SAN DIEGO AIR POLLUTION CONTROL DISTRICT
AMBIENT AIR QUALITY MONITORING
QUALITY MANAGEMENT PLAN (QMP)

San Diego Air Pollution Control District
10124 Old Grove Road
San Diego, California 92131

December 30, 2013

Foreword

This Quality Management Plan describes the quality system for environmental measurement programs for the San Diego Air Pollution Control District (SDAPCD, or District). This document shows the District's organizational structure, functional responsibilities of management and staff, lines of authority, and general methodology for assessing all activities conducted in support of ambient air quality monitoring, air quality assessments, and data submittal activities conducted by the agency.

Disclaimer

The contents of this manual are not contractually binding upon the SDAPCD. Additionally, the provisions of this manual are subject to revision. Unless contradicted by or otherwise inconsistent with applicable laws, the procedures in this manual apply to the San Diego Air Pollution Control District and District staff.

2.0 TABLE OF CONTENTS

Foreword ii

Disclaimer ii

SECTION A - MANAGEMENT AND ORGANIZATION iii

1.0 APPROVAL SHEET iii
1.1 San Diego APCD Approval Sheet iii
1.2 EPA Region IX Approval Sheet iv

2.0 TABLE OF CONTENTS v
2.1 List of Figures ix
2.2 List of Tables x

3.0 DISTRIBUTION LIST xi
3.1 San Diego APCD Distribution List xi
3.2 EPA Distribution List xii

4.0 LIST OF ACRONYMS xiii

5.0 INTRODUCTION 1
5.1 Quality Policy Statement 1
5.2 Background 1
5.3 Map of San Diego County 3
5.4 San Diego APCD Mission Statement 4
5.5 Program Funding 4
5.6 Travel Resources 4
5.7 Special Purpose Resources 4

6.0 ROLES AND RESPONSBILITIES 5
6.1 [redacted] – Air Pollution Control Officer (APCO) 5
6.2 [redacted] Assistant Director, Air Pollution Control District 5
6.3 [redacted] Chief, Air Pollution Control (Monitoring & Technical Services Division 6
6.4 [redacted] Senior Meteorologist, Meteorology & Monitoring Section 6
6.5 [redacted] Supervising Electronic Instrument Technician, Electronic Instrument Technician Section (EITS) 7

6.6 [redacted] – Senior Air Pollution Chemist, Ambient Air Quality Section (AAQS) 8
6.7 [redacted] – Associate Meteorologist 8

7.0 QUALITY ASSURANCE POLICIES 9
7.1 Management of Quality Assurance Policy 9
7.2 Quality Assurance and Quality Control (QA/QC) 9
7.3 General Quality Assurance Policies for Environmental Measurements 9
7.4 Distribution and Implementation 10
7.5 Environmental Measurement Programs 11
7.6 Air Monitoring Network Problems 11
7.7 Criteria Pollutant Monitoring Network 11
7.8 Fine Particulate Monitoring Network ($PM_{2.5}$) 12
7.9 Photochemical Assessment Monitoring Stations (PAMS) 12
7.10 Internal Coordination of QA/QC Activities 12
7.11 Quality System Implementation 13
7.12 Assessment Management 13

8.0 MANAGEMENT AND ORGANIZATION 15
8.1 Organizational Structure 15
8.2 Ambient Air Quality Monitoring Program Organization Chart 16
8.3 Program Management Responsibilities 17
8.4 Staff Responsibilities 17
8.5 Quality Assurance Organization, Responsibility and Authority 18

SECTION B – QUALITY SYSTEM COMPONENTS 21

9.0 QUALITY SYSTEM 21
9.1 Quality System Documentation 21
9.2. Annual Reviews and Planning 22
9.3 Management Assessments 22
9.4 Training 22
9.5 Systematic Planning of Projects 23
9.6 Project-Specific Quality Documentation 23
9.7 Quality Assurance Project Plans (QAPPs) 24
9.8 Standard Operating Procedures (SOPs) 25
9.9 Project and Data Assessments 25
9.10 Data Quality Assessments 26
9.11 Program Implementation Assessments 26

SECTION C – PERSONNEL QUALIFICATIONS AND TRAINING.....27

10.0 PERSONNEL 27
10.1 Personnel Qualifications 27
10.2 Personnel Hiring Practices 27
10.3 Personnel Class Specifications 28
10.4 M&TS Personnel Class Specifications 28
10.5 Supervisory Expectations.....29
10.6 QA Training 29
10.7 New Employee Orientation.....29
10.8 Continuing Education 30

SECTION D – PROCUREMENT OF EQUIPMENT, SUPPLIES, AND SERVICES 31

11.0 SUPPLIES AND SERVICES 31
11.1 Procurement 31

SECTION E – DOCUMENTS AND RECORDS 32

12.0 RECORDS 32
12.1 Responsibility for Documents and Records.....32
12.2 Public Access to Documents and Records.....32
12.3 Archiving of Documents and Records 33

SECTION F – COMPUTER HARDWARE AND SOFTWARE 34

13.0 COMPUTER INFORMATION.....34
13.1 Hardware and Software.....34

SECTION G – PLANNING 35

14.0 PLANNING 35
14.1 Planning Requirements 35
14.2 Data Quality Objectives 35

SECTION H – IMPLEMENTATION OF WORK PROCESSES.....37

15.0 PROCESSES.....37
15.1 Implementation 37

SECTION I – QUALITY ASSESSMENT AND RESPONSE 38

16.0 QUALITY ASSESSMENT 38
16.1 Systems Audits.....38
16.2 Performance Audits 38
16.3 Internal Quality Control.....38
16.4 Continuous Analyzers.....39
16.5 Discrete Sample Preparation, Sample Collection, and Sample Recovery.....39
16.6 Laboratory Instruments.....39
16.7 Corrective Action.....40
16.8 Problem Resolution.....40

SECTION J - QUALITY IMPROVEMENT.....41

17.0 QUALITY IMPROVEMENT 41
17.1 Collection and Reporting 41
17.2 Operational Activities 41
17.3 Data Processing, Validation, and Reporting 42
17.4 Quality Assurance Communication 43

SECTION K – REFERENCES.....44

18.0 REFERENCES 44

SECTION L – APPENDICES.....46

19.0 APPENDIX A – GLOSSARY OF QUALITY ASSURANCE AND RELATED TERMS 47

20.0 APPENDIX B – ORGANIZATION CHARTS.....55

21.0 APPENDIX C – QMP REVISION RECORD 59
21.1 QMP Revision Record 60

22.0 APPENDIX D – RECORDS MANAGEMENT PLAN 61
22.1 Air Pollution Control District Departmental Records Management Plan 61

2.1 List of Figures

Figure 1. Map of San Diego County 3

Figure 2. Ambient Air Quality Monitoring Program Organization Chart 16

2.2 List of Tables

Table 1. San Diego APCD Distribution List xi

Table 2. EPA Distribution List xii

Table 3. List of Acronyms Used in the San Diego APCD QMP..... xii

3.0 DISTRIBUTION LIST

A copy of the San Diego Air Pollution Control District Ambient Air Monitoring Quality Management Plan (QMP) is distributed to the following individuals:

3.1 San Diego APCD Distribution List

Table 1. San Diego APCD Distribution List

1. [redacted], Air Pollution Control Officer

2. Assistant Director – [redacted]

3. [redacted], Chief, Air Pollution Control
   Quality Assurance Administrator

4. [redacted], Senior Meteorologist
   Meteorology & Modeling Section (M&MS)
   Data Management
   Quality Assurance Officer

5. [redacted], Supervising Electronic Instrument Technician
   Electronic Instrument Technician Section (EITS)
   Quality Control Manager

6. [redacted], Senior Air Pollution Chemist
   Ambient Air Quality Section (AAQS)
   Quality Control Coordinator
   Quality Assurance Manager

7. [redacted] Associate Meteorologist
   AQS Data Entry Coordinator
   Data Management Specialist

8. All AAQS and EITS Staff

3.2 EPA Distribution List

TABLE 2. EPA Distribution List

1. [redacted]
   Manager, Air Quality Analysis Office, EPA Region 9

2. [redacted]
   Manager, Quality Assurance Office, EPA Region 9

4.0 LIST OF ACRONYMS

A list of acronyms used in this document is provided in Table 3.

Table 3. List of Acronyms Used in the San Diego APCD QMP.

AAQS	Ambient Air Quality Section
ACS	American Chemical Society
AIRS	Aerometric Information Retrieval System
ANSI	American National Standards Institute
APCO	Air Pollution Control Officer
AQS	Air Quality System
ARSD	Air Resources Specialist Department
ASQC	American Society for Quality Control
ASTM	American Society for Testing and Materials
AWMA	Air & Waste Management Association
CAA	Clean Air Act
CARB	California Air Resources Board
CAR	Corrective Action Request
CFR	Code of Federal Regulations
COC	Chain of Custody
CTO	County Technology Office
DAS	Data Acquisition System
DMV	Department of Motor Vehicles
DQA	Data Quality Assessment
DQO	Data Quality Objective
EITS	Electronic Instrument Technician Section
EPA	United States Environmental Protection Agency
ESC	Environmental Systems Corporation
FRM	Federal Reference Method
GC	Gas Chromatography
IMPROVE	Interagency Monitoring of Protected Visual Environments
ISO	International Organization for Standardization
M & MS	Meteorology & Modeling Section
M & TS	Monitoring & Technical Services
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NAMS	National Air Monitoring Station
NCore	National Core Multipollutant Monitoring Network
NIST	National Institute of Standards Technology

OAQPS	Organization of Air Quality and Planning Standards
PAMS	Photochemical Assessment Monitoring Station
PARS	Precision Accuracy Reporting System
PIA	Program Implementation Assessment
$PM_{2.5}$	Particulate Matter less than or equal to 2.5 micrometers in diameter (aka Fine Particulates)
PM_{10}	Particulate Matter less than or equal to 10 micrometers in diameter
PPM	Parts Per Million
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
RFP	Request for Proposal
RFQ	Request for Quotation
RTI	Research Triangle Institute
SDAPCD	San Diego Air Pollution Control District
SIP	State Implementation Plan
SLAMS	State/Local Air Monitoring Station
SOP	Standard Operating Procedure
TAMTAC	Toxics Air Monitoring Technical Assistance Committee
TSA	Technical System Audit
TTP	Through-The-Probe
VOC	Volatile Organic Compound

5.0 INTRODUCTION

5.1 Quality Policy Statement

This Quality Management Plan (QMP) describes the quality management system utilized by the San Diego Air Pollution Control District (SDAPCD, District) and demonstrates the agency's ability to carry out the requirements of its environmental ambient air quality monitoring programs. A glossary of terms used in this document is provided in Appendix A.

It describes the District's quality assurance goals, policies, procedures, organizational responsibilities, evaluation and reporting requirements, and other attributes of a quality management system. It provides documentation on how the SDAPCD plans, implements, and assesses the effectiveness of its quality assurance and quality control (QA/QC) operations. It is also used to guide staff in the performance of their duties.

District staff are expected to use their training, judgment, and common sense in following procedures. The SDAPCD is committed to ensuring that all personnel are competent and qualified for the tasks they perform and are familiar with all required QA/QC documentation.

It is the SDAPCD's goal to encourage active participation of all employees in quality planning and continual improvement efforts to meet all quality objectives. Employees are encouraged to exchange information, assist in developing strategies, solve problems, and make decisions.

This manual will be reviewed periodically to update changes in policies, procedures, or new rules. Revisions will be made as needed. Staff are encouraged to suggest additions and updates to this manual. All additions and updates will be distributed to staff.

5.2 Background

The SDAPCD is designated as a Primary Quality Assurance Organization (PQAO) in the State of California, and is the air pollution control agency for all of San Diego County (see Figure 1). This area encompasses 4,525 square miles and has a population of over 3 million people.

The SDAPCD has implemented environmental measurement programs to continuously monitor air quality and meteorological parameters at numerous locations in the county. These measurement programs are critical to meeting federal and state monitoring requirements. The various measurement programs collect data for criteria pollutants, air toxics, and a wide range of supporting data that are crucial to protecting the health of the residents of San Diego County and for documenting improvements in air quality and progress towards meeting air quality standards.

