



1. Title

Quality Assurance Manual Volume I



Quality Management Plan for Ambient Air Monitoring

Revision 2.0

February 2026

Period of Applicability for this Quality Management Plan starts on the date of the United States Environmental Protection Agency's signature and ends five years after that date or until a new version of the Quality Management Plan is approved.

2. Approval Page

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2.4 - Acronyms

ADAM	Aerometric Data Analysis and Management System
AIS	Audit Information System
AMB	Air Monitoring Branch
AMP	Air Monitoring Performance
AMSB	Air Monitoring Support Branch
ANP	Annual Network Plan
APCD	Air Pollution Control District
AQDA	Air Quality Data Action
AQDS	Air Quality Data Section
AQMD	Air Quality Management District
AQMIS	Air Quality and Meteorological Information System
AQPB	Air Quality Planning Branch
AQPSD	Air Quality Planning and Science Division
AQS	Air Quality System
ARD	Air Resources District
CAN	Corrective Action Notification
CARB	California Air Resources Board
CalEPA	California Environmental Protection Agency
C.F.R.	Code of Federal Regulations
CPAQAB	Consumer Products and Air Quality Assessment Branch
CSN	Chemical Speciation Network
DMS	Data Management System
DQO	Data Quality Objective
FEM	Federal Equivalent Method
FRM	Federal Reference Method
LAB	Laboratory Analysis Branch
LIMS	Laboratory Information Management System
MLD	Monitoring and Laboratory Division
NATTS	National Air Toxics Trends Station
NCore	National Core Multipollutant Monitoring Station
NIST	National Institute of Standards and Technology
NPAP	National Performance Audit Program

2.4 - Acronyms (cont.)

OIS	Office of Information Services
PAMS	Photochemical Assessment Monitoring Station
PE	Performance Evaluation
PM ₁₀	Particulate Matter (10 micrometers or less in diameter)
PM _{2.5}	Particulate Matter (2.5 micrometers or less in diameter)
PQAO	Primary Quality Assurance Organization
QAPP	Quality Assurance Project Plan
QAS	Quality Assurance Section
QA/QC	Quality Assurance and Quality Control
QMB	Quality Management Branch
QMP	Quality Management Plan
QMS	Quality Management Section
SLAMS	State and Local Air Monitoring Station
SLS	Standards Laboratory Section
SOP	Standard Operating Procedure
SPM	Special Purpose Monitor
TSA	Technical Systems Audit
U.S. EPA	United States Environmental Protection Agency

3. Organization's Quality Statement

3.1 - Purpose

This Quality Management Plan (QMP) describes the quality management system used by the California Air Resources Board (CARB) and participating air monitoring organizations within CARB's Primary Quality Assurance Organization (PQAO). The purpose of this document is to ensure that data collected by CARB's PQAO meets all applicable requirements for which it is intended through effective implementation of this QMP.

3.2 - Introduction

The U.S. Environmental Protection Agency (U.S. EPA) designated CARB as one of the seven PQAOs responsible for monitoring air pollution in California. The other six PQAOs are the Bay Area Air Quality Management District (AQMD), South Coast AQMD, San Diego County Air Pollution Control District (APCD), National Parks Service, Morongo Band of Mission Indians, and Pechanga Band of Luiseño Indians. A PQAO is responsible for managing its own air monitoring quality assurance programs and reporting its precision and bias data to U.S. EPA's Air Quality System (AQS) database.

CARB's PQAO consists of CARB and 32 air districts throughout California (a list of all 32 air districts can be found in Appendix A of this QMP). Of these air districts, 21 collect ambient air monitoring data. Throughout this document, CARB and these 21 air districts collecting ambient air monitoring data are collectively referred to as "monitoring organizations."

The program includes operation of the air monitoring network, laboratory analysis, data reporting, and quality assurance activities to ensure the quality of the data generated by CARB's PQAO. The data generated are utilized to define the nature and severity of pollution in California, determine attainment status with federal and State standards, identify pollution trends, support agricultural burn forecasting, and develop air models and emission inventories.

CARB's quality assurance program integrates both quality assurance and quality control (QA/QC) activities. Quality assurance is a set of external tasks that are performed outside of normal routine operations to provide certainty that the quality assurance program is generating data of sufficient quantity and quality, to meet or exceed all applicable requirements. Quality control activities are internal tasks that

are performed during sample collection, handling, analysis, and data reporting to ensure data precision and bias.

CARB's quality assurance program is outlined in a six-volume Quality Assurance Manual (1), including:

- Volume I - Quality Management Plan (2).
- Volume II - Standard Operating Procedures for Ambient Air Monitoring (3).
- Volume III - Laboratory Standard Operating Procedures (4).
- Volume IV - Monitoring Methods for the State Ambient Air Quality Standards (5).
- Volume V - Audit Procedures for Air Quality Monitoring (6).
- Volume VI - Standard Operating Procedures for Stationary Sources Emission Monitoring and Testing (7).

This QMP should be updated every five years, however the Quality Management Branch (QMB) Chief, or designee, may review and revise sooner based on program changes or whenever a significant change is required. Any significant or major revisions to the QMP must be approved by appropriate CARB and U.S. EPA management.

3.3 - Mission Statement

CARB is committed to ensuring that air monitoring data collected by, or on behalf of, its PQAO is scientifically and legally valid and of sufficient quantity and quality to meet or exceed all applicable federal, State, and local data reporting requirements. This QMP meets all applicable requirements and conforms to U.S. EPA policies, procedures, standards, regulations, and applicable quality assurance program documentation requirements of a QMP, including U.S. EPA Order CIO 2105.040 (8), 40 C.F.R. Parts 30, 31, 35, 50, 58 (9, 10, 11, 12, 13), and any specific grant agreements.

3.4 - Policy Statement

It is CARB's policy that all management and staff within its PQAO involved in generating air monitoring data (excluding community air monitoring, which will be governed by its own quality assurance documents) commit to this quality assurance program and continual quality improvement. CARB management is committed to providing the resources needed to successfully implement and maintain a comprehensive quality assurance program that meets or exceeds all applicable requirements. All air monitoring measurement activities performed by staff within CARB, by participating monitoring organizations within CARB's PQAO, or performed on behalf of CARB, shall comply with the quality assurance policies and procedures specified in this QMP. If a monitoring organization within CARB's PQAO chooses to utilize its own QMP or addendum to this QMP, prior written approval shall be obtained concurrently and collaboratively from CARB and U.S. EPA.

4. Organizational Charts

The organizational structure of CARB includes the Chairman's Office and the Executive Office. The Executive Office is comprised of 14 divisions and offices. The two divisions within CARB that have primary responsibility for CARB's ambient air monitoring program are Monitoring and Laboratory Division (MLD) and Air Quality Planning and Science Division (AQPSD). The branches within these two divisions that have regulatory ambient air monitoring responsibilities and functions are MLD's Air Monitoring Branch (AMB), Air Monitoring Support Branch (AMSB), and QMB, and AQPSD's Air Quality Planning Branch (AQPB) and Consumer Products and Air Quality Assessment Branch (CPAQAB). CARB's organizational charts can be found in Appendix D of this QMP.

5. Roles, Responsibilities, and Authorities

5.1 - PQAO Structure

A PQAO is a monitoring organization, or a coordinated aggregation of such organizations, responsible for a set of stations that monitors the same pollutants and for which data quality assessments can logically be pooled ([13](#)). Each pollutant sampler/monitor at a monitoring station in the State and Local Air Monitoring Station (SLAMS) network must be associated with one, and only one, PQAO ([13](#)).

Precision and bias among all air monitoring stations within a PQAO is expected to be reasonably homogeneous, to the extent possible, based on the following five common factors as defined in 40 C.F.R. Part 58, Appendix A ([13](#)):

1. Operation by a common team of field operators according to a common set of procedures.
2. Use of common quality assurance documents [e.g., QMP, Quality Assurance Project Plans (QAPP), standard operating procedures (SOP)].
3. Common calibration facilities and standards.
4. Oversight by a common quality assurance organization.
5. Support by a common management, laboratory, or headquarters.

CARB and all 21 monitoring organizations within its PQAO are expected to follow, to the extent practicable, these five common factors. A list of all 32 air districts within CARB's PQAO can be found in Appendix A of this QMP.

5.2 - PQAO Responsibilities

CARB is responsible for overseeing quality assurance activities for all monitoring organizations within its PQAO. This is accomplished through a quality assurance program that includes systematic planning, implementation, assessment, and on-going evaluation activities. These activities are discussed in more detail throughout this QMP. Roles and responsibilities for conducting these activities are defined collaboratively between CARB and monitoring organizations within CARB's PQAO. Roles and Responsibilities Agreements are available on CARB's Quality Management Document Repository website ([14](#)). Roles and Responsibilities Agreements should be updated every five years, but may be reviewed and revised sooner, based on program changes.

Anyone who is either directly or indirectly involved with air monitoring data collection has a responsibility for ensuring data quality. This includes staff-level personnel, managers, branch chiefs, division chiefs, and the Deputy and Executive Officer. Each monitoring organization within CARB's PQAO is responsible for ensuring that operation of the air monitoring network and data collected are conducted in accordance with approved procedures, and that they are of sufficient quantity and quality to meet intended objectives. CARB's goal is to work cooperatively and collaboratively with monitoring organizations within its PQAO to consistently produce high quality air monitoring data. The quality assurance program and procedures set forth in this QMP apply to CARB and all monitoring organizations within its PQAO, unless prior written approval for alternative quality management documents or addendums is obtained by CARB, or concurrently obtained by CARB and U.S. EPA, as appropriate.

To ensure uniformity and consistency, monitoring organizations within CARB's PQAO are encouraged to utilize CARB's quality management documents (QMP, QAPPs, SOPs, etc.) and laboratory services to the extent possible. A comprehensive listing of the quality management documents utilized by CARB and the monitoring organizations within CARB's PQAO is available on CARB's Quality Management Document Repository website ([14](#)).

CARB's Standards Laboratory performs certification and verification services of calibration instruments and flow and meteorological devices for CARB's PQAO. The use of common calibration facilities and standards helps ensure the data generated by monitoring organizations within CARB's PQAO are of similar quality. Monitoring organizations within CARB's PQAO are encouraged to utilize these services, which are provided free of charge. Monitoring organizations that choose to utilize other certification and verification services must comply with all applicable requirements ([15](#)) and must notify their PQAO Liaison of the alternate laboratory calibration

services utilized. More information about PQAO Liaisons can be found in Section 5.5, CARB Organization, of this QMP and on CARB's PQAO Liaison website ([16](#)).

CARB assists monitoring organizations within its PQAO in upgrading their quality assurance programs by providing technical assistance and training. Technical assistance includes equipment purchase recommendations, analyzer evaluation and repair, analyzer calibrations, inter-laboratory comparisons, training, equipment loans, and formalized reviews of air monitoring programs in the form of performance and systems audits. The goal is to develop and maintain air monitoring programs that consistently meet or exceed all applicable federal and State requirements. Monitoring organizations within CARB's PQAO are required to conform to all applicable quality assurance requirements.

Additionally, and upon request, CARB may provide quality assurance oversight and support including audits, and certification and verification services to air monitoring organizations outside of CARB's PQAO. A summary of the regulatory ambient air monitoring responsibilities and functions relevant to CARB and monitoring organizations within CARB's PQAO is provided in Appendix E of this QMP.

5.3 - Network Overview

California's air monitoring network is unique in that it is shared and operated by CARB, other PQAOs, monitoring organizations, private contractors, and tribal authorities. These combined entities operate more than 250 air monitoring stations and more than 700 air monitors in California.

California is divided geographically into 15 air basins encompassing 58 counties. An air basin generally has similar meteorological and geographic conditions and may include several different counties. Some counties lie in more than one basin (e.g., Kern, Los Angeles, Riverside, and San Bernardino). Several different monitoring organizations may operate monitoring stations in a given air basin. The geographical jurisdictions of monitoring organizations in California range from a portion of a county to several counties or even an entire air basin. A map of California's air basins and counties is available on CARB's website ([17](#)), and a list can be found in Appendix B of this QMP.

CARB's PQAO operates monitoring stations in 12 of the 15 air basins in California. In some portions of the State, private contractors operate monitoring stations under contract with businesses that are required by permit conditions to conduct air monitoring. If CARB utilizes air monitoring data generated by any of these entities, the data must meet all applicable U.S. EPA requirements and comply with the quality assurance policies and procedures specified in this QMP.

CARB's air monitoring network includes monitoring of gaseous criteria and non-criteria pollutants, particulate matter, toxic air contaminants, pesticides, meteorological parameters, and greenhouse gases.

5.4 - Network Plan Management and Design

Each year, CARB submits an Annual Network Plan (ANP) to U.S. EPA for review and approval of the current configuration of California's air monitoring network (18). CARB's ANP covers detailed information about criteria pollutant monitoring sites and instruments operating within CARB's PQAO, including monitors using Federal Reference Methods (FRM) or Federal Equivalent Methods (FEM) that are included in the SLAMS network, National Core (NCore) multipollutant monitoring stations, Chemical Speciation Network (CSN), and Special Purpose Monitor (SPM) stations, and Photochemical Assessment Monitoring Stations (PAMS).

