

Quality Management Plan for Environmental Measurement Programs

January, 2009



South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Issued by:
Office of Science and Technology Advancement

Agency: South Coast Air Quality Management District
Document: Quality Management Plan
Section: Foreword
Rev. No.: 1 Date: January, 2009
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Foreword

This Quality Management Plan presents the South Coast Air Quality Management District quality system and includes the organizational structure, functional responsibilities of management and staff, lines of authority, and general methodology for assessing all activities conducted in support of air monitoring and analysis, air quality assessment and other environmental measurement activities conducted by the agency.

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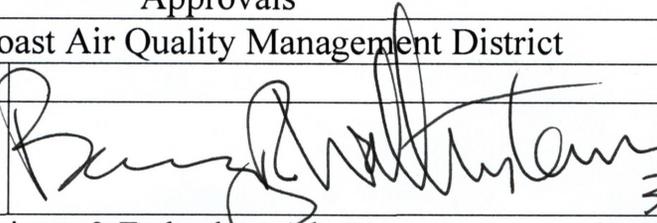
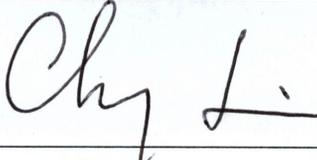
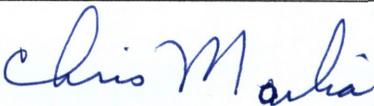
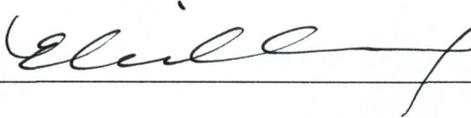
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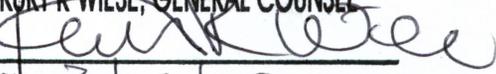
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ACS	American Chemical Society
AM	Atmospheric Measurements
ANSI	American National Standards Institute
AAQ Chemist	Assistant Air Quality Chemist
AQ Chemist	Air Quality Chemist
AQIS	Air Quality Instrument Specialist
AQMP	Air Quality Management Plan
AWMA	Air & Waste Management Association
CAR	Corrective Action Report
CARB	California Air Resources Board
CFR	Code of Federal Regulations
D. Env.	Doctor of Environmental Science
DEO	Deputy Executive Officer
DL	Detection Limit
DQA	Data Quality Assessment
DQIs	Data Quality Indicators
DQOs	Data Quality Objectives
EO	Executive Officer
HAP	Hazardous Air Pollutant
IM	Information Management
ISO	International Standards Organization
IT	Information Technology
LAP	Laboratory Approval Program
LSST	Laboratory Services & Source Testing
M&A	Monitoring & Analysis
MATES	Multiple Air Toxics Exposure Study
MSR	Management Systems Review
NATTS	National Air Toxics Trends Stations
NIST	National Institutes of Standards and Technology
NOx	Nitrogen Oxides
NVLAP	National Voluntary Laboratory Accreditation Program
OJT	On-the-Job Training
PAMS	Photochemical Assessment Monitoring Stations
PE	Performance Evaluation
Ph. D.	Doctor of Philosophy
PIA	Program Implementation Assessment

List of Acronyms (continued)	
PM10	Inhalable Particulate Matter
PM2.5	Fine Particulate
PQAO	Primary Quality Assurance Organization
PRDA	Planning, Rule Development & Area Sources
QA	Quality Assurance
QAA	Quality Assurance Alert
QAPP	Quality Assurance Project Plan
QC	Quality Control
QMP	Quality Management Plan
RECLAIM	Regional Clean Air Incentives Market
RFP	Request for Proposal
RFQ	Request for Quotation
SCAQMD (also AQMD)	South Coast Air Quality Management District
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Stations
SOP	Standard Operating Procedure
SO_x	Sulfur Oxides
STA	Science & Technology Advancement
TAMTAC	Toxics Air Monitoring Technical Assistance Committee
U.S. EPA	United States Environmental Protection Agency
UAMMP	Upper Air Meteorological Measurements Program

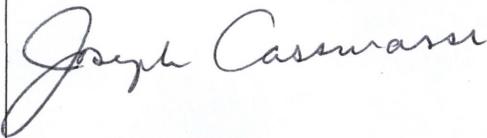
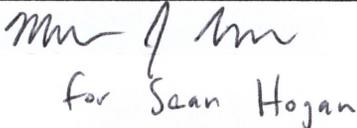
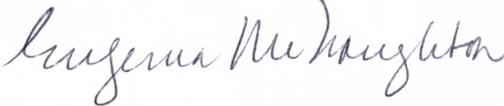
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SECTION 1. INTRODUCTION

1.1 Purpose

This Quality Management Plan (QMP) describes the quality management system utilized by the South Coast Air Quality Management District (AQMD). Quality assurance goals, policies, procedures, organizational responsibilities, evaluation and reporting requirements, and other attributes of a quality management system are addressed within this QMP. A glossary of terms used in this document is provided in Appendix A.

1.2 Background

The AQMD is designated as one of the four Primary Quality Assurance Organizations in California and is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. This area encompasses 10,743 square miles where over 16 million people live, or about half the population of the State of California. It is the second most populated urban area in the United States and is one of the most impacted by air pollution.

AQMD is responsible for controlling emissions primarily from stationary sources of air pollution. AQMD develops and adopts an Air Quality Management Plan that delineates the strategy for bringing the area under its jurisdiction into compliance with federal and state clean air standards. AQMD enacts rules to reduce emissions from various sources, including specific types of equipment, industrial processes, paints and solvents, and consumer products. AQMD issues permits to businesses and industries to ensure compliance with air quality rules, and staff conducts periodic inspections to ensure compliance with these requirements. AQMD also conducts and participates in studies and programs targeting the improvement of regional air quality and the attainment of federal and state air quality standards.

Ultimately, the measure of the impact of regulatory and compliance efforts is the quality of the air breathed by those residing and working within the area served by AQMD. AQMD has implemented environmental measurement programs to continuously monitor air quality and meteorological variables at more than thirty locations throughout the four-county area. AQMD environmental measurement programs are critical to satisfying federal and state data collection requirements and for acquiring data needed for updating the agency's Air Quality Management Plan. The various AQMD environmental measurement programs collect data on criteria pollutants, particulate matter (PM_{2.5} and PM₁₀), air toxics and a wide range of other pollutants. These data are collected from sites designated as State and Local Air Monitoring Stations (SLAMS), Photochemical Assessment Monitoring stations (PAMS), National Air Toxics Trends stations (NATTS), and other special monitoring stations. This extensive monitoring network also allows

AQMD to forecast and notify the public whenever air quality is unhealthful and to capture data needed for assessing compliance with federal and state air quality standards.

In addition, AQMD has implemented a number of environmental measurement programs to directly determine facility/manufacturer compliance with federal, state and AQMD rules and regulations, to conduct measurements for community and scientific studies, and to determine impacts sources (e.g. freeways, ports, and airports). These programs include source emissions testing, commercial/industrial materials and product compliance, and special monitoring.

To carry out these various programs, AQMD is granted authority to enact fees on regulated businesses, which account for the majority of General Fund revenue. The remainder of funding comes from motor vehicle registration fees, fines and penalties, federal and state grants, and other miscellaneous sources.

AQMD recognizes the need to ensure that data from these varied programs are of adequate and consistent quality to satisfy federal, state and regional data reporting requirements. This QMP is designed as a framework to meet these requirements. This QMP conforms to the requirements of the United States Environmental Protection Agency (U.S. EPA) Order 5360.1 and the applicable sections of 40 CFR 30, 31, and 35, as well as any specific grant agreements.

This QMP describes the AQMD quality system which includes AQMD quality assurance policy, organizational structure, responsibilities of management and staff, lines of authority, and general methodology for assessing all activities conducted in support of air monitoring, air quality assessment and other environmental measurement activities conducted by the agency. This QMP provides a generalized structure defining the requirements for Quality Assurance Project Plans (QAPP) and Standard Operating Procedures (SOP) needed for the production of high quality, scientifically and legally defensible data in support of programs operated under the AQMD mission, 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 US EPA funding authority and are intended to produce appropriate data of high quality while not being unnecessarily onerous in their application. U.S. EPA Guidelines for QMP, QAPP, and SOP development, and data validation were used extensively in the development of the QMP.

1.3 Mission Statement

AQMD believes that all people who live or work under its jurisdiction have a right to breathe clean air. AQMD is committed to undertaking all necessary steps to protect public health from air pollution, with sensitivity to the impacts of its actions on the community and businesses. This is accomplished through a comprehensive program of

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planning, regulation, compliance assistance, enforcement, monitoring, technology advancement, and public education.

SECTION 2. QUALITY ASSURANCE POLICIES

2.1 Management Quality Assurance Policy

It is AQMD policy that sufficient quality assurance activities are conducted to demonstrate that all data collected by and on behalf of AQMD are scientifically and legally valid for the purposes to which they are intended. Data shall be of known and acceptable accuracy and precision. Data shall also be complete, representative, and comparable for its intended use. Furthermore, the quality of all data shall meet agency, state and U.S. EPA program requirements, and data quality information shall be available upon request for all reported data.

2.2 Basic Principles

The terms QA and QC are related but not synonymous. QA encompasses all measures taken by management and staff to ensure that the quality of a finished product meets the standards of the company or organization. This includes measures to independently assess the quality of data collected under specific projects and the effectiveness of implementation of the quality system by project managers and their staff. As applied to environmental monitoring programs, QA refers to the collective efforts of management and staff to ensure that field and laboratory data meet the objectives of the organization and are acquired and utilized in an efficient and scientifically defensible manner. 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. 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 reliability. QC is applied from the planning and design stages of the monitoring effort, through the implementation stages, to the handling, storage and reporting of accumulated data.

2.3 General Quality Assurance Policies for Environmental Measurements

AQMD relies on environmental measurements to provide information that impacts decisions related to public health and regulatory policy and that also contributes to the general scientific and air regulation communities. A primary function of management and staff is to ensure, document and improve the quality of data produced. The quality assurance approach is both proactive and reactive. It is proactive in developing a set of quality assurance activities and assessing the effectiveness of those activities, reporting findings to management and staff, making recommendations to modify procedures, and correcting implementation practices as appropriate. However, it does not limit itself to routine assessments to maintain and improve data quality. The approach also encourages

and provides timely responses to input from staff and interested stakeholders regarding problems encountered and ideas on how to improve processes. Staff input initiates ad hoc assessments of specific parts of the quality system that may be in need of immediate corrective action to maintain data quality objectives (DQOs) and to avoid the loss of data. The implementation of the quality assurance function is not approached from an outside-in or top-down perspective, but in a spirit of cooperation with the objective being continual quality improvement.

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 AQMD or performed on behalf of AQMD by independent contractors or consultants will comply with the following general QA policies:

- a) The objectives of each environmental measurement program/project shall be clearly delineated during the planning stages of the program/project. These objectives shall be consistent with the mission, policies, and priorities of the AQMD.
- b) Acceptable limits of data uncertainty shall be identified during the planning stages of each environmental measurement program/project so that the appropriate procedures and resources may be incorporated into the design of the program/project.
- c) Quality Assurance and Quality Control activities shall be integrated into all environmental measurement programs/projects in a cost-effective manner while attaining stated quality objectives.
- d) A QAPP describing how each project/program 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(s) of the program/project, the Quality Assurance Manager (QA Manager), and the Deputy Executive Officer for Science & Technology Advancement (DEO/STA).
- e) Sample collection, sample chain-of-custody, sample analysis, training and data management activities shall be evaluated routinely by supervisory personnel and Quality Assurance staff to identify and correct deficiencies and to enhance the credibility of each environmental measurement program/project.
- f) 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, and others.

2.4 Distribution and Implementation

To ensure that the intent and spirit of AQMD quality assurance policies are appropriately implemented and inherent in all applicable ambient air quality data collection processes, the following activities are undertaken:

- A quality assurance policy memorandum (Figure 2.1) is issued by Executive Management to all affected staff, which supports and requires adherence to QA policy and the QMP, and encourages systematic and continual quality improvement in accordance with technological developments and the data quality needs of environmental programs.
- The QMP is distributed to the DEO/STA, Manager of Atmospheric Measurements (AM Manager), Manager of Laboratory Services & Source Testing (LSST Manager), and all Quality Assurance staff;
- The QMP is made available to all staff involved with ambient air quality data and associated measurement systems through AQMD on-line document resources.
- QAPPs are developed and distributed to all staff responsible for duties in support of applicable programs. The QAPPs reiterate AQMD quality assurance policy and define appropriate DQOs for each program.
- An annual review of the QMP and an annual assessment of the implementation of the QMP are carried out by the QA Manager based on performance and systems audits (internal and external) and input from program managers, with written feedback to Executive Management.
- A presentation is made by the QA Manager to management level staff to discuss the necessity and purpose for any major change to the QMP. After approval from the DEO/STA, the QMP will be updated and affected staff will be advised of such changes and their effective date by means of memorandum or email.

2.5 Environmental Measurement Programs

AQMD carries out or oversees environmental measurement programs in the following areas: air monitoring network, source emissions testing, commercial/industrial materials and product compliance, and special monitoring. There are typically multiple programs within each area, and each program is carried out for a different purpose and has varying requirements for data quality and validation. Although quality assurance is practiced in all environmental measurement programs, priority has been given to the federally mandated Air Monitoring Network Programs (Section 2.5.1) in this version of the QMP. All of the additional programs described in Sections 2.5.2 – 2.5.5 will be included in future versions of this QMP. The QMP is an evolving document. Therefore, programs not currently identified in this QMP will be incorporated as they are mandated by federal or state regulation, or, if not so mandated, at the discretion of the DEO/STA.