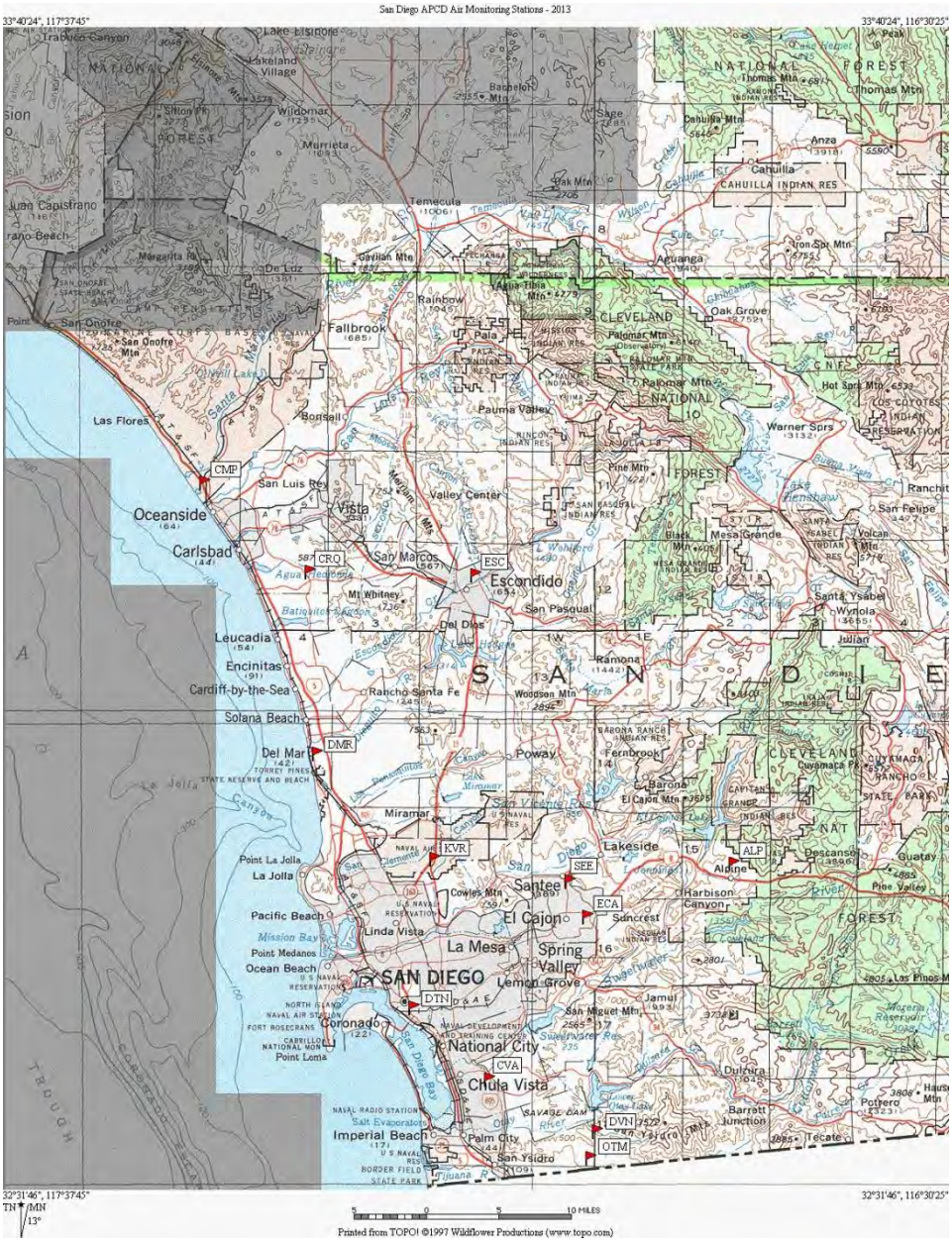
The SDAPCD ambient air quality monitoring network consists of several types of monitoring station designations. These include: State and Local Air Monitoring Stations (SLAMS), Photochemical Assessment Monitoring Stations (PAMS), the National Core (NCore) multipollutant monitoring network, and special purpose monitoring stations.

This monitoring network is used daily by the SDAPCD to forecast and report air quality levels to protect public health. Data from the network are also used to assess compliance with federal and state air quality standards and to show the effectiveness of air pollution control efforts.

This QMP describes the District's QA/QC program, organizational structure, responsibilities of management and staff, lines of authority, and general methodology for assessing all activities conducted in support of ambient air quality monitoring. It also provides a description of the requirements for Quality Assurance Project Plans (QAPP) and Standard Operating Procedures (SOP) needed for the production of high quality, defensible data in support of programs operated by the SDAPCD, including programs funded by the U.S. EPA. The Quality Assurance (QA) and Quality Control (QC) practices delineated in this QMP are designed to comply with data collection and retention requirements of the U.S. EPA and to produce data of high quality. U.S. EPA Guidelines for QMPs (U.S. EPA, 2001a), QAPPs (U.S. EPA, 2001b; U.S. EPA, 2002), SOPs (U.S. EPA, 2007), and data validation (U.S. EPA, 1978; U.S. EPA, 1980; U.S. EPA, 1994; U.S. EPA, 2011) were used extensively in the development of this QMP.

5.3 Map of San Diego County

Figure 1. Map of San Diego County



5.4 San Diego APCD Mission Statement

To protect the public from the harmful effects of air pollution, achieve and maintain air quality standards, foster community involvement, and develop and implement cost-effective programs meeting State and Federal mandates, considering environmental and economic impacts.

5.5 Program Funding

Internal Funding – The SDAPCD generates revenues to support the air monitoring programs internally through various programs including, but not limited to, California Department of Motor Vehicles (DMV) license fees, permitting fees, and analytical support of other environmental agencies.

External Funding – The SDAPCD receives funds to support the air monitoring program from State and Federal grants as well as joint monitoring programs with various agencies.

5.6 Travel Resources

The SDAPCD has a fleet of vehicles to support its monitoring programs. The Electronic Instrument Technician Section (EITS) utilizes some of these vehicles to perform routine maintenance at the ambient air quality monitoring stations, perform QC checks, as well as collect samples to be returned to the laboratory for subsequent analysis or shipment. The Ambient Air Quality Section (AAQS) uses mobile quality assurance (QA) and quality control (QC) vehicles to comply with air monitoring QA/QC requirements.

5.7 Special Purpose Resources

In the event of significant events, planned or unplanned, that can affect the SDAB air quality in some areas, (e.g., major sports events, fires, spills, etc.), additional resources to monitor impacts on local communities can be achieved by using District staff or personnel from other departments who are trained in specialized sampling techniques.

6.0 ROLES AND RESPONSIBILITIES

The following list identifies individuals participating in the Quality Management Plan (QMP) whose roles and responsibilities are well-defined (additional duties/responsibilities are listed where applicable). A more comprehensive list of basic job duties and responsibilities can be found at: http://www.sdcounty.ca.gov/hr/

Organization charts for the San Diego APCD and the Monitoring and Technical Services Division are included in Appendix B.

6.1 Robert J. Kard – Air Pollution Control Officer (APCO)

The Air Pollution Control Officer (APCO) is responsible for managing the SDAPCD, all programs, and for directing progress towards attaining and maintaining federal and state air quality standards within the geographic boundaries of San Diego County; and to perform related work as required.

QMP RESPONSIBILITIES – The APCO has overall responsibility for managing the SDAPCD and has final authority for all monitoring programs and related activities.

6.2 Assistant Director – Position Vacant, Air Pollution Control District

The Assistant Director is responsible for making managerial recommendations and decisions, as well as initiating, coordinating, and implementing plans, programs, and policies for various department units. In addition, the Assistant Director assists in providing intergovernmental coordination with city, state, county, and federal agencies and directs the Air Pollution Control District's efforts to evaluate, revise, and implement regional air quality control strategies.

QMP RESPONSIBILITIES – Oversees and supports the activities of SDAPCD staff involved in the air quality monitoring programs.

6.3 [redacted] – Chief, Air Pollution Control (Monitoring & Technical Services Division)

The Chief of the Monitoring and Technical Services Division is responsible for planning, supervising, and evaluating the air quality monitoring program for the SDAPCD. The incumbent supervises the senior-level personnel in the Division who are responsible for supervising the day-to-day operations associated with air monitoring and related QA/QC activities. The incumbent is the QA Administrator for the QMP.

QMP RESPONSIBILITIES – QA Administrator
Oversees the operation of the Air Quality Monitoring Program

6.4 [redacted] – Senior Meteorologist, Meteorology & Modeling Section

The Senior Meteorologist reports to the Chief, Air Pollution Control, Monitoring and Technical Services Division. The Senior Meteorologist directs the activities of the Meteorology and Modeling Section, which performs air quality forecasting and reporting, data analysis, dispersion modeling, and assists the District in meeting requirements of the State Implementation Plan (SIP) for various pollutants. The Senior Meteorologist currently serves as the District's Quality Assurance Officer.

QMP RESPONSIBILITIES – Quality Assurance (QA) Officer

The QA Officer is responsible for:

- Overseeing the functions of the QA/QC Managers.
- Reviewing all monitoring data before and after upload to the EPA's AQS.
- Reviewing all data corrections and invalidations.
- Reviewing all field and laboratory QA/QC timelines and issuing action reports.
- Final Data Validation.

6.5 [redacted] – Supervising Electronic Instrument Technician, Electronic Instrument Technician Section (EITS)

The Supervising Electronic Instrument Technician reports to the Chief, Air Pollution Control, Monitoring and Technical Services Division. Under general direction, the incumbent is responsible for supervising the activities of subordinate Electronic Instrument Technicians and Air Pollution Control Aides involved in operating, maintaining, and repairing air pollution monitoring equipment.

QMP RESPONSIBILITIES – Quality Control (QC) Manager

The Quality Control Manager is responsible for the oversight of:

- Station installation, operation.
- Sample collection and shipments to SDAPCD, CARB, & EPA laboratories.
- Quality control flow verifications.
- Quality control nightly zeros and spans.
- First-level data validation.
- Routine maintenance and repairs.
- Issuing calibration requests.
- Equipment repair.
- Telemetry system operation and maintenance.
- Flow verifications.
- Nightly zeros and spans.
- Shelter and utility contracts.
- Parts and supplies inventory.
- Writing SOP's for electronic instrumentation and station operations.

6.6 [redacted] - Senior Air Pollution Chemist, Ambient Air Quality Section (AAQS)

The Senior Air Pollution Chemist reports to the Chief, Air Pollution Control, Monitoring and Technical Services Division. This position is responsible for highly specialized chemical testing and analysis in addition to providing front-line supervision of subordinate Air Pollution Chemists, Test Technicians, and Departmental Aides.

QMP RESPONSIBILITIES – Quality Assurance (QA) Manager
Quality Project Manager

The Quality Assurance Manager is responsible for:

- Calibration and quality assurance standards.
- Air monitoring equipment procurement.
- Testing and calibration.
- Parts and supplies inventory.
- Air monitoring procedures and training.
- Quality assurance & quality control policies, plans, procedures and scheduling.
- Network Plans, Quality Assurance Project Plans, and other QA-related documents.

6.7 [redacted] – Associate Meteorologist

Under general supervision from the Senior Meteorologist, this position is responsible for independently performing a wide-range of air quality forecasting and reporting, and data analysis.

QMP RESPONSIBILITIES – Data Management Specialist

- AQS Data Entry Coordinator.
- Data Management Specialist.
- Division Computer Administrator.

7.0 QUALITY ASSURANCE POLICIES

7.1 Management of Quality Assurance Policy

The SDAPCD Quality Assurance Policy is to ensure that sufficient quality assurance activities are conducted to demonstrate that all data collected by, or on behalf of the SDAPCD are scientifically valid and defensible, and must meet defined precision and accuracy (P&A) criteria. Data must also be complete, representative, and comparable within the network. Furthermore, data quality must meet Agency, State, and U.S. EPA program requirements, and data quality information must be documented.

7.2 Quality Assurance and Quality Control (QA/QC)

The terms Quality Assurance (QA) and Quality Control (QC) are related but not synonymous. QC encompasses all of the direct actions taken to achieve and maintain a desired level of quality for a given product. From an environmental monitoring perspective, QC includes all of the measures taken by project managers and field, laboratory and data management personnel to achieve a predetermined level of data quality, accuracy, and reliability. QC is applied from the planning and design stages of the monitoring effort, through the implementation stages, to the handling, collection, processing, and reporting of data.

QA, on the other hand, encompasses all measures taken by management and staff to ensure that the quality of a finished product meets the standards of the organization. This includes measures to independently assess the quality of data collected under specific projects and the effectiveness of the quality system implemented by project managers and their staff. Major QA functions include review and approval of program planning documents, auditing of sample collection, sample analysis, and data handling procedures, and evaluating the effectiveness of implemented QC procedures. These efforts are all collectively referred to as QA/QC.