Air monitoring sites covered in the ANP measure ambient levels of gaseous pollutants and particulate matter, and in some cases, meteorological parameters.

CARB's PQAO is comprised of 32 of the 35 air districts in California. The remaining three air districts in California (Bay Area AQMD, San Diego County APCD, and South Coast AQMD) represent their own PQAOs. The air districts within CARB's PQAO may elect to prepare their own ANP or have their information included in CARB's ANP. Air districts are queried to ensure that those not drafting their own network plan are included in CARB's ANP. CARB's 2025 ANP covers the monitoring sites for 26 of the 32 air districts (18), while six air districts prepare their own ANPs and submit them directly to U.S. EPA. Air districts that prepare their own ANPs will submit them directly to U.S. EPA. CARB coordinates with air districts submitting their own ANPs to address any issues or concerns, and to determine air monitoring network adequacy on a statewide basis. A comprehensive list of all air districts in California and which ANP covers them is included in Appendix C of this QMP.

CARB's ANP meets the federal regulatory requirements in 40 C.F.R. Part 58, Appendices A through E (13). The primary responsibility for CARB's ANP and network management resides with CARB's MLD and AQPSD. Responsibilities include plan development, assessment, and decision-making regarding system modifications.

CARB also prepares the Ambient Air Monitoring Network Assessment to determine if California's air monitoring network achieves the monitoring objectives defined in 40 C.F.R. Part 58, Appendix D (13) for pollutants with federal ambient air quality standards. These pollutants include ozone, particulate matter 10 micrometers or less in diameter (PM₁₀), particulate matter 2.5 micrometers or less in diameter (PM_{2.5}), carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. The assessment also provides an evaluation of key elements for implementing California ambient air

quality standards and program requirements, determines if new monitoring sites are needed, if existing monitoring sites can be discontinued, and if new technologies are appropriate for incorporation into the air monitoring network. The first Ambient Air Monitoring Network Assessment was prepared in 2010, with a new document prepared every five years thereafter.

CARB's air monitoring network design follows the requirements outlined in 40 C.F.R. Part 58, Appendix D ([13](#)), based on monitoring objectives and spatial scales, and meets or exceeds the federal minimum monitoring requirements. Monitoring site location requirements are specified in 40 C.F.R. Part 58, Appendices A, C, D, and E ([13](#)). Siting considerations include appropriate spatial-scale representation, location, availability, economics, security, logistics, and atmospheric conditions. Monitor placement considerations include physical obstructions, activities in the immediate area, accessibility, and availability of utilities and other support facilities in correlation with the defined purpose of the specific monitor and design. The network also includes monitors to address attainment issues in key geographic areas.

Information about each air monitoring station in California is available on CARB's interactive Quality Assurance Air Monitoring Site Search website ([19](#)). The website includes maps of each site, latitude and longitude coordinates, site photos, and a detailed survey of the physical parameters and conditions at each site. Site surveys list detailed information including but not limited to traffic descriptions, calibration dates, distances to obstacles, and residence times.

5.5 - CARB Organization

The organizational structure of CARB includes the Chairman's Office and the Executive Office. The Executive Office is comprised of 14 divisions and offices, as shown in Appendix D of this QMP. MLD and AQPSD are the two divisions within CARB that have primary responsibility for CARB's ambient air monitoring program. A summary of CARB's regulatory ambient air monitoring responsibilities and functions relevant to CARB's PQAO is provided in Appendix E of this QMP.

Monitoring and Laboratory Division

MLD is comprised of seven branches, as shown in Appendix D of this QMP. AMB, AMSB, LAB, and QMB are the four branches within MLD that have regulatory ambient air monitoring responsibilities and functions.

Air Monitoring Branch

AMB consists of two sections that have regulatory air monitoring responsibilities: Air Monitoring North Section and Air Monitoring South Section.

AMB's Air Monitoring North Section and Air Monitoring South Section conduct most of CARB's continuous ambient air monitoring activities at over 40 air monitoring stations throughout California, including seasonal and toxic air monitoring stations. All fixed stations are operated by qualified station operators who are responsible for station operation, QA/QC activities, data management, preventive maintenance, and minor repairs of sampling equipment. AMB staff are also responsible for verification and validation of ambient air monitoring data, as well as Data Management System (DMS) administration and data reporting to U.S. EPA's AQS.

Quality assurance and operational procedures for activities conducted by AMB are covered in Volume II of CARB's Quality Assurance Manual (3).

Air Monitoring Support Branch

AMSB consists of one section that has regulatory air monitoring responsibilities: Operation and Data Support Section.

AQSB's Operation and Data Support Section provides technical assistance to monitoring organizations by conducting instrument acceptance testing, repair, modifications, and retrofits. AQSB's Operation and Data Support Section and Technology Advancement Section administer DMS, are responsible for real-time data reporting to CARB's ambient air data clients, and report continuous monitor data to U.S. EPA's AQS.

Laboratory Analysis Branch

LAB consists of three sections that have regulatory air monitoring responsibilities: Organic Lab Section, Inorganic Lab Section, and Laboratory Support Section. These three sections provide laboratory services for ambient air analyses.

The Organic Lab Section and Inorganic Lab Section analyze media-based and whole air samples by gravimetric, x-ray fluorescence spectroscopy, inductively coupled plasma-mass spectrometry, gas and liquid chromatography, and ion chromatography. Samples are analyzed for mass, metals and elements, hexavalent chromium, aldehydes, ketones, ions, elemental and organic carbon, and volatile organic compounds (i.e., benzene, butadiene, chloroform, carbon tetrachloride, trichloroethylene, oxygenates, pesticides, wood smoke tracers, and greenhouse gases). All analyses are performed by qualified personnel that are responsible for sample analyses, QA/QC activities, laboratory data verification and validation, preventive maintenance and minor repairs of analytical equipment, and data management administration.

The Laboratory Support Section provides various support services, such as sample handling and management, and QA/QC activities. The section also administers LAB's

Laboratory Information Management System (LIMS) and is responsible for reporting laboratory data to U.S. EPA's AQS and clients.

Quality control procedures and operational SOPs for activities conducted by LAB are covered in Volume III of CARB's Quality Assurance Manual (4).

Quality Management Branch

QMB consists of three sections that have regulatory air monitoring responsibilities: Quality Assurance Section (QAS), Quality Management Section (QMS), and Standards Laboratory Section (SLS).

QAS has primary responsibility for conducting CARB's performance evaluation (PE) audits of field monitoring instrumentation used in support of California's ambient air monitoring network. PE audits of special monitoring programs may also be conducted to ensure that data quality meets the purpose and objectives of the monitoring program. QAS is responsible for issuing air quality data action (AQDA) requests and initiating appropriate corrective action notifications (CAN) for issues discovered during PE audits. Additionally, QAS holds primary responsibility for conducting Technical Systems Audits (TSA). However, to ensure the highest level of technical expertise and accuracy, staff from other sections also participate in TSAs. This collaborative approach allows staff to draw on the specialized knowledge of technical experts beyond QAS, ensuring comprehensive and effective TSAs.

QMS serves as liaison support (PQAO Liaison) for all monitoring organizations within CARB's PQAO, including CARB. QMS coordinates and communicates QA/QC information; develops CARB PQAO quality management documents; develops Roles and Responsibilities Agreements; assists with conducting TSAs; reviews and assesses air monitoring programs and associated quality management documentation to ensure that consistent practices are performed; and maintains a list of all quality management documentation utilized by monitoring organizations within CARB's PQAO in a comprehensive document repository. QMS develops and manages a statewide air monitoring training program for CARB, monitoring organizations, and other PQAOs. QMS activities are conducted to ensure compliance with federal and State requirements regarding sample collection and analysis, and validation and reporting of ambient air monitoring data. Findings and observations from these activities are compiled and communicated in an Annual Data Quality Report (9). QMS also assists QMB's Chief with the preparation and review of quality management documents within CARB's PQAO to ensure that consistent practices are performed.

SLS serves as the common calibration facility for CARB's PQAO. SLS is responsible for performing certification and verification services of calibration instruments, and flow and meteorological devices for CARB's PQAO. The use of common calibration

facilities and standards helps ensure the data generated by monitoring organizations within CARB's PQAO are of similar quality.

Air Quality Planning and Science Division

AQPSD is comprised of six branches, as shown in Appendix D of this QMP. AQPB and CPAQAB are the two branches within AQPSD that have regulatory ambient air monitoring responsibilities and functions.

Air Quality Planning Branch

AQPB consists of three sections that have regulatory air monitoring responsibilities: Air Quality Analysis Section, Particulate Matter Analysis Section, and Central Valley Air Quality Planning Section.

These sections evaluate the air monitoring network to ensure that it meets federal monitoring requirements, create the ANP, and the five-year network assessment that cover 26 of the 32 air districts within CARB's PQAO as well as CARB-operated sites with the boundaries of the included air districts, certify regulatory data annually for 11 monitoring organizations and CARB, and report data for exceptional events.

Consumer Products and Air Quality Assessment Branch

CPAQAB consists of one section that has regulatory air monitoring responsibilities: Air Quality Data Section (AQDS).

AQDS is responsible for reporting ambient air quality data to AQS for SLAMS and SPMs operated by CARB, and a number of monitoring organizations in California, for which CARB has data submittal authority. AQDS also develops and maintains the State's Air Quality and Meteorological Information System (AQMIS) and Aerometric Data Analysis and Management System (ADAM) air quality databases.

5.6 - Quality Assurance Program Authority and Responsibility

QMB's Chief has overall responsibility for the quality assurance program for CARB's PQAO and reports directly to MLD's Chief who has oversight authority over the program. QMB's Chief functions independently from the day-to-day air monitoring activities and has primary responsibility for timely review, implementation, and assessment of quality management documents and systems throughout CARB's PQAO. QMB's Chief works collaboratively with staff within CARB, U.S. EPA, and monitoring organizations within CARB's PQAO on PQAO-related quality assurance issues. QMB's Chief, or designee, has authority to speak to any member of staff or management on matters related to data quality assurance, and can recommend corrective actions after discussion and joint review with the impacted division or

monitoring organization regarding data quality issues. QMB's Chief may also work collaboratively with other entities within the California Environmental Protection Agency (CalEPA) on quality assurance issues associated with air monitoring activities, projects, or programs.

6. Technical Activities and Programs Supported by the QMP

Technical activities and programs supported by this QMP can be found in Section 5 of this QMP.

7. Conformance with Policies, Procedures, Standards, and Regulations

This QMP meets all applicable requirements and conforms to U.S EPA policies, procedures, standards, regulations, and applicable quality assurance program documentation requirements of a QMP, including U.S. EPA Order CIO 2105.040 (8), 40 C.F.R. Parts 30, 31, 35, 50, 58 (9, 10, 11, 12, 13), and any specific grant agreements.7.1 – General Quality Assurance Principles

CARB relies on air monitoring measurements to provide information that is utilized for public health and regulatory policy decisions. The purpose of CARB's quality assurance program is to plan, implement, and assess air monitoring measurements or data produced within its PQAO. CARB is committed to the following to ensure the quality and reliability of air monitoring data produced within its PQAO:

- Consistently providing air monitoring data of sufficient quantity and quality that meet or exceed the precision, bias, data capture, and completeness requirements of federal, State and local air monitoring regulations.
- Minimizing loss of air monitoring data.
- Promoting continual quality improvement in all areas of air monitoring.

The quality assurance approach is both proactive and reactive. It is proactive by 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 practices, as appropriate. However, it does not limit itself to routine assessments to maintain and improve data quality. The approach encourages timely response to input from staff and interested stakeholders regarding issues encountered and ideas for improving processes. Staff input may initiate ad hoc assessments of specific parts of the quality assurance program that may need immediate corrective action to maintain data quality objectives (DQO) and to avoid the loss of data. The implementation of the quality

assurance program is approached in a collaborative and cooperative manner with the objective of promoting continuous quality improvement.

It is essential that management and staff conducting air monitoring measurements within CARB's PQAO commit to and comply with this overall quality assurance program, which includes the following general quality assurance elements:

- The objectives of each environmental measurement project shall be clearly identified during the planning stages of the project in a manner that is consistent with the mission, goals, policies, and priorities of CARB's PQAO.
- All monitoring measurement activities supporting environmental decision making will have DQOs in accordance with applicable regulatory criteria.
- Acceptable limits of uncertainty shall be identified in the planning stages of each project, so that appropriate procedures and resources are incorporated and utilized.
- Appropriate QA/QC activities shall be integrated into all projects.
- A QAPP will be developed for each project identifying how stated objectives and data reliability requirements will be achieved.
- Supervisory staff shall routinely evaluate sample collection, chain of custody, and analysis; training; and data management activities to identify areas needing improvement or modification.
- AQDAs, CANs, PE audits, TSAs, and quality assessment reports shall be utilized and documented to ensure that the quality of the air monitoring data meet or exceed all applicable requirements.