2.5.1 Air Monitoring Network Programs

AQMD air network monitoring programs include but are not limited to those funded in part or in whole by U.S. EPA under Section 103 or 105 grants. A more detailed description is found in the AQMD Annual Air Quality Monitoring Network Plan (Appendix D) which is reviewed internally, updated and submitted for public review annually.

2.5.1.1 Criteria Pollutant Monitoring Network

The Clean Air Act mandates that states and/or local agencies monitor the levels of criteria pollutants (ozone, oxides of nitrogen, sulfur dioxide, carbon monoxide, PM10, PM2.5, and lead) in the atmosphere to fulfill the following purposes:

- track pollution concentration trends in ambient air to monitor progress toward attaining federal and state 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 and state exposure limits and/or where health may be affected

To meet these objectives, AQMD operates a network of over thirty monitoring stations distributed throughout its jurisdiction.

2.5.1.2 Fine Particulate Monitoring Network (PM2.5)

Title 40, Code of Federal Regulations, Part 50 (40 CFR 50) requires states to establish a fine particulate monitoring network to collect and analyze particulate matter less than 2.5 micrometers. Initially, the network consisted of samplers for the determination of 24 hour mass loading and was for information gathering purposes only. Later, continuous analyzers (beta attenuation monitors and tapered element oscillating microbalances) and PM2.5 speciation samplers were added to several fine particulate monitoring sites. The passage of federal fine particulate ambient air quality standards resulted in AQMD enhancing its monitoring program such that data quality and breadth are analogous to those required for criteria pollutant monitoring programs.

2.5.1.3 Photochemical Assessment Monitoring Stations (PAMS)

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

- better understand the underlying causes of ozone pollution
- devise effective remedies
- measure environmental improvement

AQMD established and operates its PAMS program with funding support from U.S. EPA and carries out enhanced monitoring at seven locations that represent either an upwind background site, maximum ozone precursor emissions site, maximum ozone site, or extreme downwind site.

In conjunction with the primary PAMS program, AQMD operates a continuous Upper Air Measurement Sites program in Los Angeles County (Los Angeles International Airport and Pacoima), San Bernardino County (Ontario International Airport), Riverside County (Moreno Valley) and Orange County (Irvine). These upper-air measurements provide a better understanding of the airflow and mixing in the South Coast Air Basin, especially as related to the formation and transport of smog. The data is incorporated into current air quality forecasts and historical analyses. Data collected during air pollution events is used to develop and run models to test the effectiveness of control strategies for meeting state and federal air quality standards.

2.5.1.4 National Air Toxics Trends Stations (NATTS)

The U.S. EPA has established the NATTS program to pursue the measurement of ambient concentrations of air toxics at trends monitoring sites throughout the nation. These data are collected to fulfill the following purposes:

- track trends in ambient air of air toxics to facilitate tracking progress toward emission and risk reduction goals
- directly evaluate public exposure and environmental impacts in the vicinity of monitors
- provide quality assured hazardous air pollutants (HAPs) data for risk characterization
- assess the effectiveness of specific emission reduction activities
- evaluate, enhance and improve air toxics emission inventories and the performance of various exposure and risk assessment models

AQMD participates in the NATTS program with funding support from U.S. EPA. Two NATTS sites are in operation which monitor for pollutants including VOCs and metals such as hexavalent chromium.

2.5.2 Source Emissions Testing (Not subject to this version of the QMP)

Source emissions testing programs include rule compliance, barbecue ignition product and water heater approval, emissions inventory, engineering information, and method

development. Method development includes the adaptation or modification of existing standard methods and the development of new methods where no applicable federal, state or AQMD method exists. New and modified methods undergo validation according to an accepted protocol (e.g. U.S. EPA Method 301).

2.5.3 Commercial/Industrial Materials and Product Analysis (Not subject to this version of the QMP)

Programs include rule compliance, low VOC product certification, NVLAP approved asbestos analysis, microscopic identification, emissions inventory, engineering information, and method development (see Section 2.5.2).

2.5.4 Special Monitoring (This version of the QMP covers programs partially or fully funded by U.S. EPA; other projects may not be subject to this version of the QMP)

Programs include facility specific monitoring, AQMD rule compliance, public nuisance, and non-federally mandated community and regional measurements such as the Multiple Air Toxics Exposure Study (MATES). Projects and programs may include some that are in part or in whole funded by U.S. EPA. Those projects and programs are subject to the requirements of this QMP, including the preparation of a QAPP with appropriate approvals. The AM Manager has responsibility for the establishment, operation and maintenance of monitoring sites, and the LSST Manager has responsibility for the preparation of sampling media and the analysis of sampled media that have been submitted to the AQMD Laboratory.

2.5.5 Laboratory Approval Program (Not subject to this version of the QMP)

The AQMD administers a method-based Laboratory Approval Program (LAP) for organizations that perform testing and analysis services to determine source compliance with specific AQMD regulations. The purpose of the program is to identify and increase the number of organizations that are capable of providing testing and analysis services. LAP also ensures that data collected by the facility and reported to the AQMD are scientifically and legally valid and satisfy AQMD rules and permitting needs. Testing organizations that perform source-specific ambient monitoring, emission measurement, laboratory analysis, product certification, or other tests that determine source compliance with AQMD regulations, are subject to the requirements of this program. LAP approval is required for compliance tests for RECLAIM NO_x and RECLAIM SO_x, and Rules 1111, 1118, 1121, 1138, 1146.1 (NO_x emissions from boilers and heaters), Rule 1138 (restaurant emissions), Rule 1174 (charcoal ignition products), Rule 1420 (lead emissions) and some permit conditions.

2.6 Quality System Implementation

The QMP includes several actions and activities to ensure that critical elements of the AQMD Quality System are understood and implemented for affected environmental measurement programs. These include the following:

1. Develop an implementation strategy consistent with the AQMD organizational structure and the requirements of the program. This may include a pilot study or might consist of building early feedback to validate methods and procedures. Also, the pilot study can provide resource and cost estimates which can be used to define an acceptable resource allocation for the quality system implementation. The implementation strategy includes a high frequency of corrective action loops especially in the early phases of new program development.
2. Establish an effective implementation schedule. The schedule takes into account an initial period of adjustment, loss of data, and fine-tuning of methods and procedures, during the early phases of a new program. The schedule also provides for milestones for evaluating data relative to DQOs.
3. Provide initial training to appropriate supervising and technical staff on the QMP, documentation formats, QAPPs and SOPs, corrective action, quality assurance and other 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.
4. 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 training as an appropriate corrective action measure.
5. Provide management commitment to AQMD quality policy. This normally is in written form (Figure 2.1), and makes clear that both management and staff are required to adhere to policy.
6. Provide periodic management reinforcement of AQMD quality policy. This is done for both management and staff. Management is responsible to correct instances of non-compliance with AQMD quality policy.
7. Manage quality issues by corrective action. There are standards for timely responses, and every effort is to be made to meet these timeliness standards. When there are exceptions, these are to be identified in writing with valid reasons for delay. A written response is to be provided to all quality issues that occur.
8. 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 goals.
9. Recognize staff achievements in attaining quality goals and quality improvement. Recognition takes place at staff meetings, by memo or postings, and is included in performance appraisals.

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This list may be modified as additional actions are determined to be effective in ensuring that management and staff understand the AQMD Quality System, support it, and are motivated to fully implement its components.

Figure 2.1. Memorandum showing management commitment to data quality.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

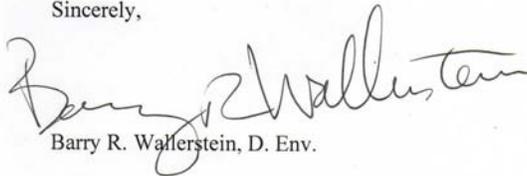
MEMORANDUM

Date: January 08, 2009
To: Dr. Liu, Deputy Executive Officer and Chief Scientist,
Science & Technology Advancement
From: Dr. Wallerstein, Executive Officer
Subject: AQMD Quality System

It is the policy of the South Coast Air Quality Management District (AQMD) to demonstrate confidence that its environmental measurement data generated and reported continues to be of the highest quality and to meet and/or exceed the state and federal requirements. This includes data produced for the U.S. Environmental Protection Agency (EPA) monitoring programs. AQMD recognizes that a strong quality system ensures the production of consistent, representative quality data from its extensive air monitoring network and state of the art analytical laboratory operated and maintained by the Atmospheric Measurements and Laboratory Services, Source Test Engineering Branches respectively.

This memorandum serves as an executive commitment to ensuring high data quality production and for continuous improvement to the AQMD quality system as documented in its Quality Management Plan (QMP) administered through the AQMD Quality Assurance Branch.

Sincerely,



Barry R. Wallerstein, D. Env.

SECTION 3. MANAGEMENT AND ORGANIZATION

3.1 Organizational Structure

The AQMD is governed by a 13-member board whose members are appointed by various state, county and municipal entities. Daily operation of the agency is delegated to a board-appointed Executive Officer who oversees several offices involved with planning, rule development, rule compliance, permitting, human resources, legal affairs, technology advancement, information management, strategic initiatives, public education and outreach, source emissions characterization, and ambient air monitoring. An Executive Council consisting of the executive heads of the various offices within AQMD serves as an advisory body to the Executive Officer. These executive heads are liaisons to the staff operating within each respective office. AQMD environmental measurement programs are administered by the Monitoring and Analysis Division (M&A) of the Office of Science and Technology Advancement (STA). The Upper Air Meteorological Measurements Program (UAMMP) is administered by the Office of Planning, Rule Development and Area Sources (PRDA). Computer hardware and software support services for M&A environmental measurement programs and the UAMMP are provided by the Office of Information Management (IM). Relevant organization charts are provided in Appendix C. The general AQMD organization is shown in Figure C.1. M&A is divided into three branches, Atmospheric Measurements (AM Branch), Laboratory Services & Source Testing (LSST Branch), and Quality Assurance (QA Branch). Branch organization charts are shown in Figures C.2 through C.4. The organization of the QA Branch, and the responsibility and authority of the QA Manager are discussed in detail in Section 3.5. The PRDA manager is responsible for conducting the UAMMP. Within IM, the Hardware & Network manager is responsible for the computer hardware and non-custom software procurement, and the Systems Development Manager is responsible for custom software development.

3.2 Administrative Responsibilities

General administrative and policy direction is provided by the DEO/STA. The DEO/STA is the senior administrative official and ultimately accountable for the quality of all environmental measurement programs conducted by AQMD staff or by personnel under contract to AQMD. Although the daily management of environmental measurement programs and quality assurance are delegated to other management staff, the DEO/STA is responsible for ensuring that the AQMD quality system is implemented with the necessary resources to achieve quality goals. The DEO/STA also is the liaison for quality issues to the Executive Officer, Executive Council, and the Governing Board.

3.3 Program Management Responsibilities

The primary responsibility for the daily management of the various environmental measurement programs is assigned to either the AM Manager or to the LSST Manager.

As management staff and program/project managers, the AM Manager and LSST Manager 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.

Table 3-1 identifies the manager with primary responsibility for each program, and, within each program, identifies the manager responsible for each major function (establish and operate stations, provide sampling media and sample analyses, data management). Program responsibilities are generally divided, with the AM Manager having responsibility for the establishment, operation and maintenance of monitoring stations, and the LSST Manager having responsibility for the preparation of sampling media and the analysis of sampled media that have been submitted to the AQMD Laboratory. When the monitoring stations are deployed or involved, the AM Branch always serves as the lead. The LSST Branch may serve as lead in certain measurement activities such as conducting source emissions testing or field support measurements (e.g. analysis of samples collected in the field). 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 AM Manager and the LSST Manager interact with the QA Branch to resolve data quality issues and to strive for continual quality improvement. They work closely with non-management supervisory staff (supervisors) in developing staff and resource needs for programs and projects, and may delegate some management aspects of some programs/projects to them. However, the AM Manager and LSST Manager are ultimately responsible for the implementation of and ongoing compliance with the QMP and QAPPs and SOPs for their respective programs/projects.

3.4 Staff Responsibilities

Staff includes both supervisors and non-supervisory personnel. Non-supervisory staff are directly involved in the identification and establishment of monitoring sites, 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 AQMD QMP. Because of their direct and frequent interaction with the basic provisions of these plans and procedures, non-supervisory staff may develop a keen understanding of the technical strengths and weaknesses of measurement programs. Consequently, to a great extent, the quality and usefulness of the data collected under any environmental measurement program reflect the ability of these staff to abide by approved QAPPs and SOPs, and to participate constructively in the ongoing review and revision of these documents.

Supervisors provide first-line supervision and thus are responsible for interacting with non-supervisory staff regarding routine data quality assessments (DQAs), ad hoc reviews of methods and procedures, and quality improvement opportunities that they encounter in the daily operation of measurement programs. The supervisors have a responsibility to 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 primarily responsible for providing or requesting the proper training for non-supervisory staff 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 with which they are directly involved.

3.5 Quality Assurance Organization, Responsibility and Authority

The QA Manager has overall responsibility for the quality assurance functions for AQMD environmental measurement programs and reports directly to the DEO/STA who has authority over all environmental measurement activities. In this regard, the QA Manager has primary responsibility for preparing (and reviewing annually) the AQMD QMP for environmental measurements and for submitting an annual quality assessment report. The QA Manager implements and maintains the quality systems, assesses the effectiveness of quality systems, revises quality systems as necessary, and supervises QA staff specializing in auditing environmental measurement programs and practicing the corrective action process.