7.3 General Quality Assurance Policies for Environmental Measurements

Environmental measurements collected by the SDAPCD provide information that relates to regulatory policy and public health. A primary function of the Monitoring and Technical Services Division management and staff is to ensure, document, and improve the quality of data collected. Quality data is achieved by developing a set of quality assurance and quality control activities, assessing the effectiveness of those activities, reporting findings to management and staff, making recommendations to modify procedures, and implementing corrective practices, as appropriate. The program also encourages input and ideas from staff to improve the entire process. Staff input provides real-time assessment on specific aspects of the monitoring program that may need corrective action to maintain data quality objectives (DQOs) and to avoid the loss

of data. It is essential that management and staff performing environmental measurement functions participate in and commit to the overall quality assurance program for it to be effective. Therefore, environmental measurement activities performed by staff within SDAPCD comply with the following general QA policies:

- The objectives of each environmental measurement program/project shall be clearly delineated during the planning stages. These objectives shall be consistent with the mission, policies, and priorities of the SDAPCD.
- Acceptable limits of data uncertainty shall be identified during the planning stages for each environmental measurement program/project so the appropriate procedures and resources may be incorporated into the overall design.
- Quality Assurance and Quality Control activities shall be integrated into all environmental measurement programs/projects in a cost-effective manner while attaining/maintaining stated quality objectives.
- A Quality Assurance Project Plan (QAPP) describing how the SDAPCD will achieve the stated objectives and required level of data reliability shall be developed for each environmental measurement program/project. The QAPP shall be reviewed and approved by the manager of the program/project, the Chief of the M&TS Division, the Assistant Director, and the APCO.
- Sample collection, sample chain-of-custody, sample analysis, training and data management activities shall be evaluated routinely by supervisory personnel and QA staff to identify and correct deficiencies and to enhance the credibility of each environmental measurement program/project.
- Measures shall be instituted within each environmental measurement program/project to ensure that the quality of the environmental data collected is accurately and permanently documented. These measures include data validation audits, performance audits, systems audits, corrective action reports, and quality reports to management.

7.4 Distribution and Implementation

To ensure that the SDAPCD quality assurance policies are appropriately implemented for all applicable ambient air quality data collection processes, the following activities are conducted:

- The QMP is made available to all staff involved with ambient air quality data and associated measurement systems.

- QAPPs are developed and distributed to all staff responsible for activities in support of applicable programs. The QAPPs reiterate SDAPCD quality assurance policy and define appropriate DQOs for each program.
- Technical SOPs are developed and utilized for air monitoring QA/QC activities
- Periodic reviews of the QMP are conducted by the QA Administrator, QA and QC Managers, and the QA Officer based on performance and systems audits (internal and external) and input from staff.

7.5 Environmental Measurement Programs

SDAPCD carries out environmental measurement programs in its air monitoring network and special monitoring program network. Although quality assurance is practiced in all environmental measurement programs, priority has been given to the federally mandated Air Quality Monitoring Network Programs (Section 7.6 thru Section 7.9) in this version of the QMP.

7.6 Air Monitoring Network Programs

SDAPCD air quality monitoring programs include those funded by U.S. EPA under Section 103 or Section 105 grants.

7.7 Criteria Pollutant Monitoring Network

The Federal Clean Air Act mandates that states and/or local agencies, including tribal agencies, monitor ambient levels of criteria pollutants (ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, PM_{10}, $PM_{2.5}$, and lead) in order to:

- Track pollution concentration trends in ambient air to monitor progress toward attaining federal air quality standards.
- Assess the effectiveness of regulatory actions to reduce specific pollutants.
- Evaluate public exposure to criteria pollutants.
- Alert the public to conditions when outdoor exposure to criteria pollutants exceeds federal exposure limits and/or where health may be affected. To meet these objectives, SDAPCD operates a network of monitoring stations distributed throughout its jurisdiction.

7.8 Fine Particulate Monitoring Network ($PM_{2.5}$)

Part 50 of Title 40 in the Code of Federal Regulations (40 CFR 50) requires states to establish a fine particulate monitoring network to collect and analyze particulate matter less than or equal to 2.5 micrometers in diameter. Historically the network consisted of filter-based, Federal Reference Method (FRM) samplers for the determination of 24-hour mass loading. Later, continuous beta attenuation monitors (BAMs), Federal Equivalent Monitors (FEMs) using BAM technology, and $PM_{2.5}$ speciation samplers were added to several of the fine particulate monitoring sites.

7.9 Photochemical Assessment Monitoring Stations (PAMS)

Part 58 of Title 40 in the Code of Federal Regulations (40 CFR 58) requires states to establish Photochemical Assessment Monitoring Stations (PAMS) as part of their State Implementation Plan (SIP) monitoring networks in all ozone non-attainment areas classified as serious, severe, or extreme. The purpose of the PAMS network is to collect and report detailed data for volatile organic compounds (VOCs), nitrogen oxides, ozone, and meteorological variables in order to:

- Better understand the underlying causes of ozone pollution.
- Devise effective emission control strategies.
- Measure environmental improvement.

The SDAPCD operates its PAMS program with funding support from U.S. EPA and carries out enhanced monitoring at locations that represent: an upwind, background site; a maximum ozone precursor emissions site; and, a maximum ozone site. In conjunction with the primary PAMS program, the SDAPCD operates a continuous upper-air measurement site at the San Diego-Kearny Villa Road site. The upper-air measurements provide a better understanding of the airflow and mixing in the San Diego Air Basin that are important to the formation and transport of smog. The data is incorporated into current air quality forecasts and historical data analyses.

7.10 Internal Coordination of QA/QC Activities

The QA Manager generates a yearly QA/QC calendar to coordinate activities between the Electronic Instrument Technicians and the QA staff of the Ambient Air Quality Section (AAQS). The Electronic Instrument Technicians' primary function is to maintain air monitoring station equipment, perform routine maintenance and perform QC checks. Additional QC checks may also need to be performed based on analyzer performance such as unexpected drift or noise. QA/QC activities necessary for a planned analyzer shutdown are also coordinated by the QA Manager.

7.11 Quality System Implementation

The QMP includes several activities and actions to ensure that critical elements of the SDAPCD Quality System are understood and implemented for all environmental measurement programs. These include, but are not limited to the following:

- Develop an implementation strategy consistent with the SDAPCD organizational structure and the requirements of the program.
- Establish an effective implementation schedule. The schedule takes into account an initial learning period and fine-tuning of methods and procedures while working to minimize data loss during the early phases of a new program. The schedule also establishes milestones for evaluating data relative to the Data Quality Objectives (DQOs).
- Provide initial training to appropriate supervising and technical staff on the QMP, documentation formats, QAPPs, SOPs, corrective actions, and quality assurance processes. This applies not only at the beginning of a new program, but also for staff who are new to an existing program.
- Provide periodic refresher training to keep skills and knowledge current, especially when involving quality issues. Training is required when methods and procedures are revised, new instrumentation is introduced, and where assessments identify the need for corrective action measures.
- Provide management commitment to the SDAPCD quality policy that both management and staff are required to follow.
- Enforce standards for timely corrective action and make every effort to meet these standards. If there are needed exceptions to these standards, these need to be identified in writing, along with valid justifications for the delay.
- Include staff in developing quality improvement goals and implementation deadlines. Participation of those who perform field and laboratory work creates an enhanced atmosphere for achieving shared data quality goals.
- Recognize staff achievements in attaining quality goals and quality improvement. Recognition takes place at staff meetings, by e-mail announcements, and is included in performance appraisals.

7.12 Assessment Management

On an ongoing basis the QA team evaluates if the District's data collection can be improved by a more defined QAPP. This should include, but not be limited to the following:

- Review of all laboratory QA/QC procedures with laboratory staff. If the percent valid data declines from expected norms, more frequent review may be necessary.
- Review of field QA/QC procedures with field staff. If the percent valid data declines below expectations, more frequent review may be necessary.
- Discussion of any recommendations with senior management. Suggestions regarding QA/QC procedures or activities will be reviewed by the QA Manager, QC Manager and QA Administrator.
- Performance Audits (laboratory) - externally driven audits shall be performed to determine the accuracy of the analytical process.
- Through-the-probe (TTP) audits, used to determine the accuracy of the delivery system.
- Technical System Audits (TSA) - performed by the EPA or a designated contractor.
- Data Quality Audits - randomly selected data should be tested by a designated QC team or specialist to check the validity of reported data.

8.0 MANAGEMENT AND ORGANIZATION

8.1 Organizational Structure

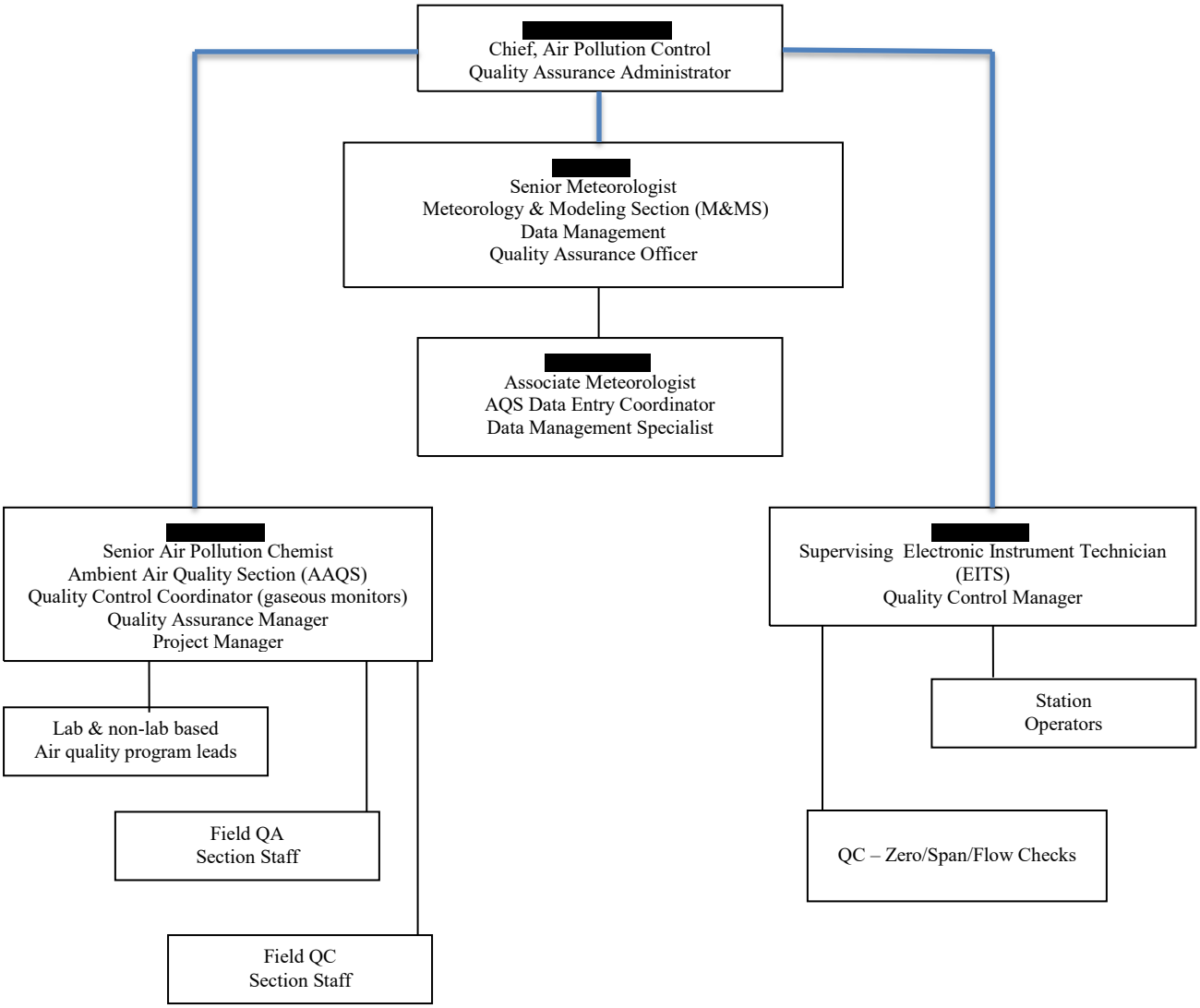
The SDAPCD is governed by the Air Pollution Control Board. This Board is comprised of the Board of Supervisors, who are elected from five supervisory districts within the County of San Diego. Daily operation of the APCD is delegated to the board-appointed Air Pollution Control Officer (APCO), who oversees all operations at the District.

District operations are conducted by several divisions/groups. The SDAPCD environmental measurement programs are administered by the Monitoring and Technical Services (M&TS) Division. The Engineering Division evaluates and issues air quality permits to operate facilities with equipment capable of emitting air contaminants. The Compliance Division ensures that regulated sources operate in compliance with permit conditions and all applicable regulations. The Air Resources & Strategy Development (ARSD) group prepares long-term regional plans and also is responsible for Rule Development. The Administrative Services Division prepares and administers the District's budget, performs business and accounting tasks, and provides permit system and Information Technology support. The SDAPCD organization chart is provided in Appendix B. The M&TS Division is divided into four sections. These sections are: the Ambient Air Quality Monitoring Section, the Electronic Instrument Technician Section, the Meteorology & Modeling Section, and the Stationary Source Emission Test Section (see Appendix B).