Additionally, CARB provides the following guidelines to monitoring organizations within its PQAO to assist in evaluating the quality and reliability of their own air monitoring programs and data generated:

- When the monitoring objective is to collect data for regulatory use, instrumentation used to measure ambient air pollutants shall be designated a reference or equivalent method by U.S. EPA and/or CARB. Federally approved methods are not automatically deemed usable for State standard attainment purposes.
- Calibration and operating procedures must be documented and approved by CARB. This includes zero, span, and precision checks; preventative and remedial maintenance of instrumentation and equipment; and documentation of quality control information.

- When the monitoring objective is to collect data for regulatory use, gaseous instruments shall be housed in temperature controlled and monitored shelters, as required by 40 C.F.R. Part 53.52 ([20](#)).

7.2 - Data Review, Verification, Validation, Reporting, and Certification

The major steps associated with the flow of data generated within CARB's PQAO are:

- Data Generation - The collection, handling, and analysis of air samples. Generation of data is the responsibility of the site operator or laboratory analyst.
- Data Verification - The process of evaluating completeness, correctness, and compliance with specified requirements. The site operator is responsible for field data verification, and the laboratory analyst is responsible for analytical data verification.
- Data Validation - A sample-specific process that builds on data verification to determine the analytical quality of a specific data set. Data validation is typically conducted by the producers of the data. However, QMB plays a key role in the validation process by periodically assessing the effectiveness of data validation procedures and recommending corrective action, as necessary, when the error rate exceeds established DQOs.
- Data Reporting - The submission of data to AQS. Data reporting is typically carried out by the monitoring organization responsible for the generation of the data but can also be reported to AQS by CARB or another monitoring organization. As required by 40 C.F.R. Part 58, Appendix A ([13](#)), data and information reported to AQS for each reporting period (i.e., quarter) must include all data gathered and must be reported to AQS within 90 days after the end of each quarterly reporting period.
- Data Certification - The evaluation of quality assurance findings and reports generated in AQS. Responsibility for data certification lies with the reporting organization. In accordance with 40 C.F.R. Part 58, Section 15 ([13](#)), the reporting organization will submit an annual data certification letter to U.S. EPA by May 1 of each year. In this letter, the reporting organization shall certify that data, including any previously certified data that was modified for the previous year, are complete and accurate.

CARB is committed to the review, verification, validation, and assessment of data generated or utilized within its PQAO. The data assessment process includes both

internal and external quality control assessments of the data precision, completeness, and criteria identified in associated quality management documents, such as the QMP, QAPPs, and SOPs. Internal assessments are conducted by the producers of the data on a continuous basis to identify issues in real-time.

A summary of the four data pathways for validating, reporting, verifying, and certifying data generated by CARB's PQAO are summarized below. Appendix F of this QMP further demonstrates these data pathways and describes the data reporting and certification responsibilities by monitoring organizations within CARB's PQAO. If an issue is identified during any portion of the process (data generation through data certification), any person can initiate a CAN. Section 15c, Check (Assessment and Oversight) of this QMP further describes the CAN process.

- CARB Only - CARB generates, validates, reports, verifies, and certifies data.
- Monitoring Organization Only - Monitoring organization generates, validates, reports, verifies, and certifies data.
- Monitoring Organization and CARB - Monitoring organization generates and validates data; CARB reports, verifies, and certifies data.
- Multiple Monitoring Organizations - One monitoring organization generates and validates data while another monitoring organization reports, verifies, and certifies data.

Secondary or existing data are data that are originally collected for a certain purpose or project and are subsequently reanalyzed and utilized for a different project or purpose. They may be obtained from many sources, including literature, industry surveys, compilations from computerized databases and information systems, and computerized or mathematical models of environmental processes. Secondary data utilized in projects that result in regulatory decision-making will have established acceptance criteria or DQOs, and the roles, responsibilities, and authority of key personnel will be specified in the corresponding QAPP.

CARB collaborates with monitoring organizations within its PQAO and other data generating entities, as appropriate, to ensure that roles and responsibilities associated with data generation, verification, validation, reporting, and certification are clearly defined in the Roles and Responsibilities Agreements between CARB and monitoring organizations. These agreements are available on CARB's Quality Management Document Repository website ([14](#)).

7.3 - Quality Assurance Documentation

This QMP documents CARB's quality assurance program for ambient air monitoring measurements for its PQAO. It describes how data of sufficient quality and quantity, which meet or exceed all applicable requirements, will be generated on a consistent basis. Additionally, it describes the management structure and organization, objectives, policies, roles and responsibilities, and quality management tools utilized to implement all the required components of the quality assurance program. Quality assurance documentation (QMP, QAPPs, SOPs, Roles and Responsibilities Agreements, etc.) for CARB and monitoring organizations within its PQAO are available on CARB's Quality Management Document Repository website ([14](#)).

QMB's Chief or designee will review and revise CARB's QMP as needed based on program changes or whenever a significant change is required. Any significant or major QMP revisions must be approved by appropriate CARB and U.S. EPA management. Minor QMP revisions may be summarized, or summarized through an addendum, and forwarded to designated U.S. EPA staff.

7.4 - Annual Reviews and Planning

CARB's quality assurance program will be reviewed annually through various assessment processes described in this QMP to determine compliance with program objectives and if modifications are needed to further improve the quality assurance program.

The Annual Data Quality Report for CARB's PQAO provides a summary of the quality of ambient data in quantifiable terms. The report presents an overview of various QA/QC activities to verify the quality of the ambient data and includes tables to summarize data for ambient air monitoring stations in the statewide network. This report is available on CARB's Annual Data Quality Report for CARB's PQAO website ([21](#)) and Section 15c, Check (Assessment and Oversight), of this QMP describes CARB's annual reviews in more detail.

7.5 - Management Assessments

Assessments are conducted by CARB and U.S. EPA management on an ongoing basis to evaluate the effectiveness of CARB's quality assurance program. Section 15c, Check (Assessment and Oversight), of this QMP describes CARB's assessments and how they are utilized, documented, and distributed by management to maintain and improve data quality. The results of management assessments are documented and distributed to all affected parties.

7.6 - Training

CARB recognizes that adequate training of all staff involved in any aspect of its air monitoring program is a critical component of maintaining continuity and an effective and efficient quality assurance program. Training needs are assessed on a continual basis by section managers. Training is encouraged and provided as needed or required to ensure staff maintain adequate skills and knowledge to successfully perform assigned duties and comply with all applicable quality assurance requirements. Section 12, Personnel Training, of this QMP describes CARB's training program in more detail.

7.7 - Systematic Planning of Projects

U.S. EPA requires that all ambient air monitoring projects supporting environmental decisions utilize established DQOs. CARB complies with these requirements and utilizes a systematic planning process for special monitoring projects or other projects where DQOs and accompanying measurement quality objectives need to be established. Prior to implementation of such projects, the following elements will be determined and included in appropriate quality management documents:

- Description of project goals and objectives.
- Identification of all stakeholders.
- Identification of the type of data required to meet goals and objectives.
- Identification of potential constraints that might affect output.
- Identification of an implementation plan that includes milestones, timelines, resources, etc.
- Detailed sampling plan (e.g., instrument type, sampling location, frequency).
- Determination of the quantity and quality of data needed.
- Determination of data analysis method, evaluation, assessment, and quality performance criteria.
- Identification of required QA/QC activities.
- Identification of project management, organization, roles, and responsibilities.

All appropriate staff will be involved in the planning process including project managers, stakeholders, and executive management in a collaborative effort to meet identified project objectives.

Section 15.2, Data Quality Objectives, of this QMP discusses DQOs in more detail and their development utilizing a systematic planning process and appropriate regulatory criteria for all sampling and analyses activities that support environmental decision making.

7.8 - Project-Specific Quality Documentation

CARB utilizes this QMP, program or project specific QAPPs, SOPs, and other quality management documents to implement its quality assurance program. CARB's quality management documents utilized by monitoring organizations within CARB's PQAO are available on CARB's Quality Management Document Repository website ([14](#)).

7.9 - Quality Assurance Project Plans

A QAPP is required for each air monitoring project that is federally funded, however QAPPs or an equivalent quality assurance document may also be developed for projects that are not federally funded. QAPPs are typically prepared by the organization or section responsible for the project and may address plans for more than one project in one comprehensive plan.

A QAPP must comply with all applicable requirements, including U.S. EPA's Quality Assurance Project Plan (QAPP) Standard ([22](#)), and must be consistent with the objectives and requirements of CARB's QMP. A QAPP document includes the following elements:

- Mission, objectives, and policies.
- Purpose and background.
- Distribution and approval signatures.
- Roles and responsibilities.
- Resource requirements.
- Measurement, sampling, analysis, and chain of custody specifics.
- Instrument requirements.
- Data acquisition and management specifics.
- QA/QC activities.
- Assessment activities and responsibilities.
- Reports produced for management.
- Data validation and DQO reconciliation specifics.

CARB develops, using U.S. EPA's guidance ([22](#)), and implements QAPPs for each major federally funded air monitoring project or pollutant class (e.g., gaseous, particulate matter, meteorological). CARB's QAPPs focus on project-specific policies and reference SOPs and other relevant technical material. All QAPPs developed by CARB must be reviewed and approved by the appropriate program manager, QMB's Chief, other related staff and management, and U.S. EPA management prior to distribution and implementation. If a monitoring organization within CARB's PQAO chooses to utilize an alternative QAPP or modify any portion of CARB's QAPPs using an addendum, prior written approval shall be obtained from CARB, or concurrently and collaboratively from CARB and U.S. EPA, as appropriate.

QAPPs should be updated every five years, but may be reviewed and revised sooner, based on project or program changes.

7.10 - Standard Operating Procedures

Pursuant to 40 C.F.R. Part 58, Appendix A ([13](#)), all monitoring organizations within CARB's PQAO are required to adopt and follow CARB's SOPs for each air monitoring instrument they operate and for which ambient air quality data are reported. Monitoring organizations may adopt and follow alternative SOPs, or addendums to CARB's SOPs, that have been reviewed and approved by CARB.

SOPs are an integral part of a quality assurance program. They provide staff with the information necessary to perform a specified task properly and facilitate consistency to ensure the quality and integrity of the results. SOPs utilized by CARB and monitoring organizations within its PQAO describe the detailed procedures for air monitoring activities, including sample collection, instrument operation and maintenance, preparation and analysis of samples, and data management procedures. New or revised SOPs are developed by experienced staff and are reviewed by the program manager and other management and staff, as appropriate. They are forwarded to QMB's Chief for review and approval prior to implementation.

CARB developed an SOP Review Checklist derived from U.S. EPA's Guidance for Preparing Standard Operating Procedures ([23](#)), which identifies the elements of an effective SOP. When a monitoring organization submits an SOP for review, CARB utilizes the checklist criteria to evaluate its completeness. Monitoring organizations are encouraged to use the SOP Review Checklist and U.S. EPA's guidance document when creating or revising SOPs. SOPs should be updated every five years but may be reviewed and updated sooner based on procedural or program changes.

SOPs utilized by CARB's PQAO and by some of the other PQAOs in California are listed on CARB's Quality Management Document Repository website ([14](#)) and in CARB's Quality Assurance Manual, Volumes II and III ([3](#), [4](#)).

7.11 - Laboratory Quality Control Requirements

The purpose of CARB's Laboratory Quality Control Manual (located in Volume III of CARB's Quality Assurance Manual) (4) is to detail the guidelines and procedures utilized by LAB's Inorganics Lab Section and Organic Lab Section. These guidelines and procedures are utilized to ensure the accuracy and precision of analytical results and supporting quality control measures, and the consistent validation of data generated. The manual includes information about program management and responsibilities, standards and reagents, media and equipment, QA/QC, data and sample management, and confidentiality procedures.

General quality control, data management, and corrective action procedures are consistent for all analytical methods supported by LAB, but specific quality control components and performance criteria vary by analytical method and are addressed in corresponding SOPs.

7.12 - Quality Assurance Assessments

CARB's quality assurance program includes activities to evaluate the implementation and effectiveness of QMPs, QAPPs, SOPs, and other quality management documents. These assessments are performed by various sections within CARB.

QMB's Chief has the overall responsibility for these assessments which are conducted in accordance with associated quality management documents. These assessments are discussed in more detail in Section 15c., Check (Assessments and Oversight), of this QMP.

7.13 - Data Quality Assessments

Data quality assessments are performed on an ongoing basis to compare data quality with established DQOs. Data quality assessments include the evaluation of data precision, bias, detection limits, acceptable operating range, representativeness, comparability, and adherence to approved QAPPs and SOPs. Independent traceable National Institute of Standards and Technology (NIST) audit standards or other approved standards are utilized for these assessments, as appropriate.

Upon request, CARB may provide external assistance with data quality assessments by evaluating existing assessment methodologies, assisting with the development of new assessment methodologies, and reviewing QMPs, QAPPs, and SOPs to ensure that data quality assessments are appropriate, adequate, properly documented, and effective.

7.14 - Project Implementation Assessments

Periodic project implementation assessments are conducted to determine the effectiveness of project implementation with respect to policies, procedures, methods, and associated QAPPs and SOPs. Training, sampling, analysis, documentation, siting criteria, and data verification and reporting procedures are evaluated in these assessments. These assessments are discussed in more detail in Section 15c, Check (Assessments and Oversight), of this QMP.