Although the QA Branch is independent, it works closely with other M&A Branches on quality assurance issues. The QA Manager has authority to speak to any staff member on matters related to data quality and to flag data that may be suspect based on quality assessments. The QA Manager may recommend remedial actions after discussions with line managers and a joint review of the data quality issues and their impact on data users. A dispute resolution procedure (see Section 11.6) is in place to resolve data invalidation issues where concurrence on the course of action cannot be reached at the managerial level.

The QA Manager is also responsible for the following: coordinating and tracking training; providing quality assurance training to staff; auditing staff training records periodically; 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; auditing or coordinating audits of outside contractors; preparing and supervising contracts with outside auditors (e.g. PM_{2.5}, meteorological measurement systems); and is the AQMD liaison on all quality assurance issues to U.S. EPA, other federal or state agencies, and other organizations involved with quality assurance. Whether audits are conducted by AQMD QA staff or externally contracted is partially a function of available resources, both equipment and personnel and partially an administrative decision of the DEO/STA. Within any project or program, audits may be conducted solely by QA staff, by QA staff and contractor(s), or solely by certified contractor(s). Each program/project specific QAPP will identify the actual audit responsibility. In all cases, however, the QA Manager has oversight responsibility.

The QA Manager annually reviews staffing, funding and resource needs in consultation with the DEO/STA and makes recommendations for the optimum number and level of staff to ensure that the quality system is adequate.

QA staff reporting to the QA Manager includes a Senior Air Quality Instrument Specialist (Senior AQIS) and a Senior Air Quality Chemist (Senior AQ Chemist).

The Senior AQIS's primary responsibility is to carry out performance audits of the field instrumentation and methodology and, as necessary, those used by AQMD contractors. Audits may also include special monitoring programs as deemed necessary to assure adequate data quality for the purpose of the monitoring. The Senior AQIS also assists the QA Manager with systems audits and is responsible for using the corrective action process for issues related to the AM Branch.

The Senior AQ Chemist's primary responsibility is to research, develop, document and carry out audits on instrumentation and processes used in the AQMD Laboratory and, as necessary, instrumentation and processes used by AQMD contract laboratories. The Senior AQ Chemist also assists the QA Manager with the preparation of the QMP and reviews QAPPs, SOPs, draft test methods, and audit data to ensure that appropriate quality control and quality assurance activities are incorporated and practiced.

In addition to the functions delineated above, the QA Branch responsibilities extend to the following activities:

- Data Analysis. Data analysis is typically carried out by the end users of the data, both internal and external. QA Branch is directly involved in the initial development of environmental monitoring programs and making sure that the DQOs and the local, state and federal requirements are met. QA Branch provides information on the intent and limitations of the data, such as the scope of programs, applicability to intended purposes, data tolerances, and compliance with DQOs. The intent is to ensure that only valid data are used for analysis.
- Data Reporting. Data reporting is typically carried out by the producers of the data, e.g. AM Branch and LSST Branch. QA Branch does not have a direct role in reporting data other than quality assurance data. However, QA Branch reviews data reporting formats for completeness of information, usefulness, proper caveats, and data quality information (e.g. quality control statistics) associated with the reported data.
- Data Archival and Retrieval. Data archival and retrieval is typically determined by the producers of the data with the assistance of IM in the area of computer hardware and software resources. QA Branch does not have a direct role in data archival and retrieval, other than for quality assurance information. However, QA Branch reviews data retrieval formats, provides input regarding the systematic organization of data, reports, and documentation, validates the accuracy of the data archival and retrieval processes, and ensures that data quality information for the archived data are available and accessible.

- Data Validation. Data validation is typically conducted by the producers of the data. However, QA Branch plays a key role by periodically assessing the effectiveness of the data validation procedures, and recommending corrective action as necessary should the error rate exceed DQOs.
- Data Assessments. Data assessments include internal and external quality control routine assessments of accuracy and precision that are identified in the QAPPs and SOPs for each environmental measurement program. QA Branch develops external assessment methodologies and carries out or oversees independent contractors who carry out external assessments. Internal assessments are conducted by the producers of the data continually. The QA Branch provides assistance in the following: development of internal assessment methodologies, as requested; reviews QAPPs to ensure that internal assessments are sufficient, appropriate and properly documented; and reviews and evaluates the implementation of internal assessments.

Table 3-1. AQMD Environmental Measurement Programs				
Primary and Functional Management Responsibilities				
Program	Primary Responsibility	Functional Responsibility		
		Establish & Operate Stations	Provide Sampling Media & Sample Analyses	Data Management
Criteria Pollutant Monitoring	AM Manager			
Continuous Analyzers		AM Manager	N/A	AM Manager
PM10, Pb Samplers		AM Manager	LSST Manager	LSST Manager

Meteorological		AM Manager	N/A	AM Manager
Fine Particulate Monitoring	AM Manager			
Continuous Analyzers		AM Manager	N/A	AM Manager
PM2.5 Samplers		AM Manager	LSST Manager	LSST Manager
Meteorological		AM Manager	N/A	AM Manager
Photochemical Assessment Monitoring Stations (PAMS)	LSST Manager			
Continuous Analyzers		AM Manager	N/A	AM Manager
VOC Canister Samplers		AM Manager	LSST Manager	LSST Manager
Automated Gas Chromatographs		LSST Manager	LSST Manager	LSST Manager
Meteorological (except Upper Air sites)		AM Manager	N/A	AM Manager
Upper Air Meteorological Measurement Sites		PRDA Manager	N/A	PRDA Manager
National Air Toxics Trends Monitoring Stations (NATTS)	LSST Manager			
Toxic Metals Samplers		AM Manager	LSST Manager	LSST Manager
VOC Canister Samplers		AM Manager	LSST Manager	LSST Manager
Source Emissions Testing	LSST Manager			
Commercial/Industrial Materials & Product Analysis	LSST Manager			
Special Monitoring	AM Manager	AM Manager	LSST Manager	AM Manager/ LSST Manager
Laboratory Approval Program	LSST Manager			

SECTION 4. QUALITY SYSTEM COMPONENTS

AQMD has established a Quality System to plan, implement, and assess environmental measurement programs, to ensure that collected data are of adequate and known quality and to encourage continual data quality improvement. The AQMD Quality System provides the structure and documentation necessary to assure that data quality meets the requirements of the end users. The AQMD Quality System follows the U.S. EPA model for a quality system as illustrated in Figure 4-1. Quality System Components are Quality System Documentation, Annual Reviews and Planning, Management Assessments, Training, Systematic Planning of Projects, Project-Specific Quality Documentation, and Project and Data Assessments. These components are discussed in the following sections with respect to the how specific tools are used to manage the AQMD Quality System, and the assignment of responsibilities.

4.1 Quality System Documentation

The AQMD QMP for Environmental Measurements documents the AQMD Quality System. The QMP is a single overarching document that provides a general description of how the quality of data is assured for environmental measurement programs where a QMP is required by federal or state regulation, or where the Executive Officer has determined that the data being collected must be of known, adequate and documented quality. 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 Manager reviews and updates the QMP annually and whenever a major change to the plan is required. All updates to the QMP are reviewed and approved by the AM Manager, LSST Manager, QA Manager, and the DEO/STA, and, if telemetry or data archival computer systems are involved, by appropriate Information Management Managers and Executives. Any major revision of the QMP (e.g. adding programs, major enhancements to existing programs, etc) are also approved by the Executive Officer. Major revisions to the QMP, as deemed by AQMD, are also discussed with U.S. EPA Region 9 staff and submitted for their approval when revisions involve sections of U.S. EPA programs. All major revised versions and an annual summary of minor changes to the QMP (or revised sections, as appropriate) are forwarded to U.S. EPA Region 9 staff.

4.2 Annual Reviews and Planning

All environmental measurement programs are reviewed annually to ensure that they are meeting program objectives and to assess whether modifications in programs are needed to better meet program objectives and to evaluate new monitoring proposals. For the air network monitoring programs, proposed changes to any program are documented in an Annual Air Quality Monitoring Network Plan that is subject to public review and comment. Following the review and comment period, the final revised plan is made available to the public upon request.

The quality assurance aspects of environmental measurement programs are documented in an Annual Quality Assurance Assessment Report. This report summarizes data quality statistics, quality improvements, quality issues and corrective actions taken during the previous year. This report is made available to the public upon request.

4.3 Management Assessments

Management assessments are ongoing activities implemented to evaluate the effectiveness of the AQMD Quality System in achieving program DQOs. Section 11 (Quality Assessment and Response) describes those assessments and how they provide a feedback mechanism to keep management informed and to maintain and improve data quality. Management assessments may be internal or external. Internal assessments are routinely undertaken; external assessments are typically ad hoc and may be initiated by AQMD or by AQMD oversight agencies which include U.S. EPA and CARB. The results of management assessments are documented and distributed to all affected parties including management.

4.4 Training

AQMD implements the appropriate training of all staff involved in ambient monitoring programs, including laboratory personnel, field operations and support personnel, quality assurance personnel, temporary and contract personnel, and supervisory and management personnel. This ensures that staff has sufficient knowledge for adequately performing assigned duties and complying with QA requirements. Section 5 further describes the training program.

4.5 Systematic Planning of Projects

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

1. Describe the project goals and objectives.
2. Identify outside stakeholders.

3. Identify the type of data required to meet goals and objectives.
4. Identify constraints to acquiring required data, e.g. schedule and resources.
5. Reconcile conflicts between project goals, schedule, and available resources.
6. Determine how (e.g. continuous analyzer, sample collection), when (frequency) and where data or samples are to be collected.
7. Determine the quantity of data required.
8. Determine the quality of data required.
9. Determine methods for data analysis, evaluation, and assessment against the intended use of the data and the quality performance criteria.
10. Specify QA/QC activities necessary to assess quality performance criteria.
11. Set program schedule, resources, milestones, implementation requirements.
12. Establish project management and organization with assigned project and communication responsibilities.

The planning process requires the active involvement of appropriate executive management, line management and the involvement of outside stakeholders to better ensure that the results and the conclusions drawn from those results meet the needs of all interested parties.

4.6 Project-Specific Quality Documentation

The primary documents that implement the Quality System for AQMD environmental measurement programs are the QMP, program-specific QAPPs, and SOPs for the various activities within specific programs.

4.6.1 Quality Assurance Project Plans (QAPPs)

The QMP presently encompasses the following four major programs: Criteria Pollutant Monitoring Network, Fine Particulate Monitoring Network, PAMS, and NATTS. These federally funded programs are required to have a current QMP, thus they a priority for QMP inclusion. As discussed in Section 2.5, additional programs will be included in future versions of the QMP. A QAPP is prepared for each program that is consistent with the objectives and requirements of the QMP but is specific to the needs of the specific 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 Manager, AM Manager, LSST Manager and DEO/STA, before they are distributed to staff and implemented. Staff training and education on QAPPs is provided as necessary through coordination of the QA Manager's office and the relevant manager(s). New

environmental measurement programs or projects that are instituted under this QMP are typically initiated with the development of an appropriate QAPP following guidance and criteria established during planning stages.

QAPP documents include the following:

- Purpose and background; conformance with AQMD mission
- Restate and/or reaffirm AQMD 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
- 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* (EPA QA/G5) may be used by the program/project manager as a tool in the QAPP planning and development process.

4.6.2 Standard Operating Procedures (SOPs)

SOPs describing the detailed procedures for program activities, including sample collection, instrument operation and maintenance, preparations and analyses of sampling media, data management and validation, are prepared by staff with the appropriate technical knowledge and experience, and are implemented through the appropriate QAPP. Several QAPPs may utilize the same SOPs. Since many ambient air measurement methods have been standardized, many SOPs are based on U.S. EPA or State of California Air Resources Board (CARB) documents. However, due to variations in equipment and facilities, AQMD has customized U.S. EPA and CARB SOPs to reflect AQMD specific instrumentation, analytical set-up, and other unique situations. Customization is differentiated from method modification or development in that the adjustments are minor in nature, adapting EPA or CARB SOPs to AQMD equipment or facilities. Even so, the customized SOP is tested prior to implementation to verify that DQOs are being met. New and modified SOPs, however, must undergo validation according to an accepted protocol such as EPA Method 301. SOP preparation is the responsibility of the supervisor who oversees and reviews the particular function being performed for proper documentation. The draft SOPs are reviewed and approved by the

responsible manager who then forwards the approved draft SOP to the QA Manager for review. Where there is an overlap in responsibility such as the operation of laboratory instrumentation at remote monitoring stations a single manager is assigned primary responsibility by the DEO/STA. The QA Manager reviews and approves new SOPs and revisions initiated within M&A or by contractors conducting work under an affected project or program. SOP review and approval are not limited to the QAPP approval process but is a continual process which also includes SOPs prepared in support of new programs, investigations and new monitoring and analytical measurement technologies.

4.7 Project and Data Assessments

The AQMD Quality System includes activities to evaluate the implementation of QMP, QAPP and SOP requirements to the environment measurement programs, and to assess whether program DQOs are being achieved. These assessment activities are undertaken by the QA Branch or by outside resources contracted by the QA Branch. 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 (Section 4.3), DQAs, assessments of accuracy and precision (e.g. performance audits), and Program Implementation Assessments (e.g. system audits).

4.7.1 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 accuracy, precision, detection limits, range, representativeness, comparability, and completeness as delineated in the program QAPP and associated SOPs. DQAs include the use of independent audit standards traceable to NIST or other appropriate audit standard if NIST traceability is not available.