8.2 Ambient Air Quality Monitoring Program Organization Chart

The QMP is administered by the Monitoring and Technical Services Division. Staff members from this Division fulfill various quality assurance/quality control roles. These roles are shown in Figure 2.

Figure 2 - Ambient Air Quality Monitoring Program Organization Chart



8.3 Program Management Responsibilities

The primary responsibilities for the daily management of the various environmental measurement programs are assigned to several individuals within the M&TS Division. These individuals are responsible for the effective allocation of budgeted staff and resources to their programs/projects to ensure that both program/project objectives and DQOs are achieved in a manner consistent with applicable QAPPs.

The individual with primary responsibility for each program and each major function (e.g., establish and operate stations, provide sampling media and sample analyses, data management, etc.) is shown in Figure 2. Program responsibilities are generally divided, with the Electronic Instrument Technician Section (EITS) Supervisor having responsibility for the establishment, operation and maintenance of monitoring stations, and the Ambient Air Quality Section (AAQS) Supervisor having responsibility for the preparation of sampling media and the analysis of sampled media that have been submitted to the SDAPCD laboratory. When the monitoring stations are involved, the EITS Supervisor always serves as the lead. Data management responsibilities are assigned according to the organization that generates the final data that is reported to the U.S. EPA and/or public. Data management practices are addressed in detail in the respective QAPP for each program/project.

The supervisors for the AAQS, the EITS, and the M&MS interact with each other to resolve data quality issues and strive for continual quality improvement. They work closely with staff and allocate resources for programs/projects. However, all three individuals are ultimately responsible for the implementation and ongoing compliance with the QMP, QAPPs, and SOPs for their respective programs/projects.

8.4 Staff Responsibilities

Staff includes supervisors and non-supervisory personnel. Non-supervisory staff are directly involved in the operation and maintenance of monitoring sites, the preparation of sampling media, the collection of samples, and the analysis of samples. Therefore, they play a key role in the implementation of the SDAPCD QMP. Because of their direct and frequent interaction with the basic aspects of these plans and procedures, non-supervisory staff develop a keen understanding of the technical strengths and weaknesses of measurement programs. Consequently, the quality and usefulness of the data collected under any environmental measurement program reflect the ability of these staff to follow approved QAPPs and SOPs, and to participate constructively in the ongoing review and revision of these documents.

Supervisors provide front-line interaction with non-supervisory staff regarding routine data quality assessments (DQAs), ad hoc reviews of methods and procedures, and quality

improvement opportunities they encounter in the daily operation of measurement programs. The supervisors solicit input from appropriate non-supervisory staff regarding the effectiveness of procedures and processes implemented through current QAPPs and SOPs, and also when developing new or revised QAPPs and SOPs. Supervisors are responsible for ensuring that non-supervisory staff receive proper training and for providing periodic evaluations and feedback on performance relative to data quality. Supervisors are expected to have significant input to their respective management with respect to staff and resource requirements for programs/projects for which they are directly involved.

8.5 Quality Assurance Organization, Responsibility, and Authority

The supervisor of the AAQS is designated as the QA Manager and has overall responsibility for the quality assurance functions for all SDAPCD environmental measurement programs. This individual reports directly to the Chief of the M&TS Division, who is designated as the QA Administrator and has responsibility over all environmental measurement activities at the District.

The QA Manager is responsible for preparing (and annually reviewing) the SDAPCD QMP for environmental measurements and for submitting an annual quality assessment report. The QA Manager supervises the QA staff who specialize in auditing environmental measurement programs and in overseeing the corrective action process. This individual also provides technical support to plan, implement, document, and assess the effectiveness of QA and QC activities.

The QA Manager communicates with the QA/QC team on issues related to data quality and to flag suspect data based on quality assessments. The QA Manager may recommend remedial actions after discussions and a review of the data quality issues. A dispute resolution procedure (see Section 16.8) is in place to resolve data or qualification issues where concurrence on the course of action cannot be reached through normal channels.

The QA Manager is also responsible for the following: providing quality assurance training to staff; auditing staff training records; preparing, issuing, and updating the QMP; coordinating the preparation, revision and issuance of QAPPs and SOPs; reviewing QAPPs and SOPs for appropriate quality assurance activities; coordinating audits of outside contractors; and preparing and supervising contracts with outside auditors (e.g., $PM_{2.5}$ or meteorological measurement systems), etc.

The QA Manager is also the SDAPCD liaison on all quality assurance issues with the U.S. EPA, other federal agencies, state agencies, and other organizations involved with quality assurance. Audits may be conducted for any program/project solely by the District's QA staff, by QA staff in conjunction with a state or federal agency, or solely by a state or federal agency or an

authorized contractor. Each program/project specific QAPP identifies the actual audit requirements. In all cases, the QA Manager has oversight responsibility.

The QA Administrator annually reviews staffing, funding and resource needs in consultation with the Assistant Director and makes recommendations for the optimum number and level of staff to ensure that the District's quality system is adequate.

Quality Assurance staff reporting to the QA Administrator include: the Senior Air Pollution Chemist (QA Manager), the Supervising Electronic Instrument Technician (QC Manager), and the Senior Meteorologist (QA Officer).

In addition to the functions described above, M&TS Division responsibilities extend to the following activities:

- Data Assessments. Data assessments include internal and external quality control and routine assessments of precision and accuracy and are identified in the QAPPs and SOPs for each environmental measurement program. Internal assessments are continuously conducted by the site instrument technicians, Ambient Air Quality Section (AAQS) and Meteorology & Modeling Section (M&MS) personnel. The M&TS Division personnel provide assistance in the following: development of internal assessment methodologies; reviewing QAPPs to ensure that internal assessments are sufficient, appropriate, and properly documented; and reviewing and evaluating the implementation of other internal assessments and activities.

- Data Validation. Primary data validation is conducted by the AAQS. The M&MS plays a key role by periodically assessing the effectiveness of the data validation procedures and recommending corrective action when problems are identified.

- Data Reporting. Data reporting is carried out by the M&MS. This includes reviewing data reporting formats for completeness of information, usefulness, and data quality information.

- Data Archival and Retrieval. Data are archived in and retrieved from the U.S. EPA AQS by the M&MS. M&TS personnel review data retrieval formats, provide input regarding the systematic organization of data, reports, and documentation, validate the accuracy of the data archival and retrieval processes, and ensure that data quality information for the archived data are available and accessible.

- Data Analysis. Data analysis is typically conducted by the Meteorology and Modeling Section (M&MS). The M&TS Division is directly involved in the initial development of environmental monitoring programs and ensures that the DQOs and all local, state, and

federal requirements are met to make sure that only valid data are used for analyses. The M&TS Division provides information on the purpose and limitations of the data, such as the scope of programs, applicability to intended purposes, data tolerances, and compliance with DQOs.

SECTION B. QUALITY SYSTEM COMPONENTS

9.0 QUALITY SYSTEM

The SDAPCD has established a Quality System to plan, implement, and assess environmental measurement programs to ensure that collected data are of adequate quality and to encourage continual data quality improvement. The Quality System described in this manual encompasses the controls necessary for District staff to carry out the duties and responsibilities of the SDAPCD as it relates to ambient air quality monitoring.

A successful Quality System will produce data of known quality. The SDAPCD Quality System provides the structure and documentation necessary to assure that data quality meets all monitoring requirements. This Quality System describes the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan the District uses to ensure quality in its environmental air monitoring programs. The accuracy of monitoring data is dependent upon the AAQS's ability to determine the quality of the analytical results.

Components of a Quality System include:

- Quality System Documentation.
- Annual Reviews & Planning.
- Management Assessments.
- Training.
- Systematic Planning of Projects.
- Project-Specific Quality Documentation.
- Quality Assurance Project Plans (QAPPs).
- Standard Operating Procedures (SOPs).
- Project and Data Assessments.
- Data Quality Assessments.
- Program Implementation Assessments.

These components of the District's Quality System are discussed in the following sections.

9.1 Quality System Documentation

The QMP is required by federal regulations and it documents the SDAPCD's Quality System and provides a general description of how the quality of data is assured for environmental measurement programs. The QMP describes objectives, policies, organization, and quality management tools used to implement the various components of the Quality System. The QMP assigns responsibilities for carrying out the various programs and provides for an independent

quality assurance function to monitor and report on the implementation of adopted quality planning activities and implement corrective action to maintain data quality within stated program objectives.

The QA team reviews and updates the QMP every three years, or whenever a major change to the plan is required. All updates to the QMP are reviewed and approved by the QA Administrator. If data acquisition system (DAS) issues are involved, the Senior Meteorologist, who is also the QA Officer, will review the updates as well. Any major revision of the QMP (e.g., adding programs, major enhancements to existing programs, etc.) requires approval by the Air Pollution Control Officer. Major revisions to the QMP are also discussed with U.S. EPA Region IX staff and submitted for their approval when revisions involve U.S. EPA programs. An annual summary of minor changes to the QMP (or revised sections) is also forwarded to U.S. EPA Region 9 staff.

9.2 Annual Reviews and Planning

All environmental measurement programs are reviewed annually to ensure that they are meeting program objectives and to assess whether modifications are needed to better meet program objectives and to evaluate new monitoring requirements. For the air quality network monitoring programs, proposed changes are documented in an Annual Air Quality Monitoring Network Plan which undergoes public review and comment. Following the review and comment period, the approved Network Plan is available to the public on the District website.

9.3 Management Assessments

A formal review of the Quality System is performed on an ongoing basis to ensure its continuing suitability and effectiveness. At a minimum, the QA Manager, along with the QA Administrator, the QA Officer, the Data Management Specialist, the QC Manager, Chemists, Test Technicians, and other involved parties perform a system review annually. The results of this review and any resulting action assignments are documented and transmitted to all participants. The QA Manager is responsible for ensuring that all action items resulting from this review are reconciled in a timely manner.

9.4 Training

The SDAPCD provides training for all staff involved in environmental monitoring programs. This ensures that staff have sufficient knowledge for adequately performing assigned duties and complying with QA requirements. The QA Administrator ensures that everyone who operates

specific equipment, performs tests, or calibrations, or both, evaluates results, and signs test reports and calibration certificates receives proper training and/or earns required certificates.

The QA Administrator formulates the requirements with respect to the education, training and skills of AAQS personnel. The QA Manager monitors the training needs of staff and evaluates the effectiveness of training received by staff. The training program must cover current and anticipated tasks of the AAQS. Section 10 further describes personnel qualifications and training.

9.5 Systematic Planning of Projects

Each ambient monitoring program goes through a systematic project planning process prior to implementation. This process includes the following activities:

- Describe the project goals and objectives.
- Identify outside stakeholders.
- Identify the type of data required to meet goals and objectives.
- Identify constraints to acquiring required data (e.g., schedule and resources).
- Reconcile conflicts between project goals, schedule, and available resources.
- Determine how (e.g., collection methods), when (frequency), and where data or samples are to be collected.
- Determine the quantity of data required.
- Determine the quality of data required.
- Determine methods for data analysis, evaluation, and assessment based on the intended use of the data and the quality performance criteria.
- Specify QA/QC activities necessary to assess quality performance criteria.
- Set program schedule, resources, milestones, and implementation requirements.
- Establish project management and organization with assigned project and communication responsibilities.

The planning process requires the involvement of management, section supervisors, and stakeholders to ensure that the results and the conclusions meet the needs of all interested parties.

9.6 Project-Specific Quality Documentation

The primary documents that implement the Quality System for SDAPCD environmental measurement programs are the QMP, program-specific QAPPs, and SOPs for the various activities within specific environmental monitoring programs. Guidance also comes from the U.S. EPA.

9.7 Quality Assurance Project Plans (QAPPs)

The QMP encompasses the following three major programs: Criteria Pollutant Monitoring Network, Fine Particulate Monitoring Network, and PAMS/Air Toxics monitoring. These federally-funded programs are required to have a current QMP. A QAPP that is consistent with the objectives and requirements of the QMP is prepared for the specific needs of each monitoring program. Each QAPP describes the required quality control, quality assurance, and related technical activities for the specific project or program. QAPPs are intended to be sufficiently complete and detailed to ensure that data meet design DQOs.

QAPP preparation is coordinated through the QA Manager, who is responsible for implementing document control, reviewing proposed quality control and quality assessment activities, providing the necessary quality assurance guidance, and ensuring internal consistency with other QAPPs. All QAPPs are approved by the QA Administrator before they are distributed to staff and implemented. Staff training and education on QAPP requirements are provided as necessary through coordination of the QA Administrator and relevant section supervisor(s). New environmental measurement programs or projects instituted under this QMP are typically initiated with the development of an appropriate QAPP.