8. QA Field Activities

QA field activities conducted by CARB's PQAO can be found in Section 15.3, Implementation of Work Processes, of this QMP.

9. Computer Hardware and Software

CARB utilizes a wide range of computer equipment and software including laptops, desktop computers, field data loggers, laboratory analytical equipment, databases, and servers. Hardware and software needs are program or project specific and are determined by the project manager, as identified in corresponding QAPPs or SOPs. The acquisition of all hardware and software equipment is subject to procurement policies, as discussed in Section 13, Procurement of Items and Services, of this QMP.

A variety of databases are utilized for data recording, reduction, management, and storage of data. Databases are managed in-house by an appointed system administrator. The system administrator is given administrative rights with a higher level of access to the database, including software modification capabilities. Data files are backed up to both on-site secured servers and virtually to the cloud, which are managed by CARB's Office of Information Services (OIS). Scheduled maintenance of servers occurs on a monthly basis to ensure they are performing as required.

Data and reports are maintained in electronic and/or hardcopy format. The electronic format is housed on a secured server maintained by OIS with password protection and limited access. The server is backed up nightly. The hardcopy format is maintained in a secured file cabinet with limited access. Electronic and hardcopy records are maintained in accordance with CARB's records management policy.

9.1 - Data Management System

DMS is comprised of instruments and computers (CARBLogger) that monitor ambient air quality throughout CARB's air monitoring network. There are over 40 monitoring sites in the network. The CARBLogger queries instruments digitally each minute to generate minute averages, which are transferred via broadband internet to the server in CARB's data center hourly. The DMS server retrieves the minute data and inputs it into a Microsoft SQL database. Data are reviewed and edited on the server by site operators, support staff, and managers. Data security is controlled by requiring a username and password. Data are continuously replicated and backed up to a synchronized replication server located in an adjacent building. Data are also backed up on a nightly basis to a Storage Area Network in the CARB data center. CARB's Storage Area Network is backed up every 16 days to tape and all tape backups are stored at an off-site facility. Data are stored on the database server for a minimum of 4 years.

Data gathered from air monitoring sites are reviewed for accuracy and completeness. The DMS server utilizes various techniques to check the reliability of the data. In the event of a database transcription error, Microsoft SQL software and DMS will generate a log of the error in the database server. If CARBLogger loses communication with the server, it will queue the data files for the missed hours and send the queue once communications are established. Station operators can also request a manual data inquiry via an automated website.

DMS is tested through daily use by site operators. Site operators have the primary responsibility for distinguishing valid or invalid data. If an issue is identified, the site operator must contact the system administrator and other appropriate personnel to assist in addressing the issue. It is the responsibility of the site operator to document the issue and the corrective action taken, as appropriate.

DMS is built around DMS software developed by Sonoma Technology Incorporated in cooperation with the Bay Area AQMD, South Coast AQMD, AirNow ([24](#)), and CARB. Guidelines for the implementation of this software are provided with system documentation ([25](#)).

9.2 - Laboratory Information Management System

Data processed by LAB is managed by LIMS, which is password protected with controlled access to authorized users only. Data processed by LIMS is stored in a database and managed through front-end LIMS software. Other software is utilized along with LIMS to aid in data reporting and electronic data transfer. The server where the database and data files reside is automatically backed up on a weekly basis. This ensures that all committed transactions can be recovered in the event of an operating system failure.

LIMS hardware and software are managed in-house by the system administrators. The database includes trace files, which are used to ensure acceptable performance as required. Trace files contain a log produced by the database debugger program. The log includes a record of errors found and corrective action taken. The log runs automatically and sends an email notification to the system administrator when errors occur.

9.3 - Audit Information System

PE audit data for monitoring sites and laboratory operations are recorded and maintained in CARB's Audit Information System (AIS). AIS is a password protected database developed by CARB, which resides on audit laptops and secured servers maintained by CARB's OIS. AIS is utilized to perform calculations necessary to determine the performance of audited parameters, verify compliance with 40 C.F.R. Part 58 ([13](#)), generate Performance Audit Reports, and initiate AQDAs and CANs, as appropriate. AIS is also capable of generating other audit and data accuracy reports.

A peer review is conducted to verify audit values and ensure the accurate transcription of data into AIS for all audit parameters. Audit information is further verified for completeness utilizing an AIS "Inconsistency Report", which identifies audit fields with missing or incomplete information. A Preliminary Performance Audit Report is generated for monitoring organizations and QAS records. Preliminary Audit Reports and AQDAs undergo a multi-level peer and management review prior to being finalized and disseminated to monitoring organizations. Audit worksheets, audit reports, and AQDAs are maintained either electronically and/or in hardcopy format in accordance with CARB's records management policy. The system administrator for AIS is responsible for maintaining the database and has access to all functions within the AIS database. Information in AIS is backed up to a primary and secondary server, in accordance with OIS policies.

9.4 - Air Quality System

AQDS is responsible for preparing, processing, and reporting ambient air quality data for several monitoring organizations to AQS; logging and archiving all received data; and applying data flags and invalidating data, as appropriate (e.g., resulting from AQDAs or CANs). Detailed data management procedures and staff responsibilities are specified in the corresponding SOP for ambient air quality data management. A comprehensive listing of SOPs and other quality management documents utilized by CARB and the monitoring organizations within CARB's PQAO are available on CARB's Quality Management Document Repository website ([14](#)).

AQDS staff receive ambient air quality data files from monitoring organizations via email. Data files received are reported to AQS as soon as possible, logged, and archived in shared server drives for future reference. Shared server drives are automatically backed up by OIS, in accordance with OIS policies.

AQDS staff apply data flags or invalidate data in AQS as needed, based on a monitoring organization request (via email) or due to an approved resolution for an AQDA or CAN. Data modification requests are initiated by monitoring organizations when errors are identified with data they previously provided to CARB. CARB will electronically store all data modification requests and associated files, in accordance with CARB's retention policies. More information can be found in Section 14.3, CARB Document Retention Policy, of this QMP.

CARB's ADAM database pulls official regulatory data reported to AQS daily and calculates all current and past regulatory relevant national and State statistics. All data reported to AQS for monitoring sites in California, and near border sites in Mexico and Nevada, are populated in ADAM. Whenever data are modified in AQS, the data in ADAM will be updated accordingly during the next update of ADAM's respective databases.

10. Information Quality Guidelines

This section is only for U.S. EPA organizations and is not applicable to this QMP for CARB's PQAO.

11. Organizational Competence

Information pertaining to organization competence for CARB's PQAO can be found in Section 12 in this QMP.

12. Personnel Training

The quality of the air monitoring program in CARB's PQAO is dependent on the level of staff training and education. It is CARB's policy that management in each program, section, and monitoring organization, routinely assess and address training needs and requirements through the annual budgeting process and in coordination with management, human resources, and the Executive Office, as appropriate.

Training needs are to be identified, documented, and addressed as they arise on an annual basis. To the extent possible, managers will provide opportunities for staff to participate in training and educational activities outside of their daily work routines (e.g., inter-program cross-training, seminars, etc.).

12.1 - Personnel Qualifications

All employees, including managers and staff, must satisfy class specifications, including those performing quality assurance or environmental measurement functions. Class specifications and duty statements identify job duties, and the minimum education, experience, knowledge, skills and abilities required to perform job duties for each specific position. Classification specifications are reviewed periodically for relevance to applicable ambient air monitoring requirements, including current technology, instrumentation, and methodologies. A competitive interview process is required for all prospective staff to ensure that the most qualified candidates are considered by the hiring manager or authority.

12.2 - Training Overview

CARB's Workforce Development Unit provides a variety of training and consultative services to CARB and CalEPA staff. The Workforce Development Unit is responsible for developing training policy; maintaining training resources and materials; assisting management teams in the development and review of their annual training plan and needs; assisting employees in the identification of appropriate courses; and preparing training plans and reports. Additional information for CARB and CalEPA staff is available on myCARB in Microsoft Teams, Training Hub ([26](#)). Additional information and training courses for all interested parties are available on CARB's Air Quality Training website ([27](#)) and CARB's PQAO Training Resources website ([28](#)).

12.3 - New Employee Orientation and Training

New staff receive on-the-job training from senior program staff and management. Additionally, each new staff member will be evaluated at approximately four, eight, and twelve months after initial hire by the appropriate section manager. A plan for achieving performance objectives is included in an employee development plan. The manager or designee of each section or monitoring organization is responsible for documenting and maintaining training records for all staff.

In addition to job-specific training, new employees of CARB and monitoring organizations within CARB's PQAO are encouraged to participate in the Air Academy Online Training Program available on CARB's Air Quality Training website ([27](#)). The program includes a series of online training modules covering major elements of CARB's programs and functions, and the fundamentals of air pollution. Upon completion of the online portion of the program, employees may meet with management or other staff to discuss any aspect of the training program in more detail. Additionally, CARB encourages staff participation in available and relevant training provided by outside agencies such as equipment manufacturers and U.S. EPA.

12.4 - Continuing Education and Training

CARB recognizes that continuing education and training are a critical component of maintaining continuity and an effective and efficient quality assurance program. Training needs are assessed on a continual basis by section managers. Training is offered as needed or required to maintain and improve the skills and knowledge of staff. All training is tracked and documented in individual personnel files by managers or their designee. Staff may be required to submit a memorandum to their supervisor or manager outlining training received or may be required to present a summary of training received at meetings, conventions, or symposia proceedings to relevant staff.

CARB's Workforce Development Unit assists employees in assessing their training needs through myCARB in Microsoft Teams, Training Hub ([26](#)). The Training Hub identifies training opportunities, along with some specific course recommendations for job classifications at CARB.

CARB's Workforce Development Unit is also dedicated to providing CARB staff training that meets CARB's mandate for educational development, enhancing employee skills, providing opportunities for upward mobility, improving productivity, and the quality of work output. CARB's Learning Management System automates training requests, approval, and tracking. More information is available on CARB's Learning Management System website ([29](#)).

12.5 - Air Monitoring Training Modules

MLD developed a comprehensive training program for staff and management at all levels within CARB's PQAO. The training program was comprised of three distinct modules, PQAO Training Modules 1, 2, and 3, which were designed to emphasize the fundamentals of key elements of ambient air monitoring. These three modules were offered between 2014 and 2015 in different locations in California and were conducted by subject-matter experts from CARB, U.S. EPA, monitoring organizations, and instrument manufacturers. The following is a summary of each training module:

- Module 1: Fundamentals of Air Monitoring and Station Setup and Operation - This module introduces attendees to the history of air monitoring, including why monitoring is performed, air monitoring terminology, network design, and station setup and operation.
- Module 2: Quality Assurance and Data Management - This module covers the basics of quality assurance, quality assessment, and quality control. Attendees receive instruction on the use of SOPs, quality control forms, calibration and routine checks, documentation, and data management procedures.
- Module 3: Instrumentation Operation and Media-Based Sampling and Analysis - This module includes instrument specific training which covers operation, maintenance, and troubleshooting of most used ambient air monitoring equipment and methodologies.

MLD has offered subsequent PQAO Trainings in 2017, 2019, 2021, and 2024, which covered key materials from PQAO Training Modules 1, 2, and 3, as well as new topics. MLD will continue to offer PQAO Trainings, aiming to host the trainings approximately every two years and alternating between Northern and Southern California.

Training materials and associated references (e.g., regulatory requirements, guidance documents, CARB's Quality Assurance Manual) were and will continue to be provided to all training participants. Training materials for all past PQAO Trainings are available on CARB's PQAO Training Resources website ([28](#)).

13. Procurement of Items and Services

13.1 - Procurement Policy

It is CARB's policy that all CARB staff shall comply with CARB's procurement policies and procedures ([30,31](#)). CARB encourages monitoring organizations within its PQAO, including independent contractors, to reference CARB's procurement policies and procedures as guidance. If an alternative policy or procedure is utilized, performance and technical specifications shall still be clearly specified.

13.2 - Procurement Overview

Item and service requirements are typically based on program or project needs and are determined based on the procedures specified on myCARB in Microsoft Teams, IT Procurements and Contracts ([30,31](#)). Procurement of items and services is performed through either an informal bid process (e.g., an interagency or State-approved vendor or sole source non-competitive bid) or a formal competitive bid/contract process. More information on these different processes is described below.

13.3 - Initiating a Contract

A contract is a legal agreement between parties that defines the terms and conditions of goods or services provided. The elements of a contract include:

- Identification of parties entering into the agreement.
- Contract terms, including dates for performance and completion of the agreement.
- Maximum amount to be paid.
- Scope of work to provide a concise and specific description of the work, services, or product rendered or provided, including terms and conditions.
- Authorized signatures from all parties involved.

13.4 - Solicitation of Contracts

Contracts involving CARB and an outside contractor or governmental entity are classified as a Standard Agreement or Interagency Agreement. These agreements are solicited through a formal or informal competitive bidding process. Formal bids require advertising on Cal eProcure, which provides online procurement services and public bidding information ([32](#)). Informal bids can be received either verbally or in writing, and do not require advertising on Cal eProcure. Whether the contract is

formally or informally bid upon depends on its complexity, cost, and other factors, and is ultimately determined by the Contract Analyst and Project Manager.