4.7.2 Program Implementation Assessments

PIAs are periodic snapshots of how well the actual environmental measurement program is being implemented with respect to procedures, methods, policies, and practices, as delineated 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.

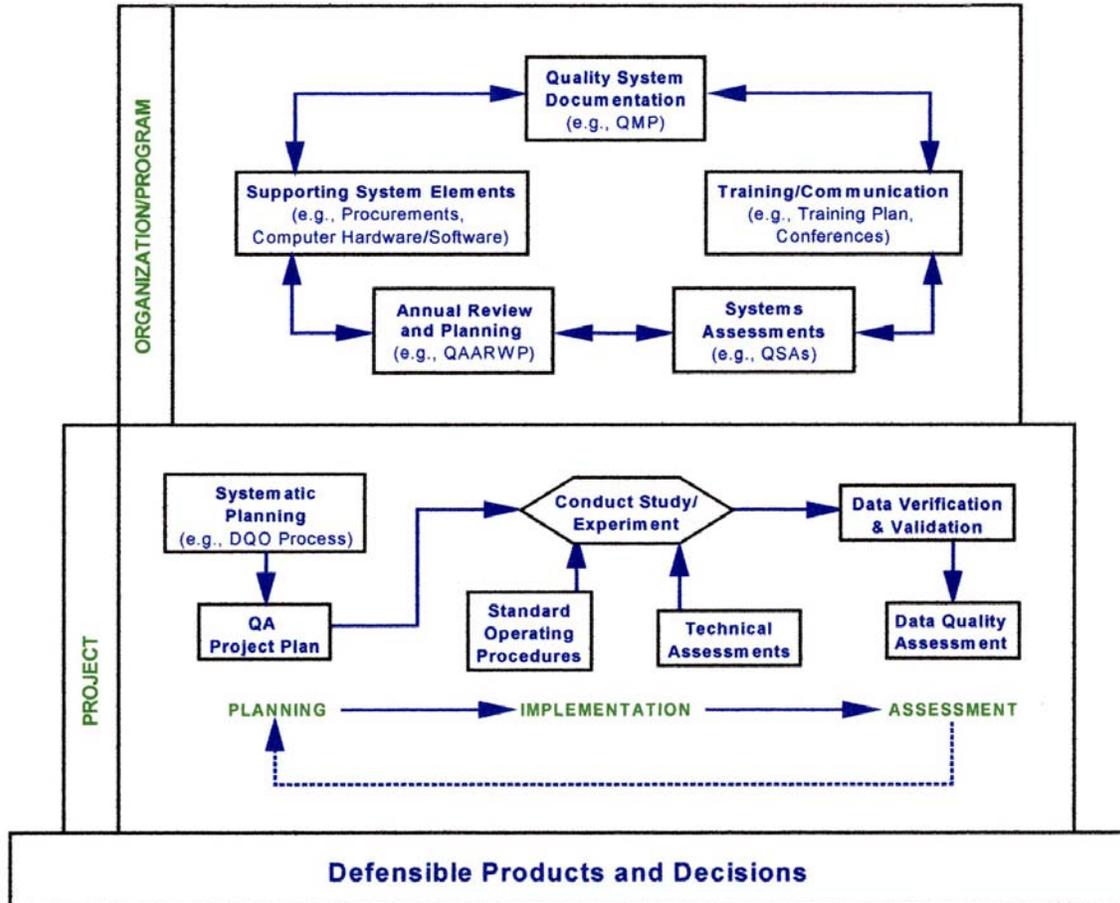


Figure 4.1. Flowchart of U.S. EPA model for a Quality System

SECTION 5. PERSONNEL QUALIFICATIONS AND TRAINING

5.1 Personnel Qualification

Staff must satisfy class specifications for each position performing a function related to the pertinent environmental measurement program. The class specifications identify the job duties for each position and the minimum requirements for education and experience, and knowledge, skills and abilities necessary to be able to perform those job duties. The classification specifications are reviewed periodically for relevance to the requirements of current technology, instrumentation, and methodologies in the ambient air monitoring networks and analytical laboratory. All class specifications and revisions are reviewed and approved by Human Resources, Executive Management, and the Governing Board. Temporary staff for short term needs and special projects are required to meet the minimum requirements of the classification specification for that position. Classification specifications are on file with Human Resources at AQMD headquarters and are available upon request. Permanent staff undergo competitive evaluation (ranking of application and/or written examination, interview) to ensure that most highly qualified candidates are considered by the hiring authority.

5.2 Supervisory Expectations

The quality of the AQMD environmental measurement programs is strongly correlated to the level of staff training, experience and preparation. Supervisors and Managers are expected to routinely assess and address the general training needs of staff through the annual budgeting process and in coordination with Human Resources. Any training needs should be identified and reported as they arise and are summarized in an annual program/project report. To broaden the experience of staff, supervisors may provide opportunities for staff to participate in activities outside their daily work routines (e.g. inter-program cross-training opportunities).

5.3 QA Training

Class specifications and competitive testing assure that all candidates considered for a permanent position with the AQMD have a minimum level of competency, knowledge and experience appropriate for their position classification and duties required by their technical assignments. This minimizes training requirements to those technical areas not addressed by the minimum requirements, and which are typically related to instrumentation, analyses, methodologies and protocols specific to ambient air quality measurements as performed at the AQMD.

Formal QA training related to environmental measurement programs and activities is coordinated by the QA Manager who maintains a record of training completed by staff. Formal training includes presentations on the QMP (including major revisions), QAPPs,

SOPs, vendor provided training classes for new equipment, professional organization training such as provided through the Air & Waste Management Association (AWMA) and the American Chemical Society (ACS), refresher training on existing equipment, and training by U.S. EPA, CARB, and other experts. The QA Manager also maintains a library of training materials developed for both formal training and for internal training purposes, such as training aids developed for training sessions by staff or for on-the-job training (OJT) references. A formal introduction to Quality Assurance for environmental measurement programs is given to the new hire by the QA Manager or QA staff. This may also be in the form of appropriate on-line training materials with self-testing.

Training records are maintained in a central location by each M&A Branch and are made available to supervisors. Whenever individual training occurs, a training form is completed and filed in a central location. A copy is forwarded to QA Branch and entered into a spreadsheet that is updated monthly and made available on-line to supervisors for their review.

5.4 New Employee Orientation

Each entry level staff are provided with current document-controlled copies of the QMP and QAPPs (includes all applicable SOPs) for programs under which they work, supplementary training aids developed for previous formal training, and any pertinent OJT training references. They are expected to review the documents as they continue through their initial training. Since staff are typically not hired in large groups, but rather one or two at one time, initial training is OJT, with the new hire being assigned to an experienced permanent staff person 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 to ensure that the training has been completed adequately and to assess the quality of work of the new hire. Assessments should be done more frequently in the beginning of the training period. If there are any deviations from normal expectations in procedure or data quality indicators, these are followed up immediately with the new hire to correct and assure that the new hire understands procedures and/or instrumentation.

5.5 Continuing Education

Sustained training will be conducted as needed to keep skills and knowledge current. Supervisors document staff training individually in individual personnel files and also in a central file location. The central file location contains copies of all certificates of completion in addition to basic training documentation. All trainees are expected to file a training completion form within ten working days of the training event. Staff may also be required to submit a memorandum to the QA Manager's office or give a short presentation to relevant staff on meeting, convention, or symposia proceedings and other places where training is attained. Examples where a presentation or memorandum is

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expected are AWMA, ACS, ASTM International, or Toxics Air Monitoring Technical Assistance Committee (TAMTAC) meetings. The QA Manager provides feedback to supervisors and management on the adequacy and timeliness of in-house training not conducted under auspices of Quality Assurance.

SECTION 6. PROCUREMENT OF EQUIPMENT, SUPPLIES AND SERVICES

AQMD has an established policy and procedure for the procurement of equipment, supplies and services (Appendix D). This policy and procedure has been adopted by the Governing Board. The purchase of fixed assets such as monitoring instruments, analytical equipment, information management software, services, and supplies are governed by this policy. Equipment specifications and scopes of work for consultants, are prepared by staff, approved by supervisors, management, and, when of significant fiscal impact, by the Governing Board. Final purchases are also approved similarly. Fixed asset equipment 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, schedules for delivery, and actions that may be taken when acceptance criteria are not met, are contained in each RFQ. The RFQ contains any requirements established by U.S EPA for monitoring and sampling instrumentation, for federally mandated programs. Similarly, contracts for consultants are subject to the requirements of a formal Request for Proposals (RFP) procedure. As with the RFQ process, all aspects of assuring that the most cost competitive, qualified proposal is selected, are included in the RFP process.

If the project or program associated with a RFP or contract is funded in whole or in part by U.S. EPA Section 103 or 105 grants, then the proposed contractor shall comply with and implement all applicable requirements of the current version of the AQMD QMP for Environmental Measurement Programs and the AQMD QAPP for the specific project or program. The QA Manager is tasked with providing guidance on the applicable requirements for the specific federal or state program or project to the author of the contract/RFP. The QA Manager is also tasked with reviewing and approving the proposed QA elements in the RFP, as applicable. Depending on the contract, some requirements may remain an AQMD function (e.g. QA audits, data assessments, data validation, data archiving). Once the contractor has been selected, the QA Manager serves as a resource for the contractor to help in the understanding the QA requirements and ensuring that the appropriate QA elements are documented in the proposed contractor's final work plan.

SECTION 7. DOCUMENTS AND RECORDS

The AQMD creates various quality-related documents and records through the implementation of environmental measurement programs. Documents include the QMP with 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, Chain-of-Custody, and Analysis Requests.

7.1 Responsibility for Documents and Records

The responsibility for identifying quality-related documents and records requiring control lies with the manager in charge of the section that creates the document or data. Once a document or type of record has been identified as requiring control, the appropriate manager works with the QA Manager to bring that document into the document control system. This may be as a separate document or record, or as part of an existing QAPP or SOP.

The recommended retention policy becomes a part of the overall AQMD Document Retention Policy (Section 7.2) as adopted by the Governing Board. However, if certain records need to be retained for longer than the standard policy, the responsibility for specifying the retention schedule for quality-related documents and records lies with the manager of the section that creates the document or data.

The QA Manager has ultimate responsibility for assuring that the QMP, QAPPs, and SOPs are current and appropriately distributed. The QA Manager is also responsible for implementing and maintaining a Document Control System for documents requiring document control. The appropriate distribution is assured by issuance of documents to staff and requiring acknowledged receipt of documents by 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 of appropriate personnel who did not receive the updated documents. In addition, as a part of routine audits, QA Branch staff will annually verify that documents in use by staff are current and that unauthorized modifications have not been made to process, procedures or methods. When discrepancies are found, corrective action is taken immediately.

7.2 AQMD Document Retention Policy

Records and documents created and/or received by the AQMD are retained for a period of time specified in the AQMD "Records Retention Schedule" which is found in Appendix D. However, if the records and/or documents are also affected by the

requirements of an outside entity having more stringent document retention policies, then the more stringent document retention policy for those records/documents shall be upheld.

7.3 Public Access to Documents and Records

Access to documents and records created and/or received by the AQMD are governed by the AQMD “Guidelines for Implementing the California Public Records Act” which is found in Appendix D. The AQMD 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 air quality monitoring studies, as well as links to the CARB Statewide Air Quality Archives and the U.S. Air Quality Archives (EPA Air Quality System). Records and documents not available on the websites may be requested through the AQMD Public Records Request procedure using the request form found in Appendix D.

7.4 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, Operation Assistance Guides (OAGs), instrument qualification information, audits, external and internal correspondence, U.S. EPA or other reference documents and certain contracts directly related to data quality. QA staff are assigned by the QA Manager to place current quality assurance documents and records in the appropriate directory as they are implemented or superseded. Documents and records related to AQMD environmental measurement programs are maintained accessible as required by AQMD and U.S. EPA record retention policies.

Quality assurance documents are preferably archived in digital format unless hardcopy originals are legally required to be kept by the program/project QAPP. Records and data that are originally captured in digital format are archived in digital format, unless a hardcopy of the original record or data is also required to be archived by the program/project QAPP. An example of this would be a hardcopy of laboratory analytical results that is printed from the digital file that was created on the analytical instrument’s local computer during the analysis.

Digital documents and records may be archived locally, on servers, mainframes (Section 8), or on storage media such as magnetic tape or compact disk. Digital documents and records are typically archived to more than one independent location, and may also be archived in hardcopy form as described above, depending on the requirements of the applicable QAPP. Digital documents and records subject to IM backup protocols may also be backed up and stored off-site (Section 8).

The QA Manager has the responsibility to keep quality assurance documents that are currently in use updated and archive documents that are no longer current. To keep the documents separate, two directories are maintained by the QA Manager. The first directory is a “current document directory” and is accessible to all staff. Current documents are defined as those documents that are in current use by management and staff for programs/projects that are in progress or are approved for implementation in the near future; the second directory is an “archived document directory” with limited access for QA documentation purposes. Archived documents are defined as all versions of documents that were at one time “current documents” for completed and current programs/projects. These documents and records provide a timeline showing when any specific version of a document was in effect. The QA Manager is responsible for maintaining a summary table that identifies start and end dates for each version of a document to enable end users of data to associate various document versions (hence variations in protocols or methods) with acquired data sets

Hardcopy documents and records may be archived on-site at AQMD Headquarters, an AQMD satellite facility (e.g. monitoring station or remote office) or at an off-site storage facility contracted by AQMD to provide storage and retrieval services.