QAPP documents generally include the following:

- Purpose and background; conformance with the SDAPCD mission.
- Restate and/or reaffirm SDAPCD quality policies.
- Distribution and approvals.
- Project management responsibilities.
- Resource requirements.
- Measurement methodology, sampling methodology, sample handling, and chain-of-custody.
- Instrument calibration.
- Data acquisition and data management.
- Quality control activities.
- Quality assurance activities.
- Assessment and oversight activities and responsibilities.
- Reports to management.
- Data validation and reconciliation with DQOs.

The U.S. EPA document *EPA Guidance for Quality Assurance Project Plans* (U.S. EPA, 2002) may be used by the program/project manager as a tool in the QAPP planning and development process.

The guidance for the Data Quality Objective (DQO) process *is Guidance on Systematic Planning Using the Data Quality Objectives Process* (U.S. EPA, 2006) and is used for the development of DQOs by the SDAPCD. In many situations, regulatory criteria define Data Quality Objectives. The SDAPCD's air monitoring programs, DQOs, and Quality Control objectives are determined by the requirements of the Clean Air Act and the EPA's National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment.

EPA has set NAAQS for six common air pollutants, which are called "criteria" pollutants. The SDAPCD's mission is to meet all appropriate NAAQS in San Diego County. It is also the SDAPCD's objective to meet the Ambient Air Quality Standards set by the California Air Resources Board and listed in the Table of Standards in the California Code of Regulations (Title 17, Section 70200).

9.8 Standard Operating Procedures (SOPs)

SOPs describing detailed procedures for program activities, including: instrument operation and maintenance, sample collection, preparation and analyses of sampling media, and data management and validation are prepared by staff with the appropriate technical knowledge and experience. These SOPs are implemented through the appropriate QAPP for each project. QAPPs may utilize the same SOPs since many ambient air measurement methods have been standardized following U.S. EPA or State of California Air Resources Board (CARB) guidance documents.

Due to variations in equipment and facilities, the SDAPCD has customized SOPs to reflect specific instrumentation or methods. Individual SOPs are tested prior to implementation to verify that DQOs are being met.

Preparation of new or modified SOPs is the responsibility of the supervisor who oversees and reviews the particular function being performed. Draft SOPs are reviewed and approved by the responsible supervisor who then forwards the approved draft to the QA Manager for review. The QA Manager reviews and approves new SOPs and revisions initiated within the M&TS Division. SOP review, revision, and approval are not limited to the QAPP process. It is a continual process which includes SOP preparation in support of new programs/projects, and new monitoring and analytical measurement technologies.

9.9 Project and Data Assessments

The SDAPCD Quality System includes activities to evaluate the implementation of QMP, QAPP and SOP requirements for the environment measurement programs, and to assess whether

program DQOs are being achieved. These assessment activities are undertaken by the M&TS Division. Assessment activities are conducted on the schedule identified in the program QAPP and consist of internal and external assessments that are divided into management assessments, DQAs, assessments of precision and accuracy (e.g., performance audits), and Program Implementation Assessments (i.e., system audits).

9.10 Data Quality Assessments

Data Quality Assessments (DQAs) are on-going activities to compare actual data quality with DQOs for the environmental measurement program. DQAs include the evaluation of data precision, accuracy, detection limits, measured range, representativeness, comparability, and completeness as described in the program QAPP and associated SOPs. DQAs include the use of independent audit standards traceable to the National Institute of Standards Technology (NIST) standards (or other appropriate audit standard if NIST traceability is not available).

9.11 Program Implementation Assessments

A Program Implementation Assessment (PIA) is a periodic snapshots of how well the environmental measurement program is being implemented with respect to procedures, methods, policies, and practices, as described in the program QAPP and associated SOPs. PIAs include the evaluation of staff training, conformance to sample preparation, handling and analytical protocols, documentation, chain-of-custody, siting criteria, data verification procedures, and data reporting/archiving procedures.

SECTION C. PERSONNEL QUALIFICATIONS AND TRAINING

10.0 PERSONNEL

10.1 Personnel Qualifications

The Chief of the M&TS Division is responsible for ensuring that all staff who operate specific equipment, perform tests, calibrations, evaluate results, and approve test reports and calibration certificates are properly trained and certified. Close supervision is provided to staff that are new to the District, Division, or Section, and those who are transitioning to new programs or procedures. Personnel performing specific tasks shall be qualified on the basis of education, training, experience, examination, certification, demonstrated skills, or a combination of these attributes.

The Chief of the M&TS Division is also responsible for defining the requirements for education, training, and skills of all M&TS personnel. The Chief of the M&TS Division also ensures that qualified individuals are assigned to oversee and supervise District programs/projects.

Qualified individuals under this QMP shall:

- Meet the experience, education, and training requirements.
- Be familiar with the Quality Assurance Manual, QMP, applicable QAPP, and applicable SOPs.

The M&TS Division, along with the District's Human Resources unit maintains records of educational and professional qualifications, training, skills, competence, relevant authorizations and certificates, and experience of all technical personnel. The District's Human Resources unit also maintains current job descriptions for all personnel in the M&TS Division.

Many of the job duties at the District require special training or certification. District management is responsible for ensuring that personnel receive the needed training. All County-based training is documented and is tracked in San Diego County's Learning Management System (LMS).

10.2 Personnel Hiring Practices

Hiring practices of the SDAPCD conform to the County of San Diego Civil Service Rules. These rules can be found at:

http://www.sdcounty.ca.gov/civilservice/rules.html

The minimum qualifications of all SDAPCD positions are defined by the County Department of Human Resources. The County adheres to strict and consistent processing of all job recruitments.

A prospective employee must complete a County application form for each desired position. All applications and recruitment materials are kept by the County Department of Human Resources.

Applicants for District positions undergo a competitive evaluation process to ensure that the most qualified candidates are considered by the hiring authority. This process includes ranking the candidates by education, relevant work experience, and other desirable work-related characteristics. Potential candidates undergo face-to-face interviews by an internal team of experts (for some positions, an outside expert from another air quality organization is included on the panel to ensure that there is no bias in the selection process) and written examinations to further evaluate their experience and qualifications.

10.3 Personnel Class Specifications

The County of San Diego has defined job specifications for each position in the County. These job class specifications identify the duties for each position and the minimum requirements for education, experience, knowledge, skills, and abilities necessary to be able to perform the defined job duties. At the District, the job classification specifications are periodically reviewed for relevance to the requirements of current technology, instrumentation, and methodologies in the ambient air monitoring network and analytical laboratory. All job class specifications and revisions are reviewed and approved by the County Department of Human Resources and District managers. Job classification specifications are on file with the Human Resources group at the SDAPCD headquarters and are available upon request

10.4 M&TS Personnel Class Specifications

Chief, Air Pollution Control
Senior Air Pollution Chemist
Associate Air Pollution Chemist
Assistant Air Pollution Chemist
Junior Air Pollution Chemist
Air Pollution Test Technician
Air Pollution Control Aide
Supervising Electronic Instrument Technician
Electronic Instrument Technician II
Electronic Instrument Technician I

Senior Meteorologist
Associate Meteorologist
Assistant Meteorologist

All job specifications are defined by the County of San Diego. These job specifications can be viewed at:

http://agency.governmentjobs.com/sdcounty/

10.5 Supervisory Expectations

The quality and success of the SDAPCD's environmental measurement programs are strongly correlated to the level of staff experience and training. District supervisors routinely assess and address the general training needs of staff in coordination with the District's Human Resources group and the County's Department of Human Resources. To broaden the experience of staff, supervisors provide opportunities for staff to participate in activities outside their daily work routines.

10.6 QA Training

Quality Assurance is a cornerstone of the District's environmental measurement programs/projects and requires continuous evaluation, revision, and training of staff. Formal QA training activities are coordinated by the QA Administrator. The District's Human Resources group maintains records of all training completed by staff.

The SDAPCD maintains a library of training materials developed for District staff. A formal introduction to Quality Assurance for environmental measurement programs is given to all new hires by the QA Manager or other QA staff. This training may also consist of appropriate online training materials with self-testing, or instructor-lead training. A training form is completed and training records are maintained by the District's Human Resources group for all training taken by an individual at the District.

.
10.7 New Employee Orientation

Entry level staff are provided with current SOPs for applicable programs they work on and equipment manuals for the equipment they operate. They are expected to review the documents as they continue through their initial training. Since staff are typically not hired in large groups, new hires are assigned to an experienced staff member for mentor training and to go over procedures and methods to ensure that the new hire is capable of routine operation of equipment

and carrying out procedures correctly. The supervisor is responsible for ensuring that the training has been completed and to assess the quality of work of new employees.

10.8 Continuing Education

Additional training is conducted as needed to keep skills and knowledge current. Training records are placed in the individual's personnel files at the SDAPCD Human Resources group. The QA Manager solicits feedback from supervisors and staff on the timeliness and adequacy of all training taken by M&TS Division staff.

SECTION D. PROCUREMENT OF EQUIPMENT, SUPPLIES, AND SERVICES

11.0 SUPPLIES AND SERVICES

11.1 Procurement

Environmental measurement programs require a wide-range of equipment and supplies to keep operations running efficiently and smoothly. The M&TS Division is responsible for the acquisition of monitoring instruments, analytical equipment, computers, information management software, services, and supplies. All purchasing activities are handled by the San Diego County Department of Purchasing and Contracting and must follow San Diego County Board of Supervisors policies designed to ensure cost competitive purchases and procurements.

Fixed asset purchases are subject to the requirements of a formal Request for Quotations (RFQ) procedure. Specifications for equipment, evaluation criteria for rating each quotation, acceptance criteria, and schedules for delivery are contained in each RFQ. The RFQ must contain all requirements established by U.S. EPA for monitoring and sampling instrumentation for federally mandated programs.

Contracts for professional services are subject to the requirements of a formal Request for Proposals (RFP) procedure. If a professional services contract is funded in whole or in part by U.S. EPA Section 103 or 105 grants, then the proposed contractor must comply with and implement all applicable requirements of the current version of the SDAPCD QMP for Environmental Measurement Programs and the SDAPCD QAPP for the specific program/project.

The SDAPCD is committed to purchasing equipment and supplies to ensure the quality of air monitoring programs. The quality of chemical reagents, calibration gas standards, instrumentation, and instrument service contracts have a direct impact on the quality of the data collected and reported. In order to ensure the integrity of data, staff must follow proper procedures for the purchasing of services and supplies. Procedures for purchasing, receipt, and storage of reagents and laboratory consumable materials for tests and calibrations are strictly followed.

Calibration and audit gas cylinders shall conform to NIST Traceability Protocol 1 (when available). All Calibration gas cylinders are purchased from a vendor that is certified by the Protocol Gas Verification Program (PGVP) (40 CFR 75.21 (g)).

SECTION E. DOCUMENTS AND RECORDS

12.0 RECORDS

The SDAPCD creates various quality-related documents and records through the process of operating environmental measurement programs. Documents include this QMP, associated QAPPs and SOPs, Data Quality Assessment Reports, Data Quality Related Memoranda, Monitoring Studies, Corrective Action Reports, and miscellaneous forms for quality control purposes. Records include Continuous Air Quality and Meteorological Monitoring Systems Data, Laboratory Analytical Reports, and Chain-of-Custody forms.

12.1 Responsibility for Documents and Records

The supervisor of the section that creates a document or dataset has the responsibility for identifying all quality-related documentation required for those products. Once a document or type of record has been identified, the appropriate supervisor works with the QA Manager to bring that component into the Document Control System. This may be as a separate document or record, or as part of an existing QAPP or SOP.

The QA Administrator has the ultimate responsibility for assuring that the QMP, QAPPs, and SOPs are current and appropriately distributed and followed. The San Diego APCD updates its SOPs every three years. The QA Manager is responsible for implementing and maintaining the Document Control System. The appropriate distribution is assured by issuance of documents to staff and requiring a signature on an issuance record sheet.

When revised QAPPs and SOPs are issued, supervisors are responsible for verifying that all appropriate staff have received updated documents and notifying the QA Manager with this information. The QA Manager will verify annually that documents in use by staff are current and that unauthorized modifications have not been made to processes, procedures, or methods. If discrepancies are found, immediate corrective action is required.

12.2 Public Access to Documents and Records

The SDAPCD provides access to a wide range of air quality information, including air quality forecasts; current air quality information; historical air quality data summary tables; ozone trends; and, information/reports from special air quality studies. Records and documents not available on the District website may be requested through the SDAPCD Public Records Request procedure. In some cases, the District will direct requestors to the CARB Statewide Air Quality Archives or provide data from the U.S. EPA Air Quality System (AQS).