The Project Manager must prepare a document which states the time frames of the contract, advertising period, scope of work, and minimum qualifications of the bidder (e.g., requiring a contractor to be NIST certified). The contract is awarded to the most qualified bidder at the lowest cost. Contracts involving CARB and a governmental entity are classified as Interagency Agreements and are exempt from the formal competitive bidding process.

13.5 - Acceptance Test Procedure

Acceptance testing is conducted to verify if equipment meets the specifications described in the contract agreement. Acceptance testing must be performed on any new air monitoring equipment purchased by CARB prior to implementation or use. Testing procedures are performed by AMSB's Operation and Data Support Section and include a physical inspection and operational and performance checks (leak checks, flow checks, linearity checks, and precision checks). Acceptance criteria for these procedures are defined in instrument acceptance test procedures documents located in Volume II of CARB's Quality Assurance Manual (3). It is the responsibility of monitoring organizations within CARB's PQAO to perform acceptance testing on their own equipment if they are not using equipment purchased by CARB. Upon request, CARB may perform acceptance testing for monitoring organizations.

Equipment returning from a vendor following repair undergoes a bench test procedure (an abbreviated acceptance test procedure), to ensure equipment is in working order prior to deployment.

14. Documents and Record Processes

14.1 - Documents and Records

CARB and monitoring organizations within its PQAO generate and maintain a variety of quality management related documents and records. Examples of such documents include QMPs, QAPPs, SOPs, quality control forms, technical bulletins, acceptance test procedures, audit and assessment reports, AQDAs and CANs, and network plans. Data records include ambient air monitoring data and laboratory analysis results, sample reports, strip charts, and maintenance records.

Effective document management includes a system for generating, updating, maintaining, and disseminating quality management related documents and records. A comprehensive listing of the quality management documents utilized by CARB and

the monitoring organizations within CARB's PQAO is available on CARB's Quality Management Document Repository website ([14](#)) and documents are available upon request. The procedures described below are those followed by CARB and monitoring organizations within its PQAO for quality management related documents and records.

14.2 - Responsibility for Documents and Records

The responsibility for identifying, preparing, and managing quality management documents and records lies with management of the group responsible for creation of the document or record. The party responsible shall work with QMB to incorporate a document into the document control system as a new document or as part of an existing document (i.e., QAPP, SOP, etc.). Previous versions of documents should be archived if no longer in use. Only authorized personnel are granted access to edit or modify documents.

QMB is responsible for maintaining a database of all current CARB quality management related documents. A comprehensive listing of the quality management documents utilized by CARB and the monitoring organizations within CARB's PQAO is available on CARB's Quality Management Document Repository website ([14](#)) and documents are available upon request.

AMB is responsible for maintaining a database of quality control documents related to the operation and maintenance of the ambient air monitoring program (SOPs, field maintenance forms, technical bulletins, acceptance test procedures, ambient air quality data, etc.) A comprehensive list of these documents is available on the Standard Operating Procedures for Ambient Air Monitoring website ([3](#)).

LAB is responsible for maintaining laboratory quality control documents. A comprehensive list of these documents is available on the Laboratory Standard Operating Procedures website ([4](#)).

14.3 - CARB Document Retention Policy

Records and documents created or received by CARB are retained for a period of time as specified in CARB's Records Management Program and the Department of General Service's Records Retention Schedule. However, the most stringent retention criteria are always applied. As a general rule, CARB retains documents and records for a minimum of four years before transferring them to the Department of General Services for long term archiving. Monitoring organizations within CARB's PQAO should include a specific record retention policy in QAPPs and SOPs submitted to CARB for approval.

Site operators should maintain and make available copies, either physically or electronically, of their station's logbooks, monthly maintenance datasheets, and all calibration and audit reports for a minimum of three years at the monitoring station, before transferring them to the Department of General Services for long term archiving.

14.4 - CARB Document Tracking

The documentation format utilized by CARB for tracking and controlling quality management documents is described below. The system incorporates a standardized indexing format and provides for revisions without reissuing the entire document.

Each document is formatted to include a 4-line indexing format that includes the following information:

- Line 1 - Short title or SOP ID number
- Line 2 - Revision number
- Line 3 - Date of issue
- Line 4 - Page X of Y

Sections within a document can be added, modified, or deleted. When a document is modified, the revision number and revision date are changed on the Title Page, Table of Contents, and in the indexing label at the top of each page.

The Title Page will include SOP number, title, effective date, approval date, and revision number.

Monitoring organizations within CARB's PQAO may adopt this procedure or develop their own standardized procedure for tracking quality management documents.

14.5 - Document Distribution

QMB is responsible for maintaining electronic files of CARB's quality management documents (i.e., QMP, QAPPs, SOPs, etc.). A comprehensive listing of the quality management documents utilized by CARB and the monitoring organizations within its PQAO is available on CARB's Quality Management Document Repository website ([14](#)). The website is updated as needed and quality management documents are available upon request. The website is available to CARB personnel, PQAO contacts within each monitoring organization, and the public. CARB management and designated PQAO Liaisons ([16](#)) are responsible for dissemination of information to the appropriate personnel within monitoring organizations.

14.6 - Archiving of CARB Document and Records

Archiving quality management documents and records is the responsibility of the section, program, or monitoring organization generating the document or record. Quality management documents that are created and shared by multiple sections, such as the QMP, are maintained and archived by QMB. The section responsible for the document or record shall maintain it in a digital format (an additional hardcopy is also recommended) in a designated electronic directory. Versions no longer in use are to be archived. Documents and records related to CARB's quality assurance program are maintained and accessible in accordance with CARB and U.S. EPA record retention policies and archived in digital format (unless hardcopy originals are legally required to be archived, as identified in a QAPP). Records and data that are originally captured in digital format should be archived in digital format, unless a hardcopy of the original record or data is also required to be archived, as identified in a QAPP. Records and data that are originally captured in a hardcopy format should be archived in a hardcopy format. The word "Archive" shall be incorporated into the title of an archived document, record, or data and shall be transferred to an "Archived Document" directory.

Section managers and monitoring organizations have the responsibility to maintain updated documents and to archive those that are no longer in use. In order to properly manage current and archived documents, two document directories shall be maintained. The "current document" directory is accessible to all staff. Current documents are defined as those currently in use by management and staff for programs in progress or approved for implementation. The "archived document" directory is for all versions of documents that were previously in use. These documents and records provide a timeline indicating when a specific version of a document was in effect. Archived documents should remain available to all CARB personnel and designated contacts for CARB's PQAO.

Hardcopy documents and records are archived on-site at CARB facilities or at an off-site secure storage facility contracted by CARB.

15. Plan, Do, Check, Act (PDCA) Quality Model

15.a. Plan

15.1 - Planning Requirements

It is CARB's policy that all operations that generate air monitoring data within CARB's PQAO must be systematically planned and documented in accordance with this QMP

and prior written approval shall be obtained from CARB, or concurrently and collaboratively from CARB and U.S. EPA, as appropriate. Reports and assessments are evaluated on an ongoing basis to help address training needs, corrective actions, and other quality assurance activities.

In the process of developing QAPPs, input must be obtained from data users, as well as field, laboratory, data management, supervisory, and other staff involved with the project. Prior to implementation, each QAPP must be reviewed and approved by appropriate CARB management for compliance with all relevant quality assurance requirements. U.S. EPA's DQOs (33) may be utilized as guidance by the project manager during the process of QAPP planning and development. Section 7, Conformance with Policies, Procedures, Standards, and Regulations, of this QMP provides more information regarding QAPPs.

15.2 - Data Quality Objectives

CARB is committed to the review, validation, and assessment of data produced within its PQAO to ensure that data quality and quantity meets or exceeds all applicable requirements, and to strive for continual data quality improvement. All sampling and analyses activities supporting environmental decision making will have established DQOs by utilizing a systematic planning process and appropriate regulatory criteria. The process of establishing DQOs is outlined in U.S. EPA's Quality Assurance Handbook (34). DQOs will be included in appropriate quality management documents.

DQOs define specific parameters, including the type of data that will be collected and allowable decision errors that will be tolerated regarding the quantity and quality of data collected to ensure objectives are met. U.S. EPA initially established DQOs based on the most stringent data quality requirements and established formal DQOs for many of the monitoring programs (e.g., ozone, criteria pollutants, PM_{2.5}, NCore, PAMS). DQOs established for each of these programs are utilized to develop measurement and data quality indicators to define acceptable data quality and quantity.

It is the goal of CARB to generate data of the type, quantity, and quality to meet established DQOs. Federal, State, and local ambient air monitoring networks are designed to collect data to meet four basic objectives:

1. Provide air pollution data to the public in a timely manner.
2. Determine compliance with air quality standards.
3. Support emission strategy development.
4. Support air pollution research.

These objectives could potentially require different DQOs based on program-specific data quality requirements. CARB and monitoring organizations may develop additional quality objectives or other systematic planning processes for their monitoring networks for special purpose monitoring projects or any other monitoring project that does not have established DQOs, or for which no regulatory criteria apply. In addition, these types of projects may utilize instrument manufacturer manuals, and other recommendations, as appropriate.

15.b. Do (Implementation)

15.3 - Implementation of Work Processes

All air monitoring work processes are conducted by qualified personnel in accordance with approved QAPPs, SOPs, and other quality management documents and addendums (14). An implementation schedule detailing objectives, timelines, and responsibilities are utilized. Any anomalies or deviations from approved procedures are documented and communicated to appropriate program management. Documentation will include a clear description of the issue or deviation and corrective action taken. Any modification or corrective action taken must be approved by a program manager and other staff, as appropriate. AQDA and CAN processes are described in Section 15c, Check (Assessment and Oversight), of this QMP and must be utilized, as appropriate.

Approved QMPs, QAPPs, SOPs, and other quality management documents and addendums utilized by CARB's PQAO are listed on CARB's Quality Management Document Repository website (14) and available upon request. Monitoring organizations are responsible for notifying CARB of changes to approved QMPs, QAPPs, SOPs, and other quality management documents, and providing CARB with updated versions of the document for approval. CARB management and the designated PQAO Liaison (16) are responsible for dissemination of information to the appropriate personnel within their monitoring organization. CARB will archive previous or outdated versions of quality management documents, as appropriate.

QMB will manage CARB's Quality Management Document Repository website, conduct assessment activities, and review and approve QMPs, QAPPs, SOPs, and other quality management documents to ensure that programs and projects are implemented in accordance with approved plans and this QMP.

15.c. Check (Assessment and Oversight)

15.4 - Assessment and Response

CARB performs a variety of quality assessments and surveillance activities to ensure the accuracy of ambient air monitoring data generated by monitoring organizations within its PQAO. Assessment activities include various audits, siting evaluations, review of precision and bias data, and preparation of data quality reports. Monitoring organizations within CARB's PQAO are required to comply with audits conducted by CARB or U.S. EPA. Surveillance activities include internal quality control tasks for both field and laboratory monitoring activities. Due to the variety of operations and programs in CARB's ambient air monitoring network, all assessments may not be required for all programs. However, each type of quality assessment is described in more detail below.

15.5 - Performance Evaluation Audits of Gaseous, Particulate Matter, and Meteorological Equipment

CARB's PE audits include through-the-probe audits on gaseous instruments; flow rate audits on particulate matter samplers; and horizontal wind speed, wind direction, ambient temperature, and barometric pressure on meteorological equipment. Bias for both gaseous instruments and particulate matter samplers is verified by PE audits.

QAS conducts PE audits for gaseous instruments that are conducted annually for all air monitoring sites within CARB's PQAO. PE audits are also conducted at monitoring sites that are operated by other PQAOs, as resources permit. PE audits verify the accuracy of monitoring equipment and ensure the integrity of the entire sampling system. PE audits are conducted using NIST traceable gases that are introduced simultaneously to audit and monitoring station instrumentation. Gases are introduced at known concentrations and readings between audit equipment and station equipment are compared to CARB's control and warning limits. PE audits are conducted for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and hydrogen sulfide.

QAS conducts PE audits of particulate matter samplers twice annually, in conjunction with monitoring organizations to verify the accuracy of the particulate samplers. The audit compares the site's instrument flow rate to a certified orifice or mass flow meter, and to the design specifications for the sampler. Additionally, temperature and pressure values associated with the flow are also compared with an audit standard. PE audits are performed by QAS personnel using NIST traceable flow devices. The audit device is connected in-line with the sampler's flow path. PE audits are

conducted while the sampler is operating under normal sampling conditions. Results of flow audits are compared to CARB's control and warning limits to ensure proper operation of particulate samplers.

QAS also conducts PE audits for meteorological parameters such as horizontal wind speed, wind direction, ambient temperature, and barometric pressure. PE audits are performed using NIST traceable audit equipment. Results are compared to the monitoring site's meteorological equipment and manufacturer design specifications. Results exceeding specified control limits will initiate corrective action, as appropriate.