Further details regarding the archiving of program/project documents and records are provided in the program/project specific QAPP

SECTION 8. COMPUTER HARDWARE AND SOFTWARE

AQMD uses computers (or computerized instrument systems) to capture, reduce, transmit, archive and retrieve environmental measurements data. Computers range from laptop and desktop personal computers, to data acquisition systems at monitoring stations, to systems integrated into laboratory analytical instruments, or to servers and mainframes maintained by IM.

The acquisition of all computer hardware and software is subject to AQMD procurement policy and procedure (Section 6). This ensures that computer hardware specifications are reviewed for the necessary requirements related to data acquisition, data processing, storage, and timely retrieval functions. It also ensures that specifications for software necessary to accomplish these functions are reviewed for compatibility with existing or proposed computer hardware. This review process provides the opportunity to request that IM review (IM staff or IM consultants) and approve computer hardware and software requests so that they are compatible with AQMD information technology (IT) infrastructure. Software that requires development (not an off-the-shelf, turnkey product) and that does or may interact with AQMD IT infrastructure must be approved by IM and use a contractor(s) approved by IM under the requirements of AQMD procurement policy and procedure.

Program and archival data security are ensured by limiting administrator access to all mainframe computers and all other computers that have access to the AQMD intranet to interface with any AQMD mainframe. Administrator access to mainframe computers is limited to IM staff only. M&A staff may be granted limited access to servers dedicated for M&A staff use, local administrative access to workstations, or full administrative access to field or laboratory instrument computers. Any administrative access to work stations or servers must be approved by IM. Where administrative access has been granted, the users are responsible for program and archival data security, and to adhere to all license, copyright and usage terms of installed software.

Procedures for backing up environmental measurement program data depend on where the data are located. Users are responsible for backing up data that are maintained on their respective workstations. IM staff are responsible for backing up data that are maintained on network storage. User backups may be accomplished by transferring data to network storage, secondary users, or optical data storage devices (e.g. CD-ROM or DVD-ROM). Network systems are backed up on a daily, monthly, yearly and fiscal year end basis. The retention period for each backup and periodic off-site archiving of backup data are set in the AQMD records retention policy.

IM maintains personal computer (both desktop and laptop) hardware and software standards through the AQMD procurement policy and procedure and by restricting hardware and software to approved configurations and versions. Administrator access for

personal computers is limited to IM staff unless specifically granted otherwise by IM upon request of a manager or DEO. In addition, laptop computers are physically audited on an annual basis. The laptop computer audits verify that all laptop computers have not had their configurations modified, and that all hardware and software are approved for use on each personal computer and properly licensed. AM and LSST staff may require specialized hardware and/or software not included in the minimum set provided by IM, and these may be requested (and justified) through management and the DEO/STA. AQMD computer hardware and software policy requires that users adhere to all license, copyright and usage terms of installed software.

Data management practices vary with each environmental measurement program; therefore, each respective data management practice is addressed in detail in the applicable program/project QAPP.

SECTION 9. PLANNING

9.1 Planning Requirements

All Divisional operations involving the generation and analysis of environmental monitoring data must be systematically planned and documented. The primary planning documents utilized by AQMD include work plans associated with U.S. EPA and other federal grants/agreements, and the QMP. End-of-year program/project reports and the Division's annual QA report also serve in a planning capacity by addressing staff training needs, pending corrective actions, and other QA initiatives.

The QAPPs constitute formal planning tools for their respective intramural and extramural environmental monitoring programs/projects. In developing a QAPP, the program/project manager is expected to obtain input from representatives of the ultimate user(s) of the data. The U.S. EPA document *Data Quality Objectives* (QA/G-4) may be used by the program/project manager as a tool in the QAPP planning and development process. The program/project manager also is expected to solicit comments from field, analytical, data management, supervisory, and other staff likely to participate in the environmental monitoring program/project and also external experts in the particular field as necessary. Prior to implementation, each QAPP must be reviewed and approved by the appropriate branch manager for conformance with the requirements of Section 4.6 (Project-Specific Quality Documentation) and organizational work policies and priorities and is reviewed also by a QA representative for conformance with applicable QA requirements as outlined in Section 4.5 (Systematic Planning of Projects). A schematic representation of the quality assurance planning process is shown in Figure 9-1.

9.2. Data Quality Objectives

Identification of appropriate DQOs is a specific preliminary planning activity for the development of QAPPs. For each environmental measurement program or project, AQMD management and staff identify DQOs that:

- are consistent with those required for the implementation of applicable standardized methods such as U.S. EPA, CARB, ISO, ASTM or other ANSI approved organization.
- include quantitative measures of accuracy, precision, timeliness, comparability and representativeness-consistent with the purposes of the program and technical capabilities
- take into consideration the needs of AQMD in addressing local and regional issues
- are monitored on a regular basis as a part of QAPPs and SOPs (Section 4.6)
- are evaluated at least annually for consistency and improvement

The DQO's identified through this process are explicitly incorporated into the program/project specific QAPP.

The key elements of the process by which DQOs are developed for specific environmental measurement programs include the following:

- statement of the problem or issue,
- identify a decision or course of action,
- identify the inputs into the decision or course of action,
- define the boundaries of the study,
- develop a decision rule,
- specify tolerable limits on decision errors, and
- optimize the design for obtaining data.

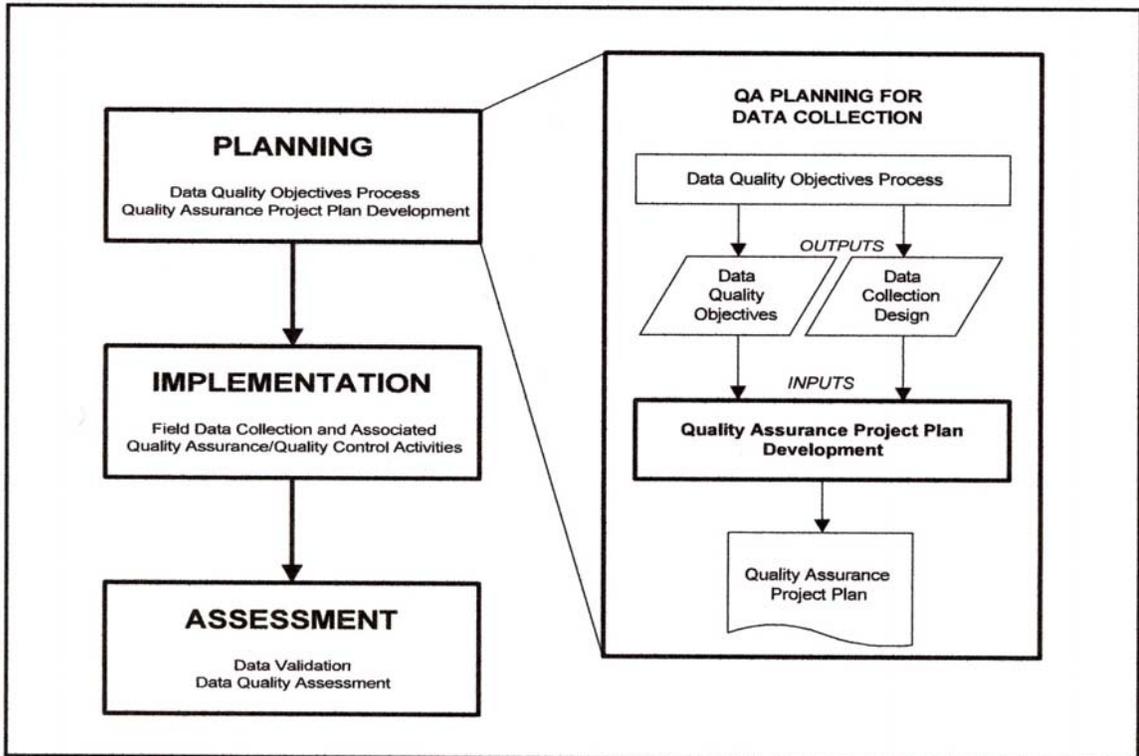


Figure 9.1. QA Planning and the Data Life Cycle (adapted from EPA document EPA QA/G-5).

SECTION 10. IMPLEMENTATION OF WORK PROCESSES

Environmental monitoring operations shall be implemented by qualified personnel based on approved QAPPs and SOPs. An implementation schedule shall be drafted delineating tasks, deadlines, and responsibilities. In the event of unforeseen contingencies, any deviation from approved procedures shall be documented and reported by the program/project manager to the QA representative. The significance of the deviation, and any needed adjustments or corrective actions, shall be determined by the QA manager and QA Branch staff with input from the appropriate non-supervisory staff with expertise in the particular process. Staff and supervisory expectations in the event of a departure from approved procedures shall be addressed in the approved or revised QAPP.

SECTION 11. QUALITY ASSESSMENT AND RESPONSE

11.1 Systems Audits

An internal systems audit that includes all aspects of the monitoring network and data quality is conducted annually, under the auspices of the QA Manager. Due to the number of programs and the size of the monitoring network, the systems audit is an on-going process. The systems audit includes inspections of one fourth of all monitoring sites each quarter, an audit of the Laboratory once per year, and periodic audits of the data validation systems from the initial source of the data through the archiving and reporting of that data. The various aspects of the annual systems audit may be conducted by QA staff or under contract with an independent consulting firm working under the oversight of the QA Manager and subject to AQMD Procurement Policy (Appendix D).

External systems audits are carried out by U.S. EPA and CARB, at their discretion and using either agency staff or through independent consultants working under the oversight of U.S. EPA or CARB. AQMD also contracts with independent consultants to conduct an external audit of selected systems in addition to the regular annual internal audit.

11.2 Performance Audits

Performance audits are conducted for determining the accuracy and precision of monitoring and analytical instrumentation and procedures that provide the data for the monitoring programs. All performance audits whether performed by AQMD QA staff, independent consultants or other entities are required to satisfy requirements under the appropriate QAPPs and SOPs. These audits may be internal or external.

Internal performance audits may be conducted by QA staff or through independent consultants under the oversight of the QA Manager and subject to AQMD Procurement Policy (Appendix D). Details as to how audits are conducted are documented in the QAPP for the Ambient Air Monitoring Quality Assurance Program. Due to the number of programs and the size of the monitoring network, performance audits are conducted on an on-going basis. Performance audits include auditing the accuracy of one fourth of the monitoring instruments and samplers each quarter. For gaseous pollutants, through the probe accuracy audits are conducted that test the integrity of the entire sampling and measurement system. In the Laboratory, each laboratory instrument/analyst/analysis combination is audited once per calendar year.

External performance audits are carried out by U.S. EPA and CARB, at their discretion and using either agency staff or through independent consultants working under the oversight of U.S. EPA or CARB. AQMD may also contract with independent consultants to conduct an external audit of selected systems in addition to the regular annual internal audit.

Consultants wishing to apply non-AQMD SOPs are required to demonstrate the equivalency of said SOPs to the comparable AQMD SOPs and to demonstrate these SOPs are referenced in the consultants' QAPP before a performance audit is conducted. Final approval for use of alternate SOPs rests with the QA Manager with the concurrence of the impacted operations manager.

11.3 Internal Quality Control

Internal quality control practices are an integral part of each QAPP and SOP. These practices are designed to ensure that collected data meet the DQOs of the program and also to both qualify data quality and provide information needed to compare collected data with the DQOs. The basic features defining the 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.

11.3.1 Continuous Analyzers

- NIST traceable daily zero/span; periodic multi-point calibrations per frequencies of SOP
- QC failure action levels and data acceptance criteria
- NIST traceable multi-level QC materials that include low, mid, high concentrations of each analyte of interest
- Reanalysis acceptance criteria
- Blank acceptance criteria
- Calibration, continuing calibration and control acceptance criteria including calibration drift allowance criteria
- Common mitigation procedures and policies
- Audit practices and acceptance criteria
- References
- Other checks as specified in SOPs

11.3.2 Discrete Sample Preparation, Sample Collection and Sample Recovery

- As appropriate, NIST traceable standards such as S class weights for balances
- Blanks and acceptance criteria
- Calibration, calibration curve, continuing calibration and control acceptance criteria including drift allowance criteria
- Procedural acceptance criteria
- As appropriate, duplicate analysis frequency and acceptance criteria
- QC failure action levels and data acceptance criteria
- Common mitigation procedures and policies

- Audit practices and acceptance criteria
- Chain of Custody
- References
- Other checks as specified in the SOP

11.3.3 Laboratory Instruments

- NIST traceable daily calibration standards and multi-point calibration standards for calibration curve preparation performed periodically as defined in the appropriate SOP
- Blanks and acceptance criteria
- Calibration, calibration curve, continuing calibration and control acceptance criteria including drift allowance criteria
- Analysis acceptance criteria
- Duplicate analysis frequency and acceptance criteria
- QC failure action levels and data acceptance criteria
- Common mitigative procedures and policies
- Audit practices and acceptance criteria
- Chain of Custody
- References
- Other checks as specified in SOP

11.4 Quality Assurance Reports and Alerts

A Quarterly Quality Assurance Assessment Report is issued through the QA Manager's office that summarizes quarterly audit activity (systems, performance), QA Alert status, recommendations for non-critical Quality Assurance improvements, and any quality improvements implemented.

An Annual Quality Assurance Assessment Report is issued through the QA Manager's office documenting QA activities carried out during the year, results of systems audits, comparison to DQOs, quality improvements, quality assurance alerts summary statistics, QMP/QAPP/SOP document control actions, training summary; and recommendations for future consideration to improve data quality. The annual report is made available to all staff in the Monitoring and Analysis Division who will be informed when it is released, and two copies which will be distributed to the DEO/STA. This annual report is due 30 days after the close of the AQMD fiscal year.