12.3 Archiving of Documents and Records

All quality assurance documents and records are archived by QA staff and are maintained in digital and/or hardcopy form. Among the documents and records generally considered to be quality assurance documents are: QMPs; QAPPs; SOPs; audits; external and internal correspondence; U.S. EPA or other reference documents; and, certain contracts directly related to District monitoring programs. The QA Manager ensures that current quality assurance documents and records are located in appropriate filing locations.

The QA Manager is responsible for maintaining quality assurance documents. The QA Manager maintains a set of "current documents" that are available to all staff, and a set of "archived documents" that have more limited access. The archived documents provide a timeline and history of all quality assurance documents. The QA Manager maintains a summary table that identifies the start and end dates for each version of a document and that provides a cross-reference to all applicable programs/projects.

Quality assurance documents are normally archived in digital format. However, some programs/projects may require hardcopy originals to be kept as well. For example, laboratory analytical results that are printed from an analytical instrument's local computer during the analysis are initially stored in hardcopy format. These hardcopy records are later scanned and stored digitally for long-term archiving.

The District maintains digital records onsite and on a secure offsite server. Hardcopy documents and records may be archived on-site at SDAPCD Headquarters for specified lengths of time. Documents and records that need to be maintained for longer periods of time can be relocated to an offsite storage facility. The types of records maintained and their retention policies are defined by the District's Departmental Records Management Plan (see Appendix D).

SECTION F. COMPUTER HARDWARE AND SOFTWARE

13.0 COMPUTER INFORMATION

13.1 Hardware and Software

The M&TS Division of the SDAPCD uses computers and computerized instrument systems to capture, process, transmit, and archive environmental data. Computers include laptop and desktop personal computers; data loggers at monitoring stations; systems integrated into laboratory analytical instruments; and, servers dedicated to the data acquisition and management systems. Computer systems are maintained by the Meteorology & Modeling Section (M&MS).

The acquisition of all computer hardware and software is subject to the County of San Diego IT procurement policy. The SDAPCD computer hardware and software policy requires that users adhere to all license, copyright, and usage terms for installed software.

The M&MS maintains an "out-of-scope" (i.e., independent of the County's IT-contracted network) computer network for the M&TS Division. This network follows the County of San Diego procurement policy and hardware/software licensing requirements. This network allows the M&TS Division to install and operate air quality modeling software, analytical software applications, and other programs needed to operate the District's air quality monitoring network (these programs fall outside of the County's IT-approved suite of software).

Administrator access for personal computers is limited to M&MS staff unless specifically granted to individual computer users by Chief of the M&TS Division. Network administrator passwords are limited to M&MS staff who operate the internal network.

Environmental measurement program data backups depend on where the data are located. The air quality and meteorological data on the District servers are automatically backed up to an offsite location. Networked computers transfer their data to the server for offsite backup. Other, stand-alone computers (e.g., those attached to analytical laboratory equipment) require the users to transfer data to the network server (e.g., via flash drive, CD-ROM, DVD-ROM) for offsite backup. Network servers are backed up offsite nightly. The retention period for each backup and off-site archiving of backup data are set in the SDAPCD Departmental Records Management plan (See Appendix D).

SECTION G. PLANNING

14.0 PLANNING

14.1 Planning Requirements

All operations involving the generation and analysis of environmental monitoring data must be planned and documented. Quality Assurance Project Plans (QAPPs) are formal planning tools for environmental monitoring programs/projects.

The U.S. EPA document *Data Quality Objectives* (U.S. EPA, 2006) may be used by the program/project manager as a guide in the QAPP planning and development process. In developing a QAPP, the program/project manager obtains input from stakeholders and users of the data to be collected.

Each QAPP is reviewed and approved by the QA Manager for conformance with the requirements of Section 9.5 (Systematic Planning of Projects) and Section 9.6 (Project-Specific Quality Documentation) of this QMP.

14.2 Data Quality Objectives

Identification of appropriate Data Quality Objectives (DQOs) is an important planning activity for the development of QAPPs. For each environmental measurement program or project, SDAPCD management and staff identify DQOs that:

- Are consistent with requirements of applicable standardized methods such as those defined by the U.S. EPA, CARB, ISO, ASTM, or other ANSI-approved organizations.
- Include quantitative measures of accuracy, precision, timeliness, comparability, and representativeness consistent with requirements of the program and technical capabilities.
- Consider the needs of the SDAPCD in addressing local and regional issues.
- Are consistent with existing QAPPs and SOPs.
- Are periodically evaluated for consistency and improvement.

DQOs identified through this process are explicitly incorporated into the program/project specific QAPP. Key elements for specific environmental measurement program DQOs include the following:

- State the problem or issue.
- Identify decision points and courses of action.
- Identify the inputs into the decision or course of action.

- Define the boundaries of the study.
- Develop a decision rule.
- Specify limits on decision errors.
- Optimize the design for obtaining quality data.

SECTION H. IMPLEMENTATION OF WORK PROCESSES

15.0 PROCESSES

15.1 Implementation

Environmental monitoring operations are based on approved QAPPs and SOPs and are implemented by qualified and trained personnel. Implementation schedules are created that define tasks, deadlines, and responsibilities. Operational deviations from approved procedures are documented and reported by the program/project manager to the QA Manager. The significance of the deviation, and any needed adjustments or corrective actions are determined by the QA Manager. The QA Administrator provides final approval on any deviations.

SECTION I. QUALITY ASSESSMENT AND RESPONSE

16.0 QUALITY ASSESSMENT

16.1 Systems Audits

Annual internal systems audits that include all aspects of the monitoring network and data quality are performed under the direction of QA Manager. Due to the number of programs and the size of the monitoring network, systems audits are an ongoing process. Systems audits include inspecting at least one-fourth of all monitoring equipment each calendar quarter, an annual audit of the laboratory, and periodic audits of the District's data validation procedures. Portions of the annual systems audit may be conducted by QA staff. External systems audits are conducted by the U.S. EPA and CARB (using either agency staff or by independent consultants working under agency oversight).

16.2 Performance Audits

Performance audits are conducted to determine the precision and accuracy of monitoring equipment and analytical instrumentation. All performance audits performed by SDAPCD QA staff or external entities are required to meet requirements under the appropriate QAPPs and SOPs.

Internal performance audits are conducted by QA staff under the oversight of the QA Manager. Audit procedures and processes are detailed in the QAPP for the Ambient Air Monitoring Quality Assurance Program. Performance audits include checking the accuracy of one fourth of the criteria pollutant monitoring instruments and samplers each calendar quarter. For gaseous pollutants, "through-the-probe" (TTP) accuracy audits are conducted that test the integrity of the entire sampling and measurement system. Laboratory processes, which include the instrumentation, analysis, and equipment operators, are audited once per calendar year.

External performance audits are conducted by the U.S. EPA or CARB (using either agency staff or by independent consultants working under agency oversight).

16.3 Internal Quality Control

Internal quality control (QC) is important to ensure that collected data meet the DQOs of the program. The basic quality control practices used for air monitoring programs include, but are not limited to the following: continuous analyzers; discrete sample preparation, sample collection, and sample recovery; and, laboratory instruments.

16.4 Continuous Analyzers

- NIST traceable daily zero/span; periodic multi-point calibrations on the schedule defined in the program/project SOP.
- QC action levels and data acceptance criteria.
- Calibration and control acceptance criteria (including calibration drift allowance criteria).
- Common mitigation procedures and policies.
- Audit practices.
- QA action levels and data acceptance criteria.

16.5 Discrete Sample Preparation, Sample Collection, and Sample Recovery

- NIST traceable standards (e.g., S-class weights for balances).
- Blanks and acceptance criteria.
- Calibration, calibration curve, and control acceptance criteria (including drift allowance criteria).
- Procedural acceptance criteria.
- Duplicate analysis frequency and acceptance criteria.
- QC action levels and data acceptance criteria.
- Common mitigation procedures and policies.
- Chain-of-Custody procedures.
- Audit practices and acceptance criteria.
- QA action levels and data acceptance criteria.

16.6 Laboratory Instruments

- NIST traceable daily calibration and multi-point calibration standards.
- Calibration, calibration curve, and control acceptance criteria (including drift allowance criteria).
- Blanks and acceptance criteria.
- QC action levels and data acceptance criteria.
- Analysis acceptance criteria.
- Duplicate analysis frequency and acceptance criteria.
- Common problem mitigation procedures and policies.
- Chain-of-Custody procedures.
- Audit practices and acceptance criteria.

16.7 Corrective Actions

Corrective Action Requests (CARs) are issued by QA staff as needed to provide immediate feedback to station technicians, supervisors, and managers if quality assurance checks identify problems that are impacting data quality. These CARs are disseminated by e-mail to the station technician and the QC Manager when potential problems are identified. Details for the corrective action recommendations are included in the CAR.

A CAR is issued within two weeks of an internal quality assurance assessment that finds potential problems. A response is required within one week of the issuance of the CAR. There are two types of responses to the CAR: 1) Correct the problem identified in the CAR; or, 2) further investigate the cause(s) of the problem to determine the best corrective action.

Depending on the seriousness or complexity of the problem, the response can be by e-mail, informal meetings, or formal meetings. However, corrective action may be taken without discussion when it is clear that the issue identified in the CAR requires immediate action.

16.8 Problem Resolution

If there is a disagreement over the applicability of a Quality System requirement, the appropriateness of quality assurance or quality control procedures, specific quality assessment findings, or a corrective action recommendation, the disputed issue is resolved by the section supervisors. The supervisors may include staff to provide technical clarification. If the issue cannot be resolved at the supervisor level, the issue is taken to the QA Administrator. The QA Administrator will determine an appropriate resolution or initiate additional fact finding. In either case, a resolution needs to be issued within ten days. The resolution is final and not subject to appeal.

SECTION J. QUALITY IMPROVEMENT

17.0 QUALITY IMPROVEMENT

17.1 Collection and Reporting

Quality improvement results from activities undertaken at every level of the organization and from open and timely communication between staff and management. Two way communication between line staff and management is crucial for ensuring that DQOs are maintained and improved in a timely and effective manner.

A continual process of assessing the Quality System, identifying and implementing improvements to the Quality System, and ongoing training contribute to the SDAPCD's commitment to data quality for current and future environmental measurement programs.

Communication between management and line staff is achieved through written correspondence and periodic meetings. The results of quality assurance assessments relative to DQOs and the proper implementation of total measurement systems are examples of areas where communication is critical to the District's data collection and reporting process. However, the timely identification and prevention of data errors is achieved through daily quality control activities at the staff level as prescribed in the appropriate QAPPs and SOPs.

17.2 Operational Activities

During field operations, significant problems and observations are documented in the station and/or instrument log books and reported to supervisors. For the purposes of this QMP, a significant problem is one that cannot be quickly mitigated in the field, results in the loss of four hours or more of data, or requires the attention of equipment specialists. When issues are discovered, corrective action is initiated through work orders and these are forwarded to the station operator's supervisor. When the issue is resolved, the station operator documents the problem and solution in the instrument and station log books. Minor problems that can be corrected by staff without loss of data are also documented in the station and instrument log books.

Laboratory operations fall under two broad categories:

- Category 1 - pre-sample preparation, sample collection, pre-analysis preparation.
- Category 2 - sample analysis.

For laboratory Category 1 operations, problems are documented in log books, reported to the AAQS Supervisor and the EITS Supervisor, as appropriate. Air Quality Chemists, under the lead of a Senior Air Quality Chemist, formulate and implement corrective actions. When the problem has been corrected, the corrective action is documented in laboratory log books.

For laboratory Category 2 operations, problems are documented in log books, and reported to the AAQS Supervisor, as appropriate. Air Quality Chemists, in consultation with the AAQS Supervisor, frequently formulate and implement corrective actions. When the problem has been corrected, the corrective action is documented in log books. For data that may be compromised or is suspect, a notation is made on laboratory reports or other relevant documents as to the problem and potential impact upon data quality.

17.3 Data Processing, Validation, and Reporting

Data collected by the SDAPCD undergo extensive processing and validation before being submitted to the EPA's Air Quality System (AQS). Most data are processed through the District's centralized Data Acquisition System (DAS). Data are generally processed, validated, and reported on a monthly or quarterly basis.

AAQS staff review all data quality and problem reports, and results from zero/span checks, precision checks, and multipoint calibrations to determine the validity of the data. Data problems identified during routine operations are also reviewed during the data validity determination process. Data validity determinations generally result in one of the following:

- Data are valid.
- Data are invalid and are removed from the database with the appropriate Null Data Code.
- Data are valid with a Qualifier Code added to indicate that the data were collected under less than ideal conditions or marginal analyzer performance.