PE audit reports are generated by QAS after an audit is conducted. They are comprised of an executive summary including audit criteria, details regarding the audit for each audited parameter, technical appendices including audit standards and calculations, audit action items and comments, and monitor surveys with information related to siting, AQS, and the ANP. After a thorough review process, approval, and finalization, monitoring organizations are given access to PE audit reports.

If any audited parameter fails to meet CARB's audit acceptance criteria, the failure is reported utilizing the AQDA or CAN process to request the monitoring organization investigate the issue and implement corrective actions, as appropriate. QAS may, as resources permit, conduct a PE re-audit to verify the resolution of any issue identified.

A complete description of PE audit procedures is available in Volume V of CARB's Quality Assurance Manual, Appendix E ([6](#)). AQDA and CAN processes are described in more detail later in this section.

A National Performance Audit Program (NPAP) assessment is an independent audit of the gaseous instruments within CARB's PQAO, performed by U.S. EPA. U.S. EPA may also employ an independent contractor to perform NPAP assessments on their behalf, as needed.

15.6 - Siting Assessments

A siting assessment is generally conducted as part of the PE audit but may be assessed at other times if deemed necessary. During the assessment, site information is reviewed and verified for each air monitoring station. Physical measurements and observations include probe/sensor height above ground level, sampler spacing, distance to obstructions, gaseous residence time, obstructions to airflow, distance to local sources, topography, vehicle counts, predominant wind direction, and sampling probe material. These evaluations are conducted to determine compliance with 40 C.F.R. Part 58, Appendix E ([13](#)) requirements.

Station information can be accessed through websites with interactive maps, a listing of air monitoring stations, or search features allowing for more sophisticated queries. These site websites are updated as new information is obtained and are listed below:

- Air Monitoring Sites - Interactive Map ([35](#)).
- Quality Assurance Air Monitoring Site Search ([19](#)).
- Quality Assurance Air Monitoring Site Information ([36](#)).
- Quality Assurance Agency Monitoring Information ([37](#)).

If any audited parameter fails to meet CARB's audit acceptance criteria, the failure is reported utilizing the AQDA or CAN process to request the monitoring organization investigate the issue and implement corrective actions, as appropriate. QAS may, as resources permit, conduct a PE re-audit to verify the resolution of any issue identified.

A complete description of PE audit procedures is available in Volume V of CARB's Quality Assurance Manual, Appendix E ([6](#)). AQDA and CAN processes are described in more detail later in this section.

15.7 - Laboratory Performance Audits

Laboratory performance audits assess the accuracy of analytical methods and instrumentation used in the laboratories and can be initiated by either LAB or QMB. LAB is encouraged to seek out government or industry sponsored round-robins and proficiency testing studies that are relevant to their analyses; in addition to using NIST standards whenever possible to verify accuracy. QMB manages CARB's participation in the annual U.S. EPA National Air Toxics Trends Station (NATTS) audit program. CARB's participation is voluntary since there are no NATTS sites within the PQAO and, as such, is not considered a NATTS laboratory. However, the program provides CARB with a unique opportunity to compare its performance with other ambient air monitoring laboratories. The audit program is presently conducted by a U.S. EPA contractor which provides performance audits containing major ambient air toxics, including volatile organic compounds, aldehyde and ketones, and metals. CARB is provided with three different blind audit samples a year to analyze in accordance with corresponding SOPs which are then reported back to the U.S. EPA contractor. Analytical results are compared with respect to a known traceable standard, the other participating laboratories, and a reference laboratory. The audit reports are provided to CARB and are evaluated and investigated, if needed. Similarly, CARB participates in the U.S. EPA PM_{2.5} CSN Mega PE program, organized by the U.S. EPA Office of Air Quality Planning & Standards. This program evaluates CARB's analytical performance in measuring gravimetric mass, ions, elemental metals, and elemental and organic carbons. Analytical results are reviewed by U.S. EPA and corrective actions are discussed between QMB and LAB, as needed.

15.8 - Mass Analysis Performance Audits

Annual mass analysis performance audits (Laboratory Performance audits) are conducted for all PM₁₀ and PM_{2.5} laboratory operations within CARB's PQAO, as well as those operated by Bay Area AQMD. Laboratory Performance audits are conducted by QAS and include an on-site evaluation of filter weighing balances, relative humidity and temperature sensors, and a review of documentation records. Laboratory Performance audits are conducted to ensure compliance with all applicable requirements under 40 C.F.R. Part 50, Appendices J and L ([12](#)) and to assess if data generated is of sufficient quantity and quality to be considered data-for-record. If any audited parameter fails to meet CARB's audit acceptance criteria, the failure is reported utilizing the AQDA or CAN process to request the monitoring organization investigate the issue and implement corrective actions, as appropriate. A Laboratory Performance re-audit may be conducted to verify resolution of any issue identified.

A complete description of Laboratory Performance audit procedures is available in Volume V of CARB's Quality Assurance Manual, Appendix E ([6](#)). AQDA and CAN processes are described in more detail later in this section.

15.9 - Technical Systems Audits

A TSA is an on-site inspection and review of a monitoring organization's entire ambient air monitoring program. The entire measurement system is reviewed which includes sample collection, sample analysis, and data processing. TSAs include a review of staff records, procedures, instrumentation, facilities, and documentation to ensure compliance with all applicable requirements.

U.S. EPA is responsible for conducting TSAs of PQAOs every three years. The TSA includes CARB's air monitoring program as well as three monitoring organizations within CARB's PQAO. QAS leads TSAs for the remaining monitoring organizations within CARB's PQAO approximately every six years ([13](#), [38](#)). The TSAs focus on air monitoring networks designated as SLAMS and follow TSA procedures established by U.S. EPA ([34](#)).

TSAs are conducted in three phases. The first phase consists of a questionnaire derived from U.S. EPA's Quality Assurance Handbook ([34](#)), which is designed to gather information regarding program areas including network management, field operations, laboratory operations, data management, quality assurance, and data reporting. The completed questionnaire undergoes a thorough review by QMB and is used as a tool to determine areas requiring further clarification and discussion during the second phase.

The second phase is an on-site assessment of a monitoring organization's field, laboratory, and data management operations, as appropriate. The evaluation includes a follow-up to the questionnaire responses, a data audit, and a review of procedures, practices, and records in all related program areas. The data audit includes, but is not limited to, a review and analysis of outliers, data gaps, data flagging/qualifiers, and QA/QC data generated from select monitoring sites of the audited organization.

The third phase is an in-depth evaluation of the information gathered from the questionnaire, Performance Audit Reports, precision and accuracy reports, data audit, and on-site assessment.

Following evaluation of available information, a draft TSA report is prepared which includes a summary of the audit process, and a summary of findings and recommendations to correct any issues identified. A draft TSA report is provided to the audited monitoring organization for review and response. All comments from the monitoring organization will be carefully considered, and any necessary changes will be incorporated into a final TSA report, as appropriate. The monitoring organization develops a plan and timeline to correct the issues identified and return the Corrective Action Plan to their PQAO Liaison ([16](#)) for approval. These issues may be specific or systematic in nature, so the scope of the corrective action and timeline may differ dependent upon the finding. The PQAO Liaison will coordinate with the monitoring organization to complete the approved corrective actions, including appropriate documentation to verify that the actions have been implemented. Upon QMB approval, the Corrective Action Plan will be considered closed.

More information related to TSAs can be found on CARB's Technical Systems Audit website ([39](#)).

15.10 - Laboratory Quality Control Reports

Air monitoring data generated by LAB are reported to AQS. LAB staff are responsible for creating and reviewing monthly data reports that include quality control information associated with sample analyses (i.e., calibration, controls, spikes, blanks, etc.). These reports are reviewed and approved by management prior to AQS submission. Information contained in these reports include but is not limited to control charts, precision data for duplicates, replicates and collocated samples, sample anomalies and corrective actions, and any departures from corresponding method SOPs. This information is analyzed statistically and reported to CARB management.

15.11 - Year-End Air Quality System Data Submittal and Summary Report

At the end of each calendar year, AMB produces a Year-End AQS Data Submittal and Summary Report for CARB management. The report summarizes continuous monitoring data reported to AQS for the prior calendar year. Tables are utilized to indicate the highest measurement values for each parameter, violations of federal and State air quality standards, data completeness percentage, calculated precision, and confidence intervals for each parameter.

15.12 - Annual Monitoring Network Reports

AQPB generates an Annual Monitoring Network Report to describe the network of criteria pollutant monitoring sites and instruments for 26 air districts in California. The report meets requirements for an ANP as defined in 40 C.F.R. Part 58 ([13](#)). The report includes detailed information about FRM and FEM monitors that are covered in the scope of the report. Regulations require submittal of this report to U.S. EPA by July 1 of each year. This report is available on CARB's Annual Monitoring Network Report website ([18](#)).

AQPB also generates an Ambient Air Monitoring Network Assessment every five years to assess the technical aspects of CARB's air monitoring network. The purpose is to evaluate and determine if the air monitoring network meets all monitoring objectives. Additionally, the assessment determines if new monitoring sites are needed, if existing sites should be discontinued, and if new technologies are appropriate for incorporation into California's ambient air monitoring network.

15.13 - Annual Data Quality Report

QMS generates an Annual Data Quality Report for CARB's PQAO to provide ambient air quality data producers and users with a centralized review of the data quality within CARB's PQAO. Any data quality assessments and audits are solely based on data available in AQS and certified by monitoring organizations. The report includes a robust statistical analysis of the data that is generated. The criteria by which the assessments are made are prescribed in 40 C.F.R. 58, Appendix A ([13](#)) and U.S. EPA's Quality Assurance Handbook ([34](#)), and are defined by measurement quality objectives including ambient data capture rate, precision, and bias. This report is available on CARB's Annual Data Quality Report for CARB's PQAO website ([21](#)).

15.14 - Annual Certification Letter and Summary Report

CPAQAB is responsible for reporting ambient air quality data to AQS for SLAMS and SPMs operated by nine monitoring organizations in California, for which CARB has data submittal authority. Operation and Data Support Section and Laboratory Support Section are responsible for submitting ambient air quality data to AQS for SLAMS and SPMs operated by CARB. In accordance with 40 C.F.R. Part 58, Section 15 (13), CARB submits an annual data certification letter to U.S. EPA by May 1 of each year.

CARB also submits annual AQS summary reports (i.e., Air Monitoring Performance (AMP) 600 and AMP 450NC) as required (13). The summary reports include both criteria and non-criteria data for which CARB is the certifying agency. CARB certifies that the previous year of ambient air data and any previously certified data that was modified is complete and accurate.

15.15 - Surveillance and Internal Quality Control

Internal quality control procedures are an integral part of the surveillance process and are included in SOPs for specific monitoring and laboratory activities. Quality control procedures are utilized by monitoring and laboratory personnel to ensure that equipment is operating properly, and that data meet program DQOs. The general areas where quality control elements are utilized by monitoring organizations include continuous analyzers, discrete samplers, and laboratory instruments. Examples of internal quality control parameters for sample preparation, collection, and recovery procedures for each are listed below.

Continuous Analyzers

- NIST traceable daily zero/span and periodic multi-point calibrations per frequencies of SOP.
- Quality control failure action levels and data acceptance criteria.
- 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.

Discrete Samplers

- 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.
- Quality control 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 SOPs.

Laboratory Instruments

- NIST traceable (or equivalent) 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.
- Quality Control 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 SOPs.

15.d. Act (Corrective Actions and Improvements)

15.16 - Air Quality Data Action

An AQDA is a request for an investigation of the validity of ambient air quality data for a certain period of time. AQDAs are generally issued by QAS staff based upon review of field calibrations or audit results that show air monitoring equipment operating outside CARB's control limits or federal requirements. AQDAs are issued to the person responsible for data collection and submittal for the monitoring organization.

A copy of the AQDA is also sent to CPAQAB and AQPB, which withholds potentially impacted data from processing and publication until appropriate actions are taken. The monitoring organization is directed to review the applicable quality control parameters in question, specifically to identify associated time periods in question, and recommend corrective action, as appropriate.

QMB may request that CPAQAB invalidate the questionable data in the absence of a response from the organization responsible within 45 days or if the data deviates beyond established control limits from true levels, as determined by zero, span, precision, or other applicable checks. QMB may recommend data be invalidated or flagged back to the initial occurrence of the malfunction. If the malfunction date cannot be verified, any data recorded after the last successful calibration will be flagged or invalidated. A re-audit may be performed after the resolution of an AQDA to verify the issue identified has been resolved, as resources permit.

15.17 - Corrective Action Notification Process

CARB's CAN process documents issues that may impact or potentially impact data quality, completeness, storage, or reporting. Any person can initiate a CAN. The goal of the CAN process is to investigate, correct, and reduce the recurrence of these issues. As such, the CAN process will identify issues not addressed by AQDAs, improve data quality, and help ensure compliance with federal, State, and local data reporting requirements.

Monitoring organizations within CARB's PQAO must use the CAN process or submit to CARB an alternative corrective action process for review and written approval. The CAN process and associated CAN form are available on CARB's Data Corrective Action Process website ([40](#)).