11.5 Corrective Actions

Corrective Action Requests (CARs) are issued by QA staff as required to provide immediate feedback to operators/analysts, supervisors and managers if an individual systems audit or performance audit discloses a quality assurance problem that is impacting data quality, storage, or reporting.

These CARs are disseminated by email to the responsible supervisor who will inform the responsible operator/analyst when a real or potential quality issue is identified. A corrective action recommendation is included in the CAR. As necessary, a meeting is scheduled to discuss the quality or potential quality issue with impacted staff, their supervisor and manager as appropriate.

Within eight working days of completing an internal quality assurance assessment, QA staff will document, in writing, any instances where an apparent need for corrective action is found, and issues a Corrective Action Request (CAR) to the supervisor of the affected group with a copy to the respective manager(s). This CAR requires a response within four working days to either accept the request to mitigate the QA issue by a certain deadline until the finding has been corrected or adequately investigated and discussed among affected staff and the QA Branch. Depending on the seriousness and complexity of the finding, this discussion may be by email, informal meetings, or formal meetings. However, the affected staff, supervisors and managers may take corrective action without discussion, should it be clear to them that the finding is valid and requires immediate action. Progress of the CAR is included in the documentation for the Monthly and Quarterly Quality Assurance Reports (see Section 11.4) and is tracked. The affected manager(s) are responsible for ensuring that the agreed upon corrective action(s) is implemented by the agreed deadline. Any disagreements over either the findings or proposed corrective action(s) are resolved through the dispute resolution process in Section 11.6.

Whenever QA Branch staff discovers a QA issue in one of its assessments:

- A Corrective Action Request (CAR) document is issued by QA staff to the Supervisor of the appropriate section with a carbon copy to the appropriate manager. It will include the date of the finding, a summary of the finding, a recommendation on how to resolve the issue, and suggested date for completion.
- For a more complicated request that requires manager attention, a high priority flag will be posted with the CAR
- The Supervisor/Manager must reply within four working days with either an acceptance, proposal for a new completion date, or decline of the request with a summary indicating the reason(s) for not pursuing any action.

- When a CAR is accepted, it is the responsibility of the affected supervisor/manager to ensure that the corrective action is implemented by the due date or communicating with the QA Branch when delays are expected and occur.
- Once the corrective action has been completed, a summary of the corrective action is documented in the CAR and then signed by the person conducting the corrective action, dated and sent back to the QA Branch with copies to the affected supervisor/manager.
- QA Branch staff follow up on the CAR in a time frame correlated to the significance of the QA finding.

Line staff who encounter quality system issues and have discussed them with the immediate supervisor(s) or manager(s) may use the Quality Assurance Alert (QAA) process to inform the QA Branch of quality assurance findings that need to be addressed, resolved, or updated:

- A QAA will be created from a standardized electronic template or filled out in hardcopy form.
- The QAA will be sent via email to the appropriate QA Branch Senior contact and QA Manager with a carbon copy to the supervisor(s) and/or manager(s) who have responsibilities over the area of concern.
- Once the QAA is received, the QA Branch staff will log it into the QAA log.
- QAA evaluation is expected to be completed within four working days with either issuance of a Corrective Action Report (CAR) or email confirming that no action is required. The QAA will be evaluated by QA Branch staff in consultation with the appropriate supervisor and/or manager as necessary. The staff person filing the QAA may be contacted for clarification of the issue before a recommendation or decision on action is made.
- The QA Manager will review the QAA log monthly and report to affected managers/ supervisors of any pattern in the findings that could be indicative of a systematic quality issue.

Through the QA Manager's office, electronic logs itemize any CARs and QAAs issued, resolved, and alerts with resolution pending. This summary log contains information on the start date of pending alerts, the finding, status of their resolution and other pertinent information. The summary is accessible to supervisors, managers and other appropriate stakeholders. The QA Manager will review the CAR and QAA logs monthly and report to affected managers/ supervisors of any pattern in the findings that could be indicative of a systematic quality issue.

11.6 Dispute Resolution

Whenever a dispute arises regarding the applicability of a quality system requirement, the appropriateness of quality control/quality assurance procedures, specific quality assessment findings, or a corrective action recommendation, the disputed issue is expected to be resolved by the program manager(s) and the QA Manager. Each manager may involve staff to provide technical clarification. If the dispute cannot be resolved at the manager level, the dispute is taken to the DEO/STA. After a presentation of the arguments for and against the disputed issue, the DEO/STA will either resolve the issue or take it under consideration with a resolution to be issued within ten days. The resolution is final and not subject to appeal. The resolution and the rationale for the decision are documented as a part of the Monthly Quality Assurance Alert Summary (Section 11.4).

SECTION 12. QUALITY IMPROVEMENT

The AQMD is committed to the collection and reporting of data that are scientifically and legally valid for the purposes to which they are intended. This philosophy mandates that the AQMD operates under a policy that stresses data quality over data quantity. The AQMD will not compromise data quality for the expediency of data collection. It is the responsibility of the QA Manager's office to ensure that this policy is followed and to serve as the "conscience" of the AQMD on this policy. A continual process of assessing the quality system, identifying and implementing improvements to the quality system, and ongoing training will continue AQMD's commitment to data quality for current and future environmental measurement programs.

Quality improvement and enhancement are the result of activities undertaken at every level of staffing and also of the free and timely communication from line staff to management and from management to line staff. Communication is crucial for ensuring that DQOs are maintained and improved in a timely and resource effective manner. Communication from management to line staff is achieved through formal reports and periodic meetings with staff. These meetings discuss the results of quality assurance assessments of measurement system performance relative to DQOs and also the proper implementation of total measurement systems. These are described in the previous section on Assessment and Response. 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.

12.1 Operational Activities

For field operations, significant problems are documented in the station and/or instrument log books and reported to supervisors. If an issue is discovered, corrective actions are initiated through work orders and are issued to the appropriate support unit. 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 the problem has been corrected, the work order is closed out by the support unit. Then this is communicated to the station operations supervisor, lead staff and station operator who notes that the issue is resolved in the instrument or station log book and also includes a summary of the actions taken to mitigate the problem. Minor problems that can be corrected by staff without loss of data are also documented in the station and/or instrument log books and identified as corrected, along with a summary of the actions taken to mitigate the problem.

For laboratory operations, activity falls under two broad categories. The first category (Category 1) consists of pre-sample preparation, sample collection, sample preparation and sample disposition. The second category (Category 2) consists of analysis.

For laboratory Category 1 operations, problems are documented in log books, reported to senior staff and the LSST Manager, as appropriate. AQ Chemists and AAQ Chemists with approval of the responsible Principal AQ Chemists in consultation with the LSST Manager and frequently under the lead of a Senior AQ Chemist formulate and implement corrective actions. When the problem has been corrected, the corrective action is documented in log books and a report is issued and filed on the laboratory server under a unique laboratory number. This report is issued to lab files, impacted stakeholders and the QA Manager's office through the Quality Assurance Alert (QAA) Process (Section 11.5).

For laboratory Category 2, operations problems are documented in log books, reported to senior staff and the LSST Manager, as appropriate. AQ Chemists and AAQ Chemists with approval of the responsible Principal AQ Chemists in consultation with the LSST Manager and frequently under the lead of a Senior AQ Chemist formulate and implement corrective actions. When the problem has been corrected, the corrective action is documented in log books and a report is issued and filed on the laboratory server under a unique laboratory number. This report is issued to laboratory files, impacted stakeholders and the QA Branch in the form of a QAA so it can be logged and documented. 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. If available, the sample will be reanalyzed as appropriate.

12.2 Data Validation and Reporting Activities

Data validation and reporting problems for both field and laboratory operations are documented by the QA Branch based on assessments of data verification records and verified data (e.g. QC data and information, reported data sets, historical norms) and program requirements (e.g. QAPPs, SOPs). Problems are reported to the appropriate manager(s) and staff through the corrective action process described in Section 11.5. QA staff work with operations staff, supervisors and managers to develop and implement corrective actions to data verification and reporting procedures and improve data quality.

12.3 Quality Assurance Communication

The QA Manager, AM Manager, LSST Manager, and DEO/STA meet on an as needed basis to review and discuss QA initiatives, training/resource needs, assessments, corrective actions, and other issues relevant to the AQMD quality management system. They also meet as needed should circumstances create an immediate impact on data quality, requiring upper management authority to resolve. Any critical information derived from these meetings is communicated to the Executive Officer by the DEO/STA. The AM Manager and LSST Manager are expected to meet with their supervisors and appropriate non-supervisory staff to obtain feedback on QA and QC issues and provide guidance. These meetings will occur on a regular basis and a minimum of once per

quarter and also will occur as needed. The QA staff will attend branch meetings (as available) to review QA and QC issues with operational staff and also will make branch-wide and division-wide presentations on quality assurance activities and topics.

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, QA staff, and/or the QA Manager. An ongoing exchange of ideas and opinions on quality issues encourages the timely recognition of areas in need of improvement, and is an indicator of a healthy quality management system.

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Document: Quality Management Plan
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Appendix A

Glossary of Terms

Acceptance criteria — Specified limits placed on characteristics of an item, process, or service defined in requirements documents. (ASQC Definitions)

Accuracy — A measure of the closeness of an individual measurement or the average of a number of measurements to the true value. See **Bias**.

Assistant Air Quality Chemist (AAQ Chemist) – Entry level position in the AQMD chemist series that is assigned supervised duties related to operating and maintaining instrumentation utilized in the laboratory for preparing sampling media, and recovering, processing, and analyzing samples.

Air Quality Chemist (AQ Chemist) – Journey level position in the AQMD chemist series that is assigned full responsibility for duties related to operating and maintaining instrumentation utilized in the laboratory for preparing sampling media, and recovering, processing, and analyzing samples.

Air Quality Instrument Specialist (AQIS) – Journey level position in the AQMD technician series that is assigned to duties related to operating and maintaining analyzers, samplers, and other equipment utilized at ambient air monitoring stations for the collection of air quality samples and air quality data.

Air Quality Management Plan (AQMP) – The comprehensive program of actions and strategies intended to reduce emissions from sources of pollution within the jurisdiction of the South Coast Air Quality Management District to bring the region into attainment with federal air quality standards by designated attainment dates.

Annual Air Quality Monitoring Network Plan -- The description of the network of ambient air quality monitors located within the South Coast Air Quality Management District's 4-county jurisdiction. The Plan includes a review of actions taken during the previous fiscal year, and outlines plans for action in the year ahead.

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

Audit (system) — A systematic and independent examination to determine whether quality activities and related results comply with planned operations and whether these operations are implemented effectively and are suitable to achieve objectives.

Audit (performance) – See **Performance Evaluation**

Bias — the difference between the sample value of the test results and an accepted reference 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.

Calibration — A comparison of a measurement standard, instrument, or item with a standard or instrument of higher accuracy or certification to detect and quantify inaccuracies and to report or eliminate those inaccuracies by adjustments.

Calibration drift — The deviation in instrument response from a reference value over a period of time before recalibration.

Certification — The process of testing and evaluation against specifications designed to document, verify, and recognize the competence of a person, organization, or other entity to perform a function or service, usually for a specified time.

Chain of custody — An unbroken trail of accountability that ensures the physical security of samples, data, and records.

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 compared to the amount that was expected to be obtained under correct, normal conditions.

Computer program — A sequence of instructions suitable for processing by a computer. Processing may include the use of an assembler, a compiler, an interpreter, or a translator to prepare the program for execution. A computer program may be stored on magnetic media and referred to as “software,” or it may be stored permanently on computer chips, referred to as “firmware.” Computer programs covered in a QAPP are those used for audit results, design analysis, data acquisition, data reduction, data storage (databases), operation or control, and database or document control registers when used as the controlled source of quality information.

Conformance — An affirmative indication or judgment that a product or service has met the requirements of the relevant specification, contract, or regulation; also, the state of meeting the requirements.

Consensus standard — A standard established by a group representing a cross section of particular government agencies, industry or trade, or a part thereof.

Contractor — Any organization or individual contracting to furnish services or items or to perform work.

Corrective action — Any measures taken to rectify conditions adverse to quality and, where possible, to preclude their recurrence.

Corrective Action Report (CAR)— A report from the AQMD QA Branch indicating a finding that is or is potentially an issue that affects data quality. The report is tracked until proper resolution of the finding has been performed.

Correlation coefficient — A number between -1 and 1 that indicates the degree of linearity between two variables or sets of numbers. The closer to -1 or +1, the stronger the linear relationship between the two (i.e., the better the correlation). Values close to zero suggest no correlation between the two variables.

Criteria Pollutant – One of six common air pollutants for which the Clean Air Act requires U.S. EPA to set national ambient air quality standards. These six pollutants are inhalable particulate matter (PM10), ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. The “criteria” by which the standards are based on human health effects and/or environmental effects (science-based guidelines).

Data of known quality — Data that have the qualitative and quantitative components associated with their derivation documented appropriately for their intended use, and when such documentation is verifiable and defensible.

Data Quality Assessment (DQA) — 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. The five steps of the DQA Process include: 1) reviewing the DQOs and sampling design, 2) conducting a preliminary data review, 3) selecting the statistical test, 4) verifying the assumptions of the statistical test, and 5) drawing conclusions from the data.

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

Data Quality Objectives (DQOs) — The qualitative and quantitative statements derived from the DQO Process that clarify a 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.

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

Detection Limit (DL) — 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 — Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.

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 requirements.

Environmental data — Any parameters or pieces of information collected or produced from measurements, analyses, or models of environmental processes, conditions, and effects of pollutants on human health and the ecology, including results from laboratory analyses or from experimental systems representing such processes and conditions.