After the data have been processed and validated by the AAQS, they undergo additional computerized screening, statistical analysis, graphical inspection, and cross-network consistency checks by the QA Officer before being submitted to the AQS.

If operational issues are found during data processing and validation, the QA Officer meets with the QA Manager and QC Manager to get the problem resolved. If changes to routine operations are needed, the QA Administrator is informed. The QA or QC Manager then disseminates the information through their respective sections and the appropriate SOPs or QAPPs are updated.

17.4 Quality Assurance Communication

The QA Manager, the QC Manager, and the QA Officer meet as needed to review and discuss QA initiatives, training/resource needs, assessments, corrective actions, and other issues relevant to the SDAPCD Quality System. They also meet if operational issues create an immediate impact on data quality. QA staff work with operations staff, supervisors, and managers to develop and implement corrective actions for data verification and reporting procedures to improve data quality.

The QA Manager and the QC Manager meet regularly with their staff. In these meetings they discuss QA and QC issues, listen to feedback from staff, and provide guidance. Staff involved in environmental measurement programs are encouraged to communicate openly and often on QA and QC issues, and to express any concerns or recommendations to their immediate supervisors. An ongoing exchange of ideas and opinions on quality issues encourages the timely recognition and action on areas in need of improvement, and is an indicator of a healthy quality management system.

SECTION K. REFERENCES

18.0 REFERENCES

40 CFR 50. Code of Federal Regulations. *National Primary and Secondary Ambient Air Quality Standards*.

40 CFR 58. Code of Federal Regulations. *Ambient Air Quality Surveillance*.

40 CFR 75.21(g). Code of Federal Regulations. *Quality Assurance and Quality Control Requirements (Requirements for EPA Protocol Gas Verification Program)*.

California Code of Regulations (CCR). *Title 17 – Public Health, Section 70200 – Table of Standards*.

U.S. Environmental Protection Agency. 1978. *Screening Procedures for Ambient Air Quality Data,* EPA-450/2-78-037, Office of Air Quality Planning and Standards, Research Triangle Park, NC.

U.S. Environmental Protection Agency. 1980. *Validation of Air Monitoring Data,* EPA-600/4-80-030, Environmental Monitoring and Support Laboratory, Research Triangle Park, NC.

U.S. Environmental Protection Agency. 1994. *A Screening Analysis of Ambient Monitoring Data for the Urban Area Source Program,* EPA-453/R-94-075, Office of Air Quality Planning and Standards, Research Triangle Park, NC.

U.S. Environmental Protection Agency. 2001a. *EPA Requirements for Quality Management Plans – EPA QA/R-2,* EPA/240/B-01/002, Office of Environmental Information, Washington, D.C.

U.S. Environmental Protection Agency. 2001b. *EPA Requirements for Quality Assurance Project Plans – EPA QA/R-5*, EPA/240/B-01/003, Office of Environmental Information, Washington, D.C.

U.S. Environmental Protection Agency. 2002. *Guidance for Quality Assurance Project Plans – EPA QA/G-5*, EPA/240/R-02/009, Office of Environmental Information, Washington, D.C.

U.S. Environmental Protection Agency. 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process – EPA QA/G-4*, EPA/240/B-06/001, Office of Environmental Information, Washington, D.C.

U.S. Environmental Protection Agency. 2007. *Guidance for Preparing Standard Operating Procedures (SOPs) – EPA QA/G-6*, EPA/600/B-07/001, Office of Environmental Information, Washington, D.C.

U.S. Environmental Protection Agency. 2011. *Data Quality Screening Using Trend Charts,* Quality Assurance Office, Region 9.

SECTION L. – APPENDICES

APPENDIX

A

19.0 APPENDIX A

Appendix A: Glossary of Quality Assurance and Related Terms (Based upon EPA definitions provided in U.S. EPA, 2002)

(Note that these definitions are for the purposes of this document only and do not affect the use of the terms for other purposes.)

acceptance criteria — address the adequacy of existing information proposed for inclusion into the project. These criteria often apply to data drawn from existing sources ("secondary" data).

accuracy — a measure of the overall agreement of a measurement to a known value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations; EPA recommends using the terms *"precision"* and *"bias*," rather than "accuracy," to convey the information usually associated with accuracy.

assessment — the evaluation process used to measure the performance or effectiveness of a system and its elements.

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.

bias — the systematic or persistent distortion of a measurement process that causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value).

blank — a sample subjected to the usual analytical or measurement process to establish a zero baseline or background value. Sometimes used to adjust or correct routine analytical results. A sample that is intended to contain none of the analytes of interest. A blank is used to detect contamination during sample handling preparation and/or analysis.

chain-of-custody — an unbroken trail of accountability that ensures the physical security of samples, data, and records.

collocated samples — two or more portions collected at the same point in time and space so as to be considered identical. These samples are also known as field replicates and should be identified as such.

comparability — a measure of the confidence with which one data set or method can be compared to another.

completeness — a measure of the amount of valid data obtained from a measurement system.

conformance — an affirmative indication or judgment that a product or service satisfies the relevant specification, contract, or regulation.

corrective action — any measures taken to rectify conditions adverse to quality and, where possible, to prevent recurrence.

data quality — a measure of the degree of acceptability or utility of data for a particular purpose.

data quality assessment — the scientific and statistical evaluation of data to determine if data obtained from environmental operations are of the right type, quality, and quantity to support their intended use.

data quality indicators — the quantitative statistics and qualitative descriptors used to interpret the degree of acceptability or utility of data to the user. The principal data quality indicators are bias, precision, accuracy (bias is preferred), comparability, completeness, representativeness, and sensitivity.

data quality objectives — the qualitative and quantitative statements derived from the DQO process that clarifies study's technical and quality objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions.

data quality objective process — a systematic planning tool based on the scientific method that identifies and defines the type, quality, and quantity of data needed to satisfy a specified use. DQOs are the qualitative and quantitative outputs from the DQO Process.

data reduction — the process of transforming the number of data items by arithmetic or statistical calculations, standard curves, and concentration factors, and collating them into a more useful form. Data reduction is irreversible and generally results in a reduced data set and an associated loss of detail.

data validation — an analyte- and sample-specific process that extends the evaluation of data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of a specific data set.

data verification — the process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual specifications.

design — the specifications, drawings, design criteria, and performance specifications. Also, the result of deliberate planning, analysis, mathematical manipulations, and design processes.

detection limit — a measure of the capability of an analytical method to distinguish samples that do not contain a specific analyte from samples that contain low concentrations of the analyte; the lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability. DLs are analyte- and matrix-specific and may be laboratory-dependent.

document control — the policies and procedures used by an organization to ensure that its documents and their revisions are proposed, reviewed, approved for release, inventoried, distributed, archived, stored, and retrieved in accordance with the organization's specifications.

environmental conditions — the description of a physical medium (for example, air, water, soil, sediment) or a biological system expressed in terms of its physical, chemical, radiological, or biological characteristics.

environmental data — any measurements or information that describe environmental processes, location, or conditions; ecological or health effects and consequences; or the performance of environmental technology. For EPA, environmental data include information collected directly from measurements, produced from models. Compiled from other sources such as data bases or the literature.

environmental data operation — work performed to obtain, use, or report information pertaining to environmental processes and conditions.

environmental monitoring — the process of measuring or collecting environmental data.

environmental processes — any manufactured or natural processes that produce discharges to, or that impact, the ambient environment.

environmental technology — an all-inclusive term used to describe pollution control devices and systems, waste treatment processes and storage facilities, and site remediation technologies and their components that may be used to remove pollutants or contaminants from, or to prevent them from entering, the environment. Examples include wet scrubbers (air), soil washing (soil), granulated activated carbon unit (water), and filtration (air, water). Usually, this term applies to hardware-based systems; however, it can also apply to methods or techniques used for pollution prevention, pollutant reduction, or containment of contamination to prevent further movement of the contaminants, such as capping, solidification or vitrification, and biological treatment.

field blank — a clean analyte-free sample which is carried to the sampling site and then exposed to sampling conditions, returned to the laboratory, and treated as an environmental sample. This blank is used to provide information about contaminants that may be introduced during sample collection, storage, and transport.

financial assistance — the process by which funds are provided by one organization (usually governmental) to another organization for the purpose of performing work or furnishing services or items. Financial assistance mechanisms include grants, cooperative agreements, and governmental interagency agreements.

graded approach — the process of applying managerial controls to an item or work according to the intended use of the results and the degree of confidence needed in the quality of the results.

guidance — a suggested practice that is not mandatory, intended as an aid or example in complying with a standard or specification.

holding time — the period of time a sample may be stored before analysis. While exceeding the holding time does not necessarily negate the veracity of analytical results, it causes the qualifying or "flagging" of any data not meeting all of the specified acceptance criteria.

independent assessment — an assessment performed by a qualified individual, group, or organization that is not a part of the organization directly performing and accountable for the work being assessed.

inspection — the examination or measurement of an item or activity to verify conformance to specifications.

matrix spike sample — a sample prepared by adding a known amount of the target analyte to a specified amount of a matrix. Spiked samples are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

measurement quality objectives — the individual performance or acceptance goals for the individual Data Quality Indicators such as precision or bias.

metadata — information that describes the data and the quality criteria associated with their generation.

method — a body of procedures and techniques for performing an activity (for example, sampling, chemical analysis, quantification), systematically presented in the order in which they are to be executed.

method blank — a blank prepared to represent the sample matrix as closely as possible and analyzed exactly like the calibration standards, samples, and quality control (QC) samples. Results of method blanks provide an estimate of the within-batch variability of the blank response and an indication of bias introduced by the analytical procedure.

outlier — an extreme observation that is shown to have a low probability of belonging to a specified data population.

parameter — a quantity, usually unknown, such as a mean or a standard deviation characterizing a population. Commonly misused for "variable," "characteristic," or "property."

performance criteria — address the adequacy of information that is to be collected for the project. These criteria often apply to new data collected for a specific use ("primary" data).

precision — a measure of agreement among repeated measurements of the same property under identical, of substantially similar, conditions; expressed generally in terms of the standard deviation.

process — a set of interrelated resources and activities that transforms inputs into outputs. Examples of processes include analysis, design, data collection, operation, fabrication, and calculation.

proficiency test — a type of assessment in which a sample, the composition of which is unknown to the analyst, is provided to test whether the analyst/laboratory can produce analytical results within the specified acceptance criteria.

quality — the totality of features and characteristics of a product or service that bears on its ability to meet the stated or implied needs and expectations of the user.

quality assurance — an integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer.

quality assurance project plan — a formal document describing in comprehensive detail the necessary quality assurance procedures, quality control activities, and other technical activities that need to be implemented to ensure that the results of the work performed will satisfy the stated performance or acceptance criteria.

quality control — 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 specifications established by the customer; operational techniques and activities that are used to fulfill the need for quality.

quality control sample — an uncontaminated sample matrix spiked with known amounts of analytes from a source independent of the calibration standards. Generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system.

quality management plan — a document that describes the quality system in terms of the organization's structure, the functional responsibilities of management and staff, the lines of authority, and the 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, and assessing work performed by the organization and for carrying out quality assurance procedures and quality control activities.

readiness review — a systematic, documented review of the readiness for the start-up or continued use of a facility, process, or activity. Readiness reviews are typically conducted before proceeding beyond project milestones and before initiation of a major phase of work.

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

recovery — the act of determining whether or not the methodology measures all of the analyte contained in a sample.

representativeness — the measure of the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

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

sensitivity — the capability of a method or instrument to discriminate between measurement responses representing different levels of a variable of interest.

spike — a substance that is added to an environmental sample to increase the concentration of the target analyte by known amount; used to assess measurement accuracy (spike recovery). Spike duplicates are used to assess measurement precision.

split samples — two or more representative portions taken from one sample in the field or in the laboratory and analyzed by different analysts or laboratories. Split samples are quality control samples that are used to assess analytical variability and comparability.

standard operating procedure — a document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps to be followed. It is officially approved as the method for performing certain routine or repetitive tasks.

surveillance (quality) — continual or frequent monitoring and verification of the status of an entity and the analysis of records to ensure that specifications are being fulfilled.

technical systems audit — a thorough, systematic, on-site qualitative audit of facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and reporting aspects of a system.