16. Dispute Resolution Process

16.1 - Dispute Resolution

In the event that a quality assurance related dispute arises, QMB's Chief will review and discuss the identified issue with appropriate staff and management from the impacted parties. After this collaborative discussion, QMB's Chief will recommend corrective action. If impacted parties are not able to resolve the issue, QMB's Chief and associated personnel involved will work collaboratively with U.S. EPA to address the issue appropriately. QMB's Chief has the authority to approve the resolution of any quality assurance related disputes. The goal is to ensure that data generated within CARB's PQAO are legally and scientifically defensible.

17. Continual Improvement

Information pertaining to continual improvements for CARB's PQAO can be found in Section 18 of this QMP.

18. Data Review, Validation and Verification, and Data Usability Reporting

CARB is committed to ensuring that air monitoring data collected by and on behalf of its PQAO is scientifically and legally valid and of sufficient quality and quantity to meet or exceed all applicable requirements. It is the responsibility of QMB's Chief to ensure that CARB's mission and policies as specified in this document are followed. This is accomplished by implementation and management of a system that emphasizes and promotes continuous quality improvement, utilizes a consistent process of assessing the quality assurance program, encouraging recommendations, identifying and implementing improvements to the quality assurance program, and promoting ongoing training of all staff, as appropriate. Open and timely communication of quality assurance topics are encouraged at all levels within CARB's PQAO through routine meetings, conference calls, newsletters, website updates, and other reports. Timely identification and prevention of data errors that potentially affect data quality is achieved through quality control activities prescribed in appropriate quality management documents (e.g., QAPPs, SOPs, and other quality management documents).

18.1 - Operational Activities

Field and laboratory personnel shall document significant anomalies or deviation from SOPs in the appropriate location (e.g., monitoring station's instrument logbooks, laboratory notebooks, and monthly data reports) and notify management, as described in Section 15c, Check (Assessment and Oversight), of this QMP.

18.2 - Data Validation and Reporting Activities

Data validation and reporting issues for field and laboratory operations are reported to appropriate managers, as described in Section 15c, Check (Assessment and Oversight), of this QMP. AMB and LAB are responsible for verification and validation of ambient air monitoring data as described in Section 5.5 of this QMP. Affected staff shall work collaboratively with staff and management within the monitoring organization, CARB, and U.S. EPA, as appropriate, to develop and implement

appropriate corrective action for data verification and reporting procedures and improve data quality.

18.3 - Quality Assurance Communication

Accurate and timely communication of information within CARB's PQAO is an important component of the quality assurance program. Workgroups, conference calls, newsletters, websites, and direct communication are used to facilitate the dissemination of information within CARB and monitoring organization personnel.

The California Air Pollution Control Officers Association is a working group comprised of CARB and monitoring organization management and staff that holds monthly conference calls to discuss quality assurance related issues and provide training relevant to ambient air monitoring. QMS serves as liaison support (PQAO Liaison) for all monitoring organizations within CARB's PQAO and holds regularly scheduled meetings with the monitoring organizations to which they are assigned. More information on the PQAO Liaisons assigned to each monitoring organization can be found on CARB's program website ([41](#)). These meetings provide an open forum for communication between CARB and the monitoring organizations within its PQAO and cover pertinent air monitoring issues as well as regular standing agenda items.

QMB's Chief meets with staff and managers within CARB's PQAO, as needed, to review and address quality assurance assessments, training needs, resources, corrective actions, and any other quality assurance related issues. Any critical information from these meetings will be communicated to CARB's Executive Office, as appropriate. Additional information related to the ambient air monitoring network is available on CARB's PQAO program website ([41](#)).

19. Revision History

A record of modifications, including the nature of changes from Revision 0 (July 2013) to Revision 1.0 (March 2019) and to Revision 2.0 (December 2025), are summarized in Appendix G of this QMP.

20. References

1. California Air Resources Board, Quality Assurance Manual. Accessed January 21, 2025: <https://ww2.arb.ca.gov/our-work/programs/quality-assurance/quality-assurance-manual>
2. California Air Resources Board, Quality Assurance Manual Volume I: Quality Management Plan. Accessed January 21, 2025: <https://ww2.arb.ca.gov/quality-management-plan>
3. California Air Resources Board, Quality Assurance Manual Volume II: Standard Operating Procedures for Ambient Air Monitoring. Accessed January 21, 2025: <https://ww2.arb.ca.gov/resources/documents/standard-operating-procedures-ambient-air-monitoring>
4. California Air Resources Board, Quality Assurance Manual Volume III: Laboratory Standard Operating Procedures. Accessed January 21, 2025: <https://ww2.arb.ca.gov/laboratory-standard-operating-procedures>
5. California Air Resources Board, Quality Assurance Manual Volume IV: Monitoring Methods for the State Ambient Air Quality Standards. Accessed January 21, 2025: <https://ww2.arb.ca.gov/volume-iv-monitoring-methods-state-ambient-air-quality-standards>
6. California Air Resources Board, Quality Assurance Manual Volume V: Audit Procedures for Air Quality Monitoring. Accessed January 21, 2025: <https://ww2.arb.ca.gov/audit-procedures-air-quality-monitoring>
7. California Air Resources Board, Quality Assurance Manual Volume VI: Standard Operating Procedures for Stationary Sources Emission Monitoring and Testing. Accessed February 3, 2025: <https://ww2.arb.ca.gov/sites/default/files/2025-02/Quality Assurance Manual Volume VI.pdf>
8. United States Environmental Protection Agency, EPA Order CIO 2105.0. Accessed February 3, 2025. <https://www.epa.gov/sites/default/files/2013-10/documents/21050.pdf>
9. Code of Federal Regulations, Title 40 Protection of Environment, Chapter 1 Environmental Protection Agency, Subchapter A General, Part 30. Accessed February 3, 2025: <https://www.eCFR.gov/current/title-40/chapter-1/subchapter-A>
10. Code of Federal Regulations, Title 40 Protection of Environment, Chapter 1 Environmental Protection Agency, Subchapter A General, Part 31. Accessed February 3, 2025: <https://www.eCFR.gov/current/title-40/chapter-1/subchapter-A>

11. Code of Federal Regulations, Title 40 Protection of Environment, Chapter 1 Environmental Protection Agency, Subchapter B Grants and Other Federal Assistance, Part 35 State and Local Assistance. Accessed February 3, 2025: <https://www.eCFR.gov/current/title-40/chapter-I/subchapter-B/part-35?toc=1>
12. Code of Federal Regulations, Title 40 Protection of Environment, Chapter I Environmental Protection Agency, Subchapter C Air Programs, Part 50 National Primary and Secondary Ambient Air Quality Standards. Accessed February 5, 2025: <https://www.eCFR.gov/current/title-40/chapter-I/subchapter-C/part-50?toc=1>
13. Code of Federal Regulations, Title 40 Protection of Environment, Chapter I Environmental Protection Agency, Subchapter C Air Programs, Part 58 Ambient Air Quality Surveillance. Accessed February 3, 2025: <https://www.eCFR.gov/current/title-40/chapter-I/subchapter-C/part-58?toc=1>
14. California Air Resources Board, Quality Management Document Repository. Accessed January 21, 2025: <https://ww2.arb.ca.gov/our-work/programs/quality-assurance/quality-management-document-repository>
15. National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program. Accessed February 7, 2025: <https://www.nist.gov/nvlap>
16. California Air Resources Board, Primary Quality Assurance Organization Liaisons. Accessed January 21, 2025: <https://ww2.arb.ca.gov/our-work/programs/quality-assurance/pqao-liaisons>
17. California Air Resources Board, California Air Basin Map. Accessed January 21, 2025: <https://ww3.arb.ca.gov/ei/maps/statemap/abmap.htm>
18. California Air Resources Board, Annual Monitoring Network Report. Accessed January 21, 2025: <https://ww2.arb.ca.gov/our-work/programs/ambient-air-monitoring-regulatory/annual-monitoring-network-report>
19. California Air Resources Board, Quality Assurance Air Monitoring Site Search. Accessed January 21, 2025: <https://ww2.arb.ca.gov/applications/quality-assurance-air-monitoring-site-search-1>
20. Code of Federal Regulations, Title 40 Protection of Environment, Chapter I Environmental Protection Agency, Subchapter C Air Programs, Part 53 Ambient Air Monitoring Reference and Equivalent Methods. Accessed March 7, 2025: <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-53>
21. California Air Resources Board, Annual Data Quality Report for CARB's Primary Quality Assurance Organization. Accessed February 19, 2025: <https://ww2.arb.ca.gov/our-work/programs/quality-assurance/annual-data-quality-report-carbs-pqao>

22. United States Environmental Protection Agency, Quality Assurance Project Plan (QAPP) Standard. Accessed September 25, 2025: https://www.epa.gov/system/files/documents/202404/quality_assurance_project_plan_standard.pdf
23. United States Environmental Protection Agency, Guidance for Preparing Standard Operating Procedures (EPA QA/G-6). Accessed January 21, 2025: <https://www.epa.gov/sites/default/files/2015-06/documents/g6-final.pdf>
24. AirNow, Air Quality Index. Accessed February 5, 2025: <https://www.airnow.gov/aqi/>
25. California Air Resources Board, Standard Operating Procedures for California Air Resources Board Logger (CARBLogger). Accessed February 5, 2025: https://ww2.arb.ca.gov/sites/default/files/2023-08/AQSB_SOP_605_%28CARBLogger%29_Third_Edition_FINAL_8Aug23_signed.pdf
26. California Air Resources Board, Training Hub. Accessed January 21, 2025: https://carb.sharepoint.com/teams/WorkforceDevelopmentUnit/SitePages/Training_Hub.aspx?locale=en-us
27. California Air Resources Board, Air Quality Training. Accessed January 21, 2025: <https://ww2.arb.ca.gov/our-work/programs/air-quality-training>
28. California Air Resources Board, PQAO Training Resources. Accessed January 21, 2025: <https://ww2.arb.ca.gov/our-work/programs/quality-assurance/pqao-training-resources>
29. California Air Resources Board, Learning Management System. Accessed February 5, 2025: <https://arb.csod.com/login/render.aspx?id=defaultclp>
30. California Air Resources Board, IT Procurements and Contracts. Accessed January 21, 2025: <https://carb.sharepoint.com/sites/Home/SitePages/ITContractsProcurements.aspx>
31. California Department of General Services, State Contracting Manual Volume 1. Accessed February 19, 2026: <https://www.dgs.ca.gov/OLS/Resources/Page-Content/Office-of-Legal-Services-Resources-List-Folder/State-Contracting>
32. California State Government Marketplace. Cal eProcure. Accessed February 5, 2025: <https://caleprocure.ca.gov/pages/index.aspx>
33. United States Environmental Protection Agency, Guidance on Systematic Planning Using the Data Quality Objectives Process. Accessed January 21, 2025: <https://www.epa.gov/sites/default/files/2015-06/documents/g4-final.pdf>
34. United States Environmental Protection Agency, Quality Assurance Handbook for Air Pollution Measurement Systems Volume II Ambient Air Quality Monitoring

Program. Accessed January 21, 2025:

https://www3.epa.gov/ttnamti1/files/ambient/pm25/qa/Final Handbook Document 1_17.pdf

35. California Air Resources Board, Air Monitoring Sites - Interactive Map. Accessed January 21, 2025: <https://ww2.arb.ca.gov/applications/air-monitoring-sites-interactive-map>
36. California Air Resources Board, Quality Assurance Air Monitoring Site Information. Accessed January 21, 2025: <https://ww2.arb.ca.gov/applications/quality-assurance-air-monitoring-site-information>
37. California Air Resources Board, Quality Assurance Agency Monitoring Information. Accessed January 21, 2025: <https://ww2.arb.ca.gov/applications/quality-assurance-agency-monitoring-information>
38. United States Environmental Protection Agency, Cooperative Approach Between EPA and CARB for Conducting Technical Systems Audits of Agencies with California Air Resources Board's PQAO. Accessed February 28, 2025: <https://ww2.arb.ca.gov/resources/documents/cooperative-approach-between-epa-and-carb-conducting-technical-systems-audits>
39. California Air Resources Board, Technical Systems Audits. Accessed February 5, 2025: <https://ww2.arb.ca.gov/our-work/programs/quality-assurance/technical-systems-audits>
40. California Air Resources Board, Data Corrective Action Process. Accessed February 5, 2025: <https://ww2.arb.ca.gov/our-work/programs/quality-assurance/data-corrective-action-process>
41. California Air Resources Board, Quality Assurance Website. Accessed January 21, 2025: <https://ww2.arb.ca.gov/our-work/programs/quality-assurance>

Appendices

Appendix A - Air Districts within CARB's PQAO

Ambient air monitoring data are generated by CARB, plus 21 of the 32 air districts within CARB's PQAO. Monitoring sites may be operated by the monitoring organization, CARB, or both and this distinction is noted in Table A-1.