Environmental monitoring — The process of measuring or collecting environmental data.

Environmental Measurement Program – A systematic, planned and quality assured group of activities intended to quantify a specific set of related pollutant concentrations in ambient air, source emissions, or commercial/industrial materials and products.

Environmental programs — An all-inclusive term pertaining to any work or activities involving the environment, including but not limited to: characterization of environmental processes and conditions; environmental monitoring; environmental research and development; the design, construction, and operation of environmental technologies; and laboratory operations on environmental samples.

Finding — An assessment conclusion that identifies a condition having a significant effect on an item or activity. An assessment finding may be positive or negative, and is normally accompanied by specific examples of the observed condition.

Fine Particulate (PM_{2.5}) – Particles and liquid droplets in the air that are 2.5 micrometers in diameter or smaller that pass through the throat and nose and enter the lungs.

Hazardous Air Pollutant (HAP) -- Hazardous air pollutants, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. The list of HAPs emitted by sources is currently at 188 pollutants identified by EPA for reduction under Section 112 of the Clean Air Act. Examples of HAPs include benzene, which is found in gasoline; perchloroethylene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Examples of other listed HAPs include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.

Inhalable Particulate Matter (PM₁₀) – Particles and liquid droplets in the air that are 10 micrometers in diameter or smaller that generally pass through the throat and nose and enter the lungs. Inhalable Course Particulate Matter does not include the PM_{2.5} fraction of Inhalable Particulate Matter.

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

Guideline — A suggested practice that is not mandatory in programs intended to comply with a standard.

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

Laboratory Approval Program (LAP) -- The program functions to approve laboratories that perform source compliance services based on evaluation of their technical qualifications and competence to conduct tests in accordance with AQMD-approved methods and requirements.

Management — Those individuals directly responsible and accountable for planning, implementing, and assessing work.

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

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

May — When used in a sentence, a term denoting permission but not a necessity.

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

Must — When used in a sentence, a term denoting a requirement that has to be met.

Nitrogen Oxides (NO_x) – For the purpose of RECLAIM, oxides of nitrogen are defined as the sum of nitrogen dioxide and nitric oxide.

Organization — A company, corporation, firm, enterprise, or institution, or part thereof, whether incorporated or not, public or private, that has its own functions and administration.

Organizational structure — The responsibilities, authorities, and relationships, arranged in a pattern, through which an organization performs its functions.

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

Practice -. An accepted body of procedures and techniques for performing an activity (e.g., sampling, chemical analysis, quantification), systematically presented in the order in which they are to be executed. Unlike a method, a practice is not limited to activities resulting in a numeric result.

Precision — A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions expressed generally in terms of the standard deviation. Other measures, such as Relative Percent Difference, are typically used when there are too few data points to determine a valid standard deviation.

Primary Quality Assurance Organization (PQAO) – A PQAO is defined such that measurement uncertainty among all stations in the organization can be expected to be reasonably homogeneous, as a result of common factors. A complete definition may be found in 40 CFR 58, Appendix A. Common factors that should be considered by monitoring organizations in defining primary quality assurance organizations include:

- (a) Operation by a common team of field operators according to a common set of procedures
- (b) Use of a common QAPP or standard operating procedures
- (c) Common calibration facilities and standards
- (d) Oversight by a common quality assurance organization, and
- (e) Support by a common management, laboratory or headquarters.

Procedure — A specified way to perform an activity.

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.

Program Implementation Assessment (PIA) -- Periodic snapshots of how well the actual environmental measurement program is being implemented with respect to procedures, methods, policies, and practices, as delineated in the program QAPP and associated SOPs.

Project — An organized set of activities within a program.

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 (QA) — 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 client.

Quality Assurance Alert (QAA) -- An AQMD report generated from staff to inform the QA Branch of an issue that affects or potentially affects data quality. The QA Branch may issue a corrective action report (see **CAR**) as a result to resolve the finding.

Quality Assurance Project Plan (QAPP) — A formal document describing in comprehensive detail the necessary quality assurance (QA), quality control (QC), and other technical activities that must be implemented to ensure that the results of the work performed will satisfy the stated performance criteria. The QAPP components are divided into four classes: 1) Project Management, 2) Measurement/Data Acquisition, 3) Assessment/Oversight, and 4) Data Validation and Usability. Guidance and requirements on preparation of QAPPs can be found in EPA QA/R-5 and QA/G-5.

Quality Control (QC) — The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality. The system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against “out of control” conditions and ensuring the results are of acceptable quality.

Quality control (QC) 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 Improvement — A management program for improving the quality of operations. Such management programs generally entail a formal mechanism for encouraging worker recommendations with timely management evaluation and feedback or implementation.

Quality Management — That aspect of the overall management system of the organization that determines and implements the quality policy. Quality management includes strategic planning, allocation of resources, and other systematic activities (e.g., planning, implementation, and assessment) pertaining to the quality system.

Quality Management Plan (QMP) — A formal 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 required interfaces for those planning, implementing, and assessing all activities conducted.

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

Regional Clean Air Incentives Market (RECLAIM) – SCAQMD Regulation XX is a market incentive program designed to allow facilities flexibility in achieving emission reduction requirements for Oxides of Nitrogen (NO_x), and oxides of Sulfur (SO_x) under the Air Quality Management Plan using methods which include, but are not limited to: add-on controls, equipment modifications, reformulated products, operational changes, shutdowns, and the purchase of excess emission reductions.

Record (quality) — A document that furnishes objective evidence of the quality of items or activities and that has been verified and authenticated as technically complete and correct. 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 — A measure of the degree to which data accurately and precisely represent a characteristic of a population, a parameter variation at a sampling point, a process condition, or an environmental condition.

Requirement — A formal statement of a need and the expected manner in which it is to be met.

Research (applied) — A process, the objective of which is to gain the knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.

Shall — A term denoting a requirement that is mandatory whenever the criterion for conformance with the specification permits no deviation. This term does not prohibit the use of alternative approaches or methods for implementing the specification so long as the requirement is fulfilled.

Should — A term denoting a guideline or recommendation whenever noncompliance with the specification is permissible.

Software – See **Computer Program**

Source Emissions Testing -- Source emissions testing programs include rule compliance, barbecue ignition product and water heater approval, emissions inventory, engineering information, and method development.

Special Monitoring – An environmental measurement program that uses ambient air monitoring methods, techniques, and equipment to make measurements in support of on-going enforcement or special needs projects related to specific emission sources that may be out of compliance with SCAQMD regulations or may pose a health threat or nuisance to the general public.

Specification — A document stating requirements and referring to or including drawings or other relevant documents. Specifications should indicate the means and criteria for determining conformance.

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

Sulfur Oxides (SO_x) – For the purpose of RECLAIM, oxides of sulfur are defined as sulfur dioxide.

Traceability – The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standards, primary standards, basic physical constants or properties, or reference materials. In a data collection sense, it related calculations and data generated throughout the project back to the requirements of the project.

Upper Air Meteorological Measurements Program (UAMMP) -- The upper-air measurement programs provide a better understanding of the airflow and mixing in the South Coast Air Basin, especially as related to the formation and transport of smog. The data is incorporated into current air quality forecasts and historical analyses. Data collected during air pollution events is used to develop and run models to test the effectiveness of control strategies for meeting state and federal air quality standards.

Validate (Validation) – Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use have been fulfilled. In design and development, validation concerns the process of examining a product or result to determine conformance to user needs.

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Verify (Verification) -- confirm by examination and provision of objective evidence that specified requirements have been fulfilled. In design and development, verification concerns the process of examining a result of a given activity to determine conformance to the stated requirements for that activity.

APPENDIX B. REFERENCES

Title	Publication Number and Date	Description
Division of Environment Quality Management Plan Part I, Divisional Quality Assurance Management Policies and Procedures	Revision 1, October 30, 2004,	Kansas Department of Health and Environment quality management plan
EPA Quality Manual for Environmental Programs	CIO 2105-P-01-0 (formerly EPA Manual 5360 A1) , May 2000	Specifications for satisfying the mandatory Quality System defined in CIO 2105.0. For more information and resources, see Policies and Procedures for EPA Organizations .
EPA Requirements for Quality Management Plans (QA/R-2)	EPA/240/B-01/002 March 2001 Reissue Notice May 2006	Specifications for Quality Management Plans for organizations that receive funding from EPA. These specifications are equivalent to Chapter 3 of EPA Manual CIO 2105-P-01-0. For more information and resources, see Tools - Quality Management Plans .
EPA Requirements for QA Project Plans (QA/R-5)	EPA/240/B-01/003 March 2001 Reissue Notice May 2006	Specifications for QA Project Plans prepared for activities conducted by or funded by EPA. These specifications are equivalent to Chapter 5 of EPA Manual CIO 2105-P-01-0. For more information and resources, see Tools - QA Project Plans .
Overview of the EPA Quality System for Environmental Data and Technology	EPA/240/R-02/003 November 2002	Information on existing Agency policies, responsibilities, and resources to use in implementing both the EPA Quality System and your organization's Quality System. For more information and resources, see Policies and Procedures for EPA Organizations and Quality Specifications for Non-EPA Organizations .
Guidance for Developing Quality Systems for Environmental Programs (QA/G-1)	EPA/240/R-02/008 November 2002 Reissue Notice January 2008	Guidance on developing and documenting the elements of a functional quality system in organizations that carry out environmental data operations within, or on behalf of, EPA. For more information and resources, see Tools - Quality Management Plans .
Guidance on Assessing Quality Systems (QA/G-3)	EPA/240/R-03/002 March 2003	Guidance on assessing the adequacy and effectiveness of an environmental quality system. For more information and resources, see Tools - Quality Systems Assessments .
Guidance on Systematic Planning using the Data Quality Objectives Process (QA/G-4)	EPA/240/B-06/001 February 2006	This document is an expanded version of the August 2000, <i>Guidance for the Data Quality Objectives Process</i> and includes both decision making and estimation using the Data Quality Objectives (DQO) Process. It provides information on how to apply systematic planning to generate performance and acceptance criteria for collecting environmental data. The basic structure of the DQO Process is unchanged but there are some minor

		revisions in the names of the seven steps of the Process. For more information and resources, see Tools - Systematic Planning .
Systematic Planning: A Case Study for Hazardous Waste Site Investigations (QA/CS-1)	EPA/240/B-06/004 February 2006)	This document shows the use of systematic planning using the Data Quality Objectives (DQO) Process in the form of a case study.
Systematic Planning: A Case Study of Particulate Matter Ambient Air Monitoring (QA/CS-2)	EPA/240/B-07/001 March 2007	This document shows the use of systematic planning using the Data Quality Objectives (DQO) Process. This case study shows how the DQO Process was applied to a particulate matter ambient air monitoring problem.
Decision Error Feasibility Trials (DEFT) Software (QA/G-4D)	EPA/240/B-01/007 September 2001	PC-based software for determining the feasibility of data quality objectives defined using the Data Quality Objectives Process. Note: This version replaces the original software issued September 1994 (EPA/600/R-96/056). For more information and resources, see Tools - Systematic Planning .
Data Quality Objectives Process for Hazardous Waste Site Investigations (QA/G-4HW)	No longer available as of March 2006	For an example on applying the DQO process to hazardous waste site investigations, see Systematic Planning: A Case Study for Hazardous Waste Site Investigations . For more information and resources on the DQO Process and systematic planning, see Tools - Systematic Planning .
Guidance for Quality Assurance Project Plans (QA/G-5)	EPA/240/R-02/009 December 2002	Guidance on developing Quality Assurance Project Plans that meet EPA specifications. Note: This version replaces the original document issued in February 1998 (EPA/600/R-98/018). For more information and resources, see Tools - QA Project Plans .
Guidance for Geospatial Data Quality Assurance Project Plans (QA/G-5G)	EPA/240/R-03/003 March 2003	Guidance on developing Quality Assurance Project Plans for geospatial data projects. For more information and resources, see Tools - QA Project Plans .
Guidance on Choosing a Sampling Design for Environmental Data Collection (QA/G-5S)	EPA/240/R-02/005 December 2002	Guidance on applying standard statistical sampling designs (such as simple random sampling) and more advanced sampling designs (such as ranked set sampling, adaptive cluster sampling) to environmental applications.
Guidance for Quality Assurance Project Plans for Modeling (QA/G-5M)	EPA/240/R-02/007 December 2002	Guidance on developing Quality Assurance Project Plans for modeling projects. For more information and resources, see Tools - QA Project Plans .
Guidance for Preparing Standard Operating Procedures (QA/G-6)	EPA/600/B-07/001 April 2007	Guidance on the development and documentation of Standard Operating Procedures. Note: This version replaces the previous document issued in March 2001 (EPA/240/B-01/004). For more information and resources, see Tools - Standard Operating Procedures .