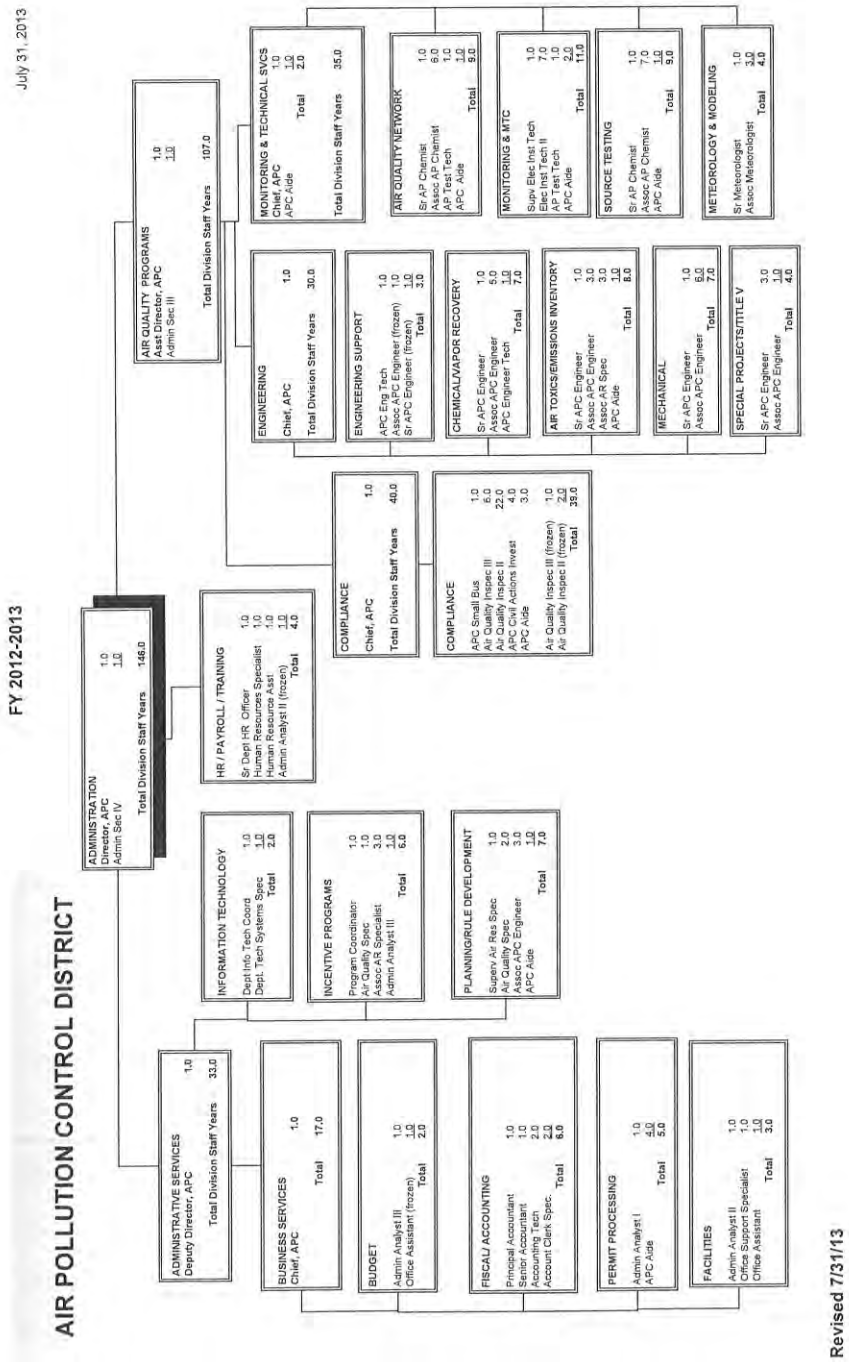
validation — an analyte- and sample-specific process that extends the evaluation of data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of a specific data set.

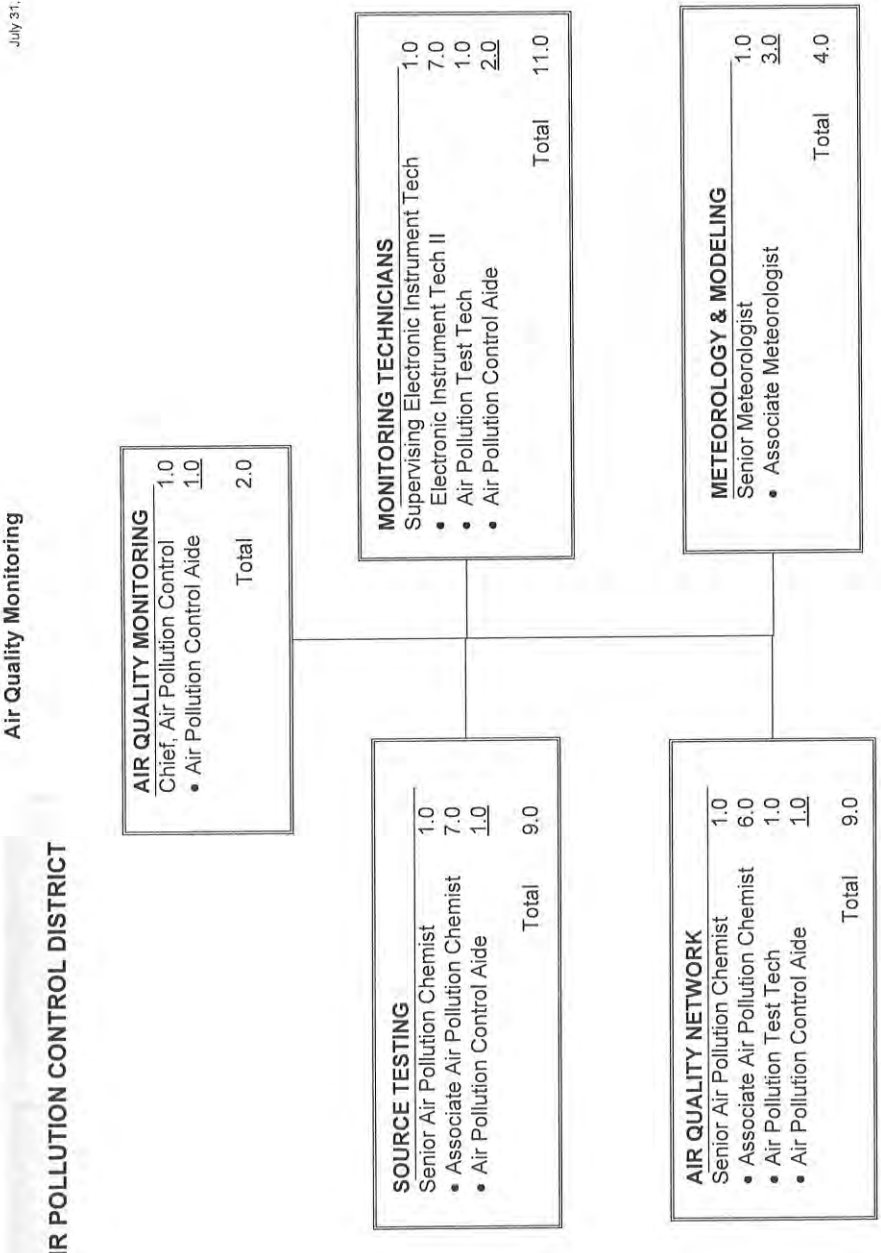
verification — the process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual specifications.

APPENDIX

B

20.0 APPENDIX B: ORGANIZATION CHARTS




AIR POLLUTION CONTROL DISTRICT
Air Quality Monitoring
July 31, 2013
AIR QUALITY MONITORING
Chief, Air Pollution Control 1.0
• Air Pollution Control Aide 1.0
Total 2.0
MONITORING TECHNICIANS
Supervising Electronic Instrument Tech 1.0
• Electronic Instrument Tech II 7.0
• Air Pollution Test Tech 1.0
• Air Pollution Control Aide 2.0
Total 11.0
METEOROLOGY & MODELING
Senior Meteorologist 1.0
• Associate Meteorologist 3.0
Total 4.0
SOURCE TESTING
Senior Air Pollution Chemist 1.0
• Associate Air Pollution Chemist 7.0
• Air Pollution Control Aide 1.0
Total 9.0
AIR QUALITY NETWORK
Senior Air Pollution Chemist 1.0
• Associate Air Pollution Chemist 6.0
• Air Pollution Test Tech 1.0
• Air Pollution Control Aide 1.0
Total 9.0
Revised 7/31/13

This page is intentionally blank.

APPENDIX

C

21.0 APPENDIX C: QMP REVISION RECORD

21.1 QMP Revision Record

REVISION DATE	REVISION NUMBER	SUMMARY OF CHANGES	SECTION(S)	REVISED BY
December 30, 2013	1	Major Revision / Rewrite	All	[redacted]

APPENDIX

D

22.0 APPENDIX D: AIR POLLUTION CONTROL DISTRICT DEPARTMENTAL RECORDS MANAGEMENT PLAN

22.1 Air Pollution Control District Departmental Records Management Plan

AIR POLLUTION CONTROL DISTRICT
DEPARTMENTAL RECORDS MANAGEMENT PLAN

I. General Information

a. Global Retention Schedule
The Global Retention Schedule can be found on the San Diego County Intranet site (cww) at:
[redacted]

b. Departmental Retention Schedule
The District's departmental retention schedule can be found on cww at:
[redacted]

II. Responsibilities

a. The Administrative Support Division (ASD) shall administer the District's overall Records Management Program, providing guidance, reviewing the program, and taking corrective action as needed.
b. ASD shall be responsible for periodic review and updates to the District's Records Retention Schedule and Records Management Plan.
c. ASD shall be responsible for tracking, storage, retrieval, and destruction of all records.
d. Each Division within the District is responsible for preparing an inventory, including length of time, for each box to be stored (on- or off-site).

III. Tracking and Handling

a. Active Records
All active records are kept within each Division and are reviewed annually.
b. Inactive Records
- Annually, each Division shall review all inactive records and determine if retention is required.
- If required, they will box all like records with the same retention date and provide an inventory of each box before submittal to ASD.
- If not required, they will recycle or shred.

c. Electronic Records
APCD is in the process of implementing a solution to use County of San Diego standard Documentum. Records will be stored within Documentum Records Manager and will be destroyed in compliance with APCD Records Retention Schedule.

APCD is currently using Documentum to scan all documents related to permit applications.

APCD Records Management Plan.doc

IV. Storage

a. Paper Records

i. On-site

- An inventory of each box is provided to ASD.
- ASD tracks the inventory sheet on a master inventory.
- ASD assures that each box is of like records with the same retention date.
- The contents of each box is removed and placed in filing cabinets in the On-site Storage Room.
- Drawer numbers are added to the master inventory and the original inventory sheet.
- A copy of the inventory sheet is returned to the originator for their records.

ii. Off-site

- ASD completes the Iron Mountain transmittal sheet using information from the original inventory sheet.
- Copies of transmittal sheets are kept in chronological order in file cabinet.

b. Electronic Records

APCD is in the process of implementing a solution to use County of San Diego standard Documentum. Records will be stored within Documentum Record Manager and will b destroyed in complianece with APCD Records Retention Schedule.

APCD is currently using Documentum to scan all documents related to permit **applications.**

V. Retrieval

a. Paper Records

i. On-site

- Requestor provides a work order for retrieval of on-site records to ASD staff.
- ASD retrieves record from the On-site Storage Room and provides it to requestor.
- An out card is placed in the file cabinet unless request is for permanent removal.
- Retrieval is tracked on master inventory with requestor's name, date of retrieval, and date of anticipated return.

ii. Off-site

- Requestor provides a work order for retrieval of off-site records.
- ASD completes an online request to Iron Mountain to retrieve boxes or files.
- Iron Mountain delivers boxes or files to ASD.
- ASD informs requestor of receipt and notes on transmittal form date of receipt and date of anticipated return.
- ASD sets up tickler notification for date of anticipated return.

b. Electronic Records

APCD is in the procress of implementing a solution to use County of San Diego standard Documetum. Records will be stored within Documentum Record Manager and will be destroyed in compliance with APCD Records Retention Schedule.

APCD is currently using Documentum to scan all documents related to permit applications.

VI. Records Destruction

a. Paper Records

i. On-site

- Records stored on-site reaching their destruction date are checked against retention schedules.
- The AUD-100-1 form is completed and sent to Auditor & Controller.
- Once approved, records are recycled or shredded by ASD staff.

ii. Off-site (Iron Mountain)

- Records stored off-site reaching their destruction date are checked against retention schedules.
- The AUD-100-1 form is completed and sent to Auditor & Controller.
- Once approved, a copy of the AUD-100-1 is sent to Iron Mountain with a request from the District to destroy records.

b. Electronic Records

APCD is in the process of implementing a solution to use County of San Diego standard Documentum. Records will be stored within Documentum Record Manager **and will be destroyed in compliance with APCD Records Retention Schedule.**

APCD is currently using Documentum to scan all documents related to permit applications.

VII. Long-Term Records Storage

Any record that must be kept indefinitely will be permanently removed from Iron Mountain and microfiched.