Table A-1. Air Districts within CARB's PQAO

Air District	Monitoring By
Amador County APCD	CARB
Antelope Valley AQMD	Air district
Butte County AQMD	CARB
Calaveras County APCD	CARB
Colusa County APCD	CARB
Eastern Kern APCD	Air district; CARB
El Dorado County AQMD	CARB
Feather River AQMD	CARB
Glenn County APCD	CARB
Great Basin Unified APCD	Air district
Imperial County APCD	Air district; CARB
Lake County APCD	Air district
Lassen County APCD	N/A
Mariposa County APCD	CARB
Mendocino County AQMD	Air district
Modoc County APCD	N/A
Mojave Desert AQMD	Air district; CARB
Monterey Bay Air Resources District (ARD)	Air district
North Coast Unified AQMD	Air district
Northern Sierra AQMD	Air district
Northern Sonoma County APCD	Air district
Placer County APCD	Air district; CARB
Sacramento Metropolitan AQMD	Air district; CARB

Table A-1. Air Districts within CARB’s PQAO (cont.)

Air District	Monitoring By
San Joaquin Valley APCD	Air district; CARB
San Luis Obispo County APCD	Air district; CARB
Santa Barbara County APCD	Air district
Shasta County APCD	Air district
Siskiyou County APCD	Air district
Tehama County APCD	Air district; CARB
Tuolumne County APCD	CARB
Ventura County APCD	Air district
Yolo-Solano AQMD	Air district; CARB

- N/A = means not applicable for this air district.

Appendix B - California Air Basins

California is divided geographically into 15 air basins and CARB's PQAO operates monitoring stations in 12 of these 15 air basins. An air basin generally has similar meteorological and geographic conditions and may include several different counties. Some counties lie in more than one basin and different monitoring organizations may operate monitoring stations in the same air basin. A map of California's air basins is available on CARB's website ([17](#)). Table B-1 provides a list of California's air basins and associated counties and PQAOs.

Table B-1. California Air Basins and Associated Counties and PQAOs

Air Basin	County(s)	PQAO(s)
Great Basin Valleys	Alpine, Inyo, Mono	CARB
Lake County	Lake	CARB
Lake Tahoe	El Dorado, Placer	CARB
Mojave Desert	Kern, Los Angeles, Riverside, San Bernardino	CARB South Coast AQMD
Mountain Counties	Amador, Calaveras, El Dorado, Mariposa, Nevada, Placer, Plumas, Sierra, Tuolumne	CARB
North Central Coast	Monterey, San Benito, Santa Cruz	CARB
North Coast	Del Norte, Humboldt, Mendocino, Sonoma , Trinity	CARB
Northeast Plateau	Lassen, Modoc, Siskiyou	CARB
Sacramento Valley	Butte, Colusa, Glenn, Placer, Sacramento, Shasta, Solano , Sutter, Tehama, Yolo, Yuba	CARB
Salton Sea	Imperial, Riverside	CARB South Coast AQMD
San Diego	San Diego	San Diego APCD
San Francisco Bay Area	Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma	Bay Area AQMD
San Joaquin Valley	Fresno, Kern , Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare	CARB
South Central Coast	San Luis Obispo, Santa Barbara, Ventura	CARB
South Coast	Los Angeles, Orange, Riverside, San Bernardino	South Coast AQMD

- Bay Area AQMD, South Coast AQMD, San Diego APCD, National Park Service, Morongo Band of Mission Indians, and Pechanga Band of Luiseño Indians also operate air monitoring networks throughout California, however they are not represented in this table.
- **Bold** text indicates the county resides in multiple air basins. Kern, Los Angeles, San Bernardino, Sonoma, and Solano counties are in two different air basins, while Riverside resides in three different air basins.

Appendix C - Annual Network Plans

Each year, CARB submits an ANP to U.S. EPA for review and approval. Air districts within CARB’s PQAO may elect to prepare their own ANP or have their information included in CARB’s ANP, as this is summarized in Table C-1.

Table C-1. Annual Network Plans for Air Districts within CARB’s PQAO

Air District	Included in Annual Network Plan Developed by
Amador County APCD	CARB
Antelope Valley AQMD	CARB
Butte County AQMD	CARB
Calaveras County APCD	CARB
Colusa County APCD	CARB
Eastern Kern APCD	CARB
El Dorado County AQMD	CARB
Feather River AQMD	CARB
Glenn County APCD	CARB
Great Basin Unified APCD	Air district
Imperial County APCD	CARB
Lake County APCD	CARB
Lassen County APCD	CARB
Mariposa County APCD	CARB
Mendocino County AQMD	CARB
Modoc County APCD	CARB
Mojave Desert AQMD	CARB
Monterey Bay ARD	CARB
North Coast Unified AQMD	Air district
Northern Sierra AQMD	CARB
Northern Sonoma County APCD	CARB
Placer County APCD	CARB

Table C-1. Annual Network Plans for Air Districts within CARB’s PQAO (cont.)

Air District	Included in Annual Network Plan Developed by
Sacramento Metropolitan AQMD	Air district
San Joaquin Valley APCD	Air district
San Luis Obispo County APCD	Air district
Santa Barbara County APCD	Air district
Shasta County APCD	CARB
Siskiyou County APCD	CARB
Tehama County APCD	CARB
Tuolumne County APCD	CARB
Ventura County APCD	CARB
Yolo-Solano AQMD	CARB

- Source: CARB’s 2025 Annual Network Plan ([18](#)).

Appendix D - Organizational Charts

The organizational structure of CARB includes the Chairman’s Office and the Executive Office. The Executive Office is comprised of 14 divisions and offices. The two divisions within CARB that have primary responsibility for CARB’s ambient air monitoring program are MLD and AQPSD. The branches within these two divisions that have regulatory ambient air monitoring responsibilities and functions are MLD’s AQSB, Laboratory Analysis Branch, and QMB, and AQPSD’s AQPB and CPAQAB.

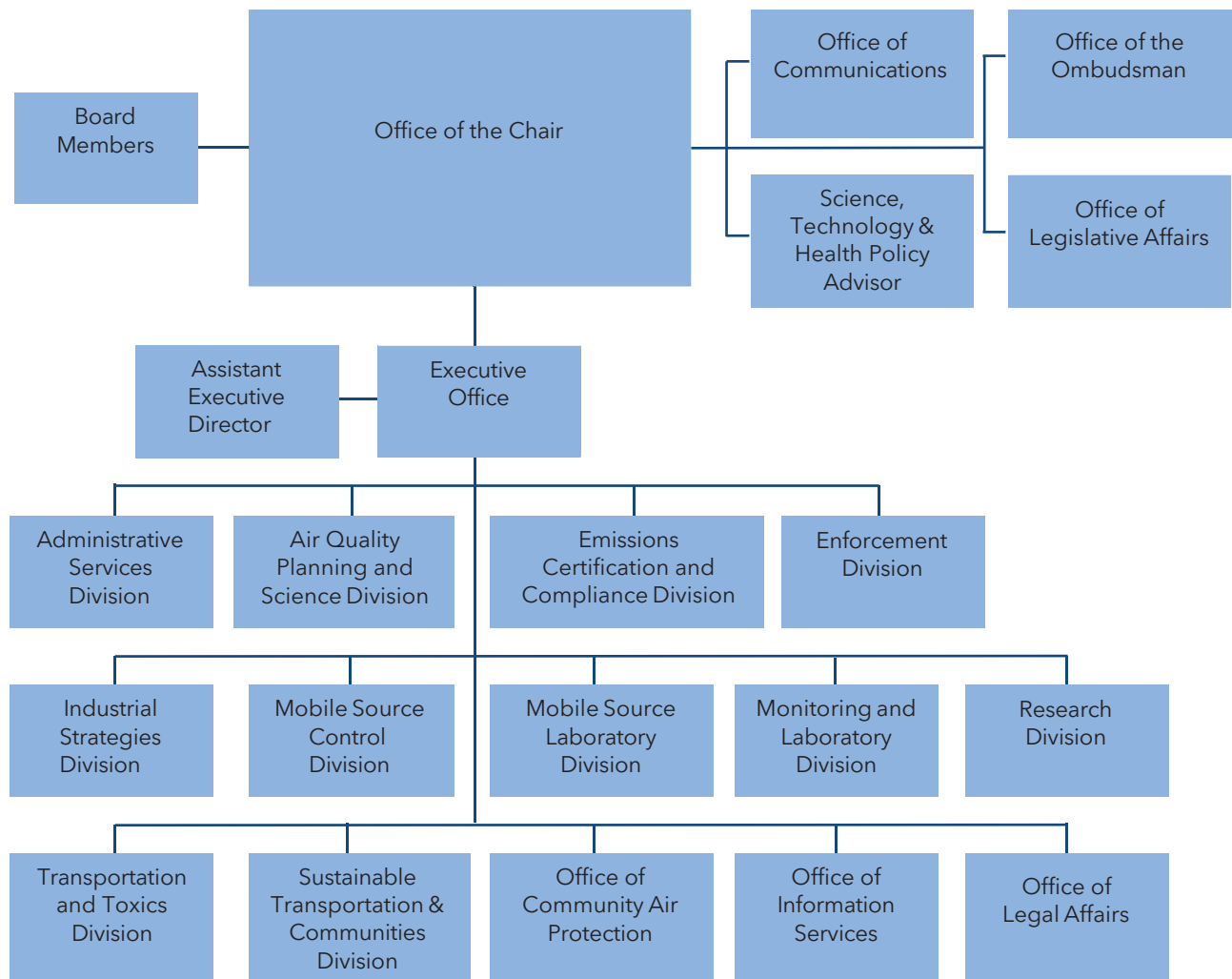


Figure D-1. Organizational Chart - California Air Resources Board

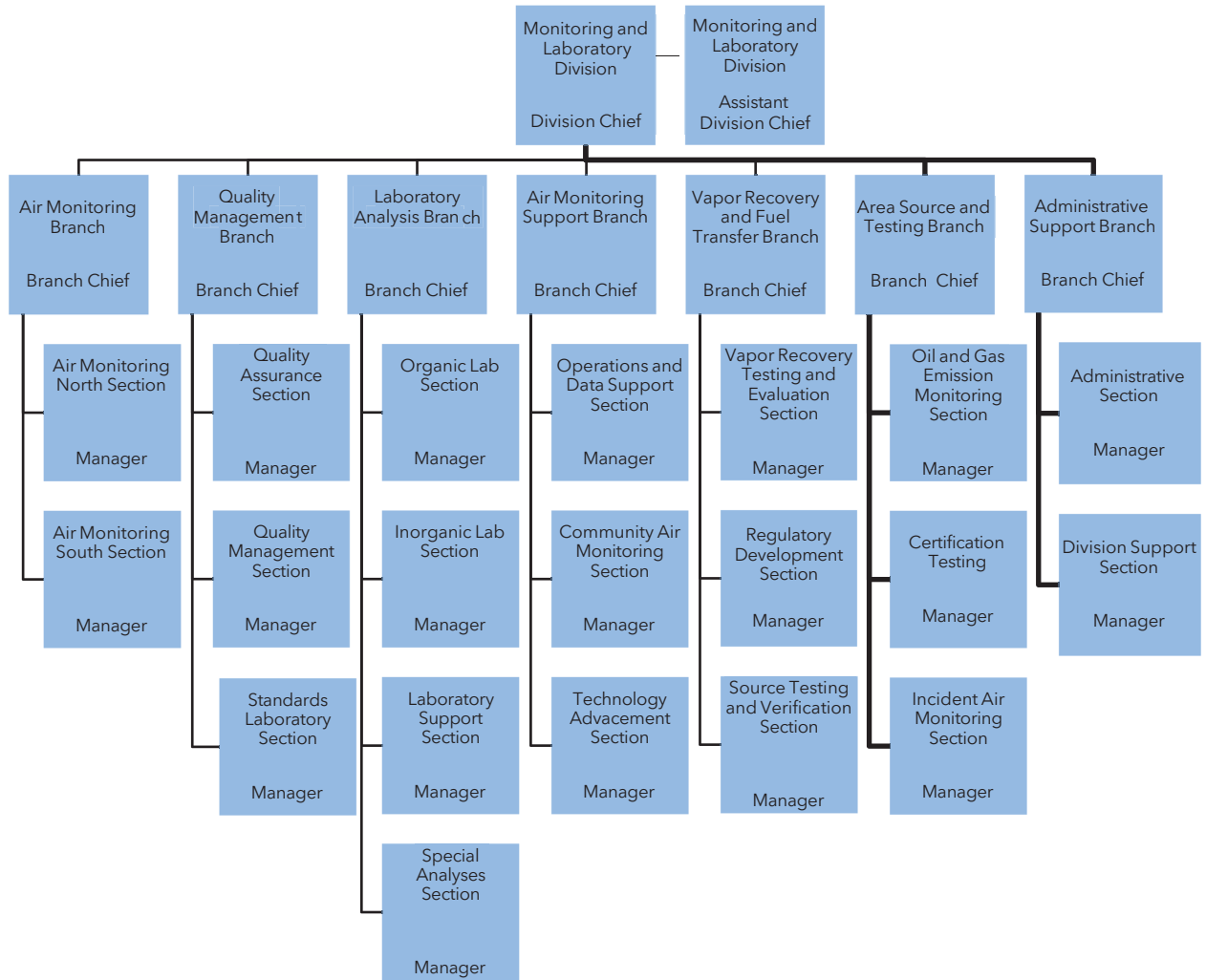


Figure D-2. Organizational Chart - Monitoring and Laboratory Division

