate staff member.

10.0 IMPLEMENTATION OF WORK PROCESS

This specifies those processes particular to the Clean Water Program and Safe Drinking Water Program, including the identification of operations, preparation of procedures, review, and approvals. These processes are described in the Quality System and Description section.

A primary goal of this QMP is to ensure that all environmental data collected is of sufficient quality for its preferred use. The Quality System and Description section of this QMP addresses implementation of work processes to ensure that this goal is met. Field audits or other QA/QC checks will be used as tools to verify that project staff is following a QAPP and completing its work as planned.

11.0 ASSESSMENT AND RESPONSE

Assessment and response activities will be addressed within specific QAPPs for all projects within a program, as discussed earlier in this document (See Section 4.0). The QMP itself will be assessed for effectiveness, and revised if needed, every 5 years, but may be reviewed and revised whenever a problem is noted. Program review will incorporate various assessment and response procedures including but not limited to surveillance, management system reviews, technical system audits, and audits of data quality. The specific methodology for program and/or project assessment and response will be determined at the program level and will include specifications appropriate to the program and/or project.

The department's *Conflicts of Interest* policy 13.6 explains that personnel have no real or perceived conflict of interest with the department as a whole and should qualify program personnel as such when assessing and responding to program quality situations. This conflict of interest policy is an extension of the Governor's Office *Executive Department Code of Ethics*, which includes language precluding individuals from being exclusively involved in

review of their own data, data analysis, or data collection procedures. The QMC serves to prevent conflict of interest with regard to data collection and QMP implementation. This function is performed by QMC members that have technical backgrounds and training adequate to identify compromised data and processes.

All staff charged with reviewing, collecting, analyzing, and assessing environmental data will have full access to the QMP document, supporting QMP materials, and access to program staff and management, including time with QAOs.

Additional information on the review and corrective action implementation phase of an assessment is available in the Management and Organization section. The overall quality management, review, and implementation protocol is outlined here.

Information on dispute resolution arising from assessment results will be handled in a similar fashion to the above referenced dispute resolution language (see Section 3.0).

12.0 QUALITY IMPROVEMENT

Quality System Reviews of QA/QC activities will be conducted in accordance with EPA document *Guidance on Assessing Quality Systems* QA/G-3 (EPA 2003). Several of the specific processes are described in the Quality System and Description section of this QMP document.

Program management will assess the effectiveness of this QMP on an annual basis. It will be the responsibility of the QAOs to produce an annual report which reviews QMP effectiveness and summarizes the results of management review. The QMP will be revised as necessary when warranted by the annual review. However, changes to the plan may be made at any time a deficiency is noted. The QAOs will document the deficiency, identify appropriate modifications, and facilitate the implementation of changes to correct the deficiency.

This QMP provides for a continuous feedback loop between staff and management when and if problems arise. The nature of the QMP is easily adapted to communications between staff, customers, and suppliers. The structure of the QMP allows continuous identification of process improvement opportunities and solutions. The formal review structure built into the QMP at the division and program level provides for formal quality improvement on an annual basis. However, continuous quality improvement processes can be implemented on an ongoing basis.

13.0 REFERENCES

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14.0 DIVISION ORGANIZATION CHART