Guidance on Technical Audits and Related Assessments for Environmental Data Operations (QA/G-7)	EPA/600/R-99/080 January 2000 Reissue Notice May 2006	Guidance to help organizations plan, conduct, evaluate, and document technical assessments. For more information and resources, see Tools - Technical Audits .
Guidance on Environmental Data Verification and Data Validation (QA/G-8)	EPA/240/R-02/004 November 2002 Reissue Notice January 2008	Guidance to help organizations conduct data verification and data validation activities. For more information and resources, see Tools - Data Verification and Data Validation .
Data Quality Assessment: A Reviewer's Guide (QA/G-9R)	EPA/240/B-06/002 February 2006	General guidance to organizations on assessing data quality criteria and performance specifications for decision making. G-9R is non-technical document and shows a reviewer what constitutes an appropriate Data Quality Assessment (DQA), and how to recognize situations or reports where a DQA has been conducted. For more information and resources, see Tools - Data Quality Assessment .
Data Quality Assessment: Statistical Tools for Practitioners (QA/G-9S)	EPA/240/B-06/003 February 2006	This document can be considered the technical aspect of G-9R. The document is designed as a "tool-box" of useful techniques in assessing the quality of data. The overall structure of the document will enable the analyst to investigate many different problems using a systematic methodology. For more information and resources, see Tools - Data Quality Assessment .
Guidance for Data Quality Assessment: Practical Methods for Data Analysis (QA/G-9)	No Longer Available as of March 2006	This document is replaced by Data Quality Assessment: A Reviewer's Guide (QA/G-9R) , and the companion document Data Quality Assessment: Statistical Tools for Practitioners (QA/G-9S) . A Cross-Walk (PDF 6pp, 46K About PDF) between QA/G-9 and QA/G-9S is available.
DataQUEST (QA/G-9D)	No Longer Available.	The DataQUEST software is no longer available. For links to other free software for performing data quality assessment, see Quality-Related Resources - Software . EPA has a site license for SAS for EPA employees - for information, email: quality@epa.gov .
Guidance for Developing a Training Program for Quality Systems (QA/G-10)	EPA/240/B-00/004 December 2000 Reissue Notice May 2006	Guidance on developing a program-specific quality systems training program for all levels of management and staff. For more information and resources, see Tools - Training Programs .
Guidance on Quality Assurance for Environmental Technology Design, Construction and Operation (QA/G-11)	EPA/240/B-05/001 January 2005	Guidance on basic quality assurance and quality control procedures, and good engineering principles/practices, that may be used in the design, construction, or operation of environmental technologies. For more information and resources, see Tools - Environmental Technology

APPENDIX C. Organization Charts

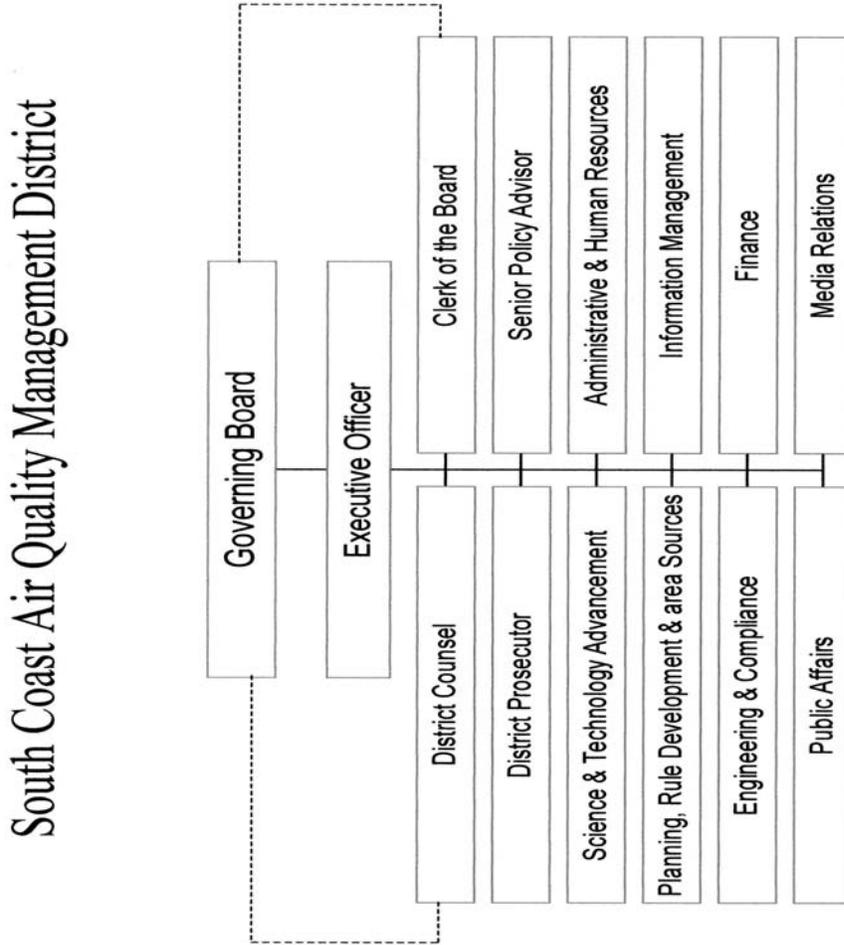
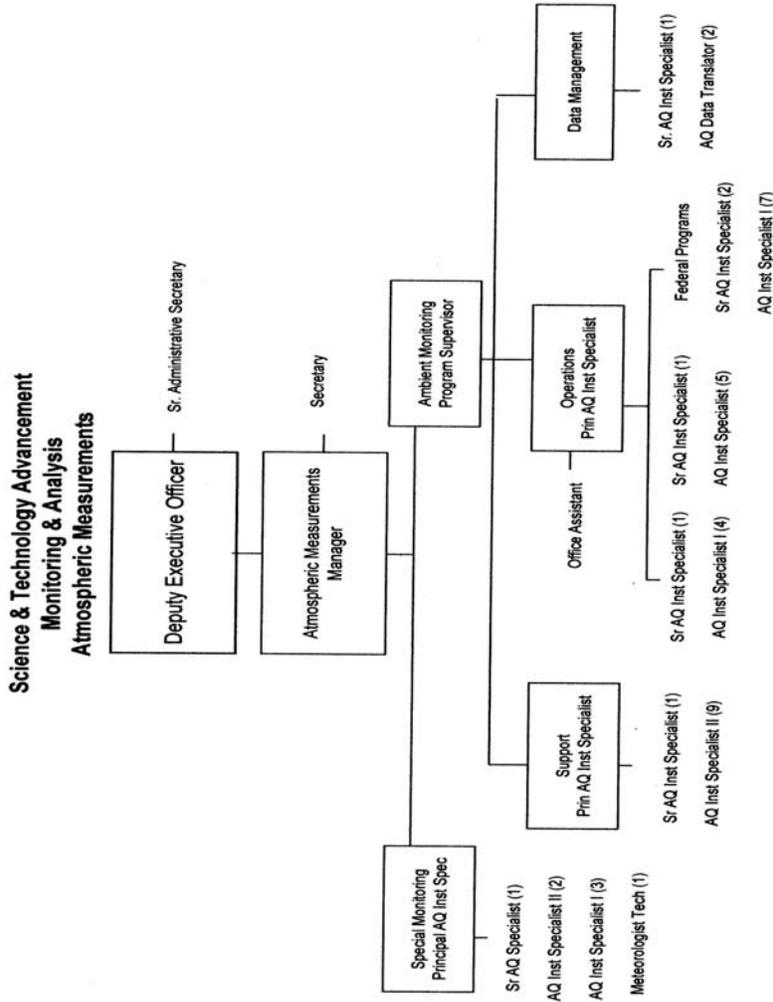


Figure C.1. Organization Chart for South Coast Air Quality Management District

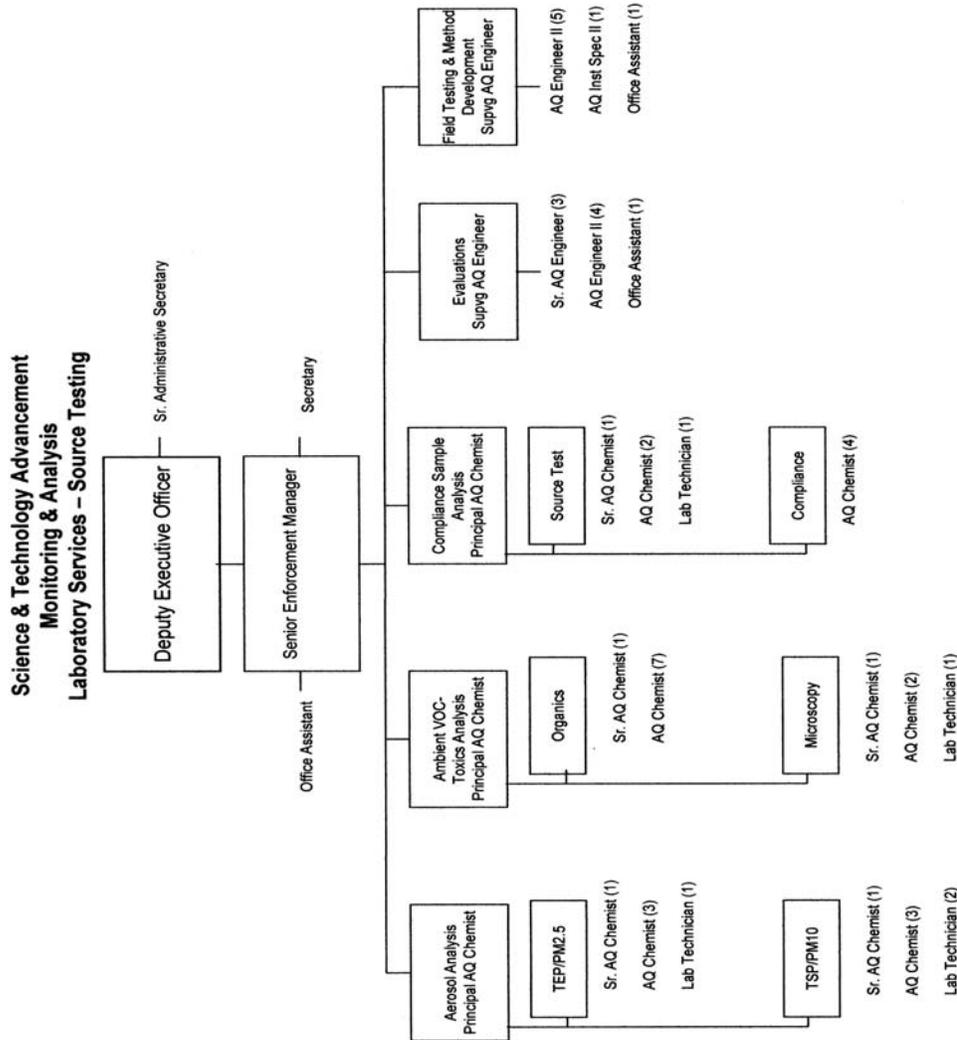
APPENDIX C. Organization Charts (Continued)



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Figure C.2. Organization Chart for Atmospheric Measurements Branch

APPENDIX C. Organization Charts (Continued)



2-14-08

Figure C.4. Organization Chart for Laboratory Services – Source Testing Branch

APPENDIX C. Organization Charts (Continued)

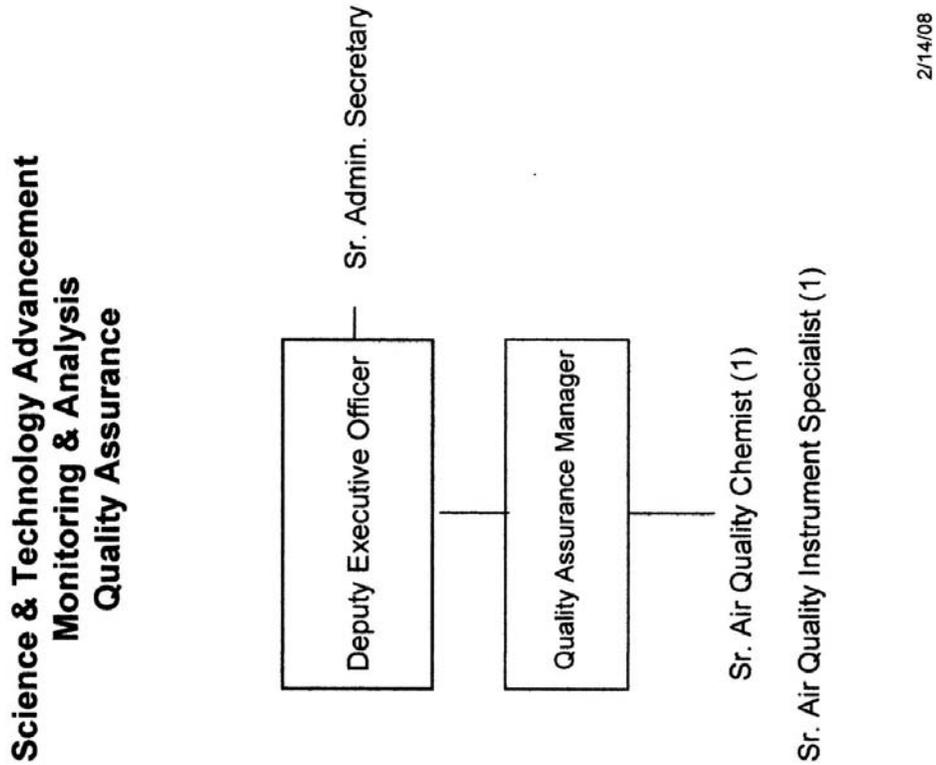


Figure C.5. Organization Chart for Quality Assurance Branch

APPENDIX D. SCAQMD DOCUMENTS

1. Procurement Policy and Procedure (revised: October 5, 2007)
2. Records Retention Policy and Procedure (revised: September 7, 2007)
3. Records Retention Schedule (revised: September, 7, 2007)
4. Guidelines for Implementing the California Public Records Act (adopted May 6, 2005)
5. Annual Air Quality Monitoring Network Plan (revised June 2007)
6. Public Records Request Form
7. Ambient Air Monitoring Quality Assurance Plan (1995)
8. DRAFT Multiple Air Toxics Exposure Study in the South Coast Air Basin - MATES III (January 2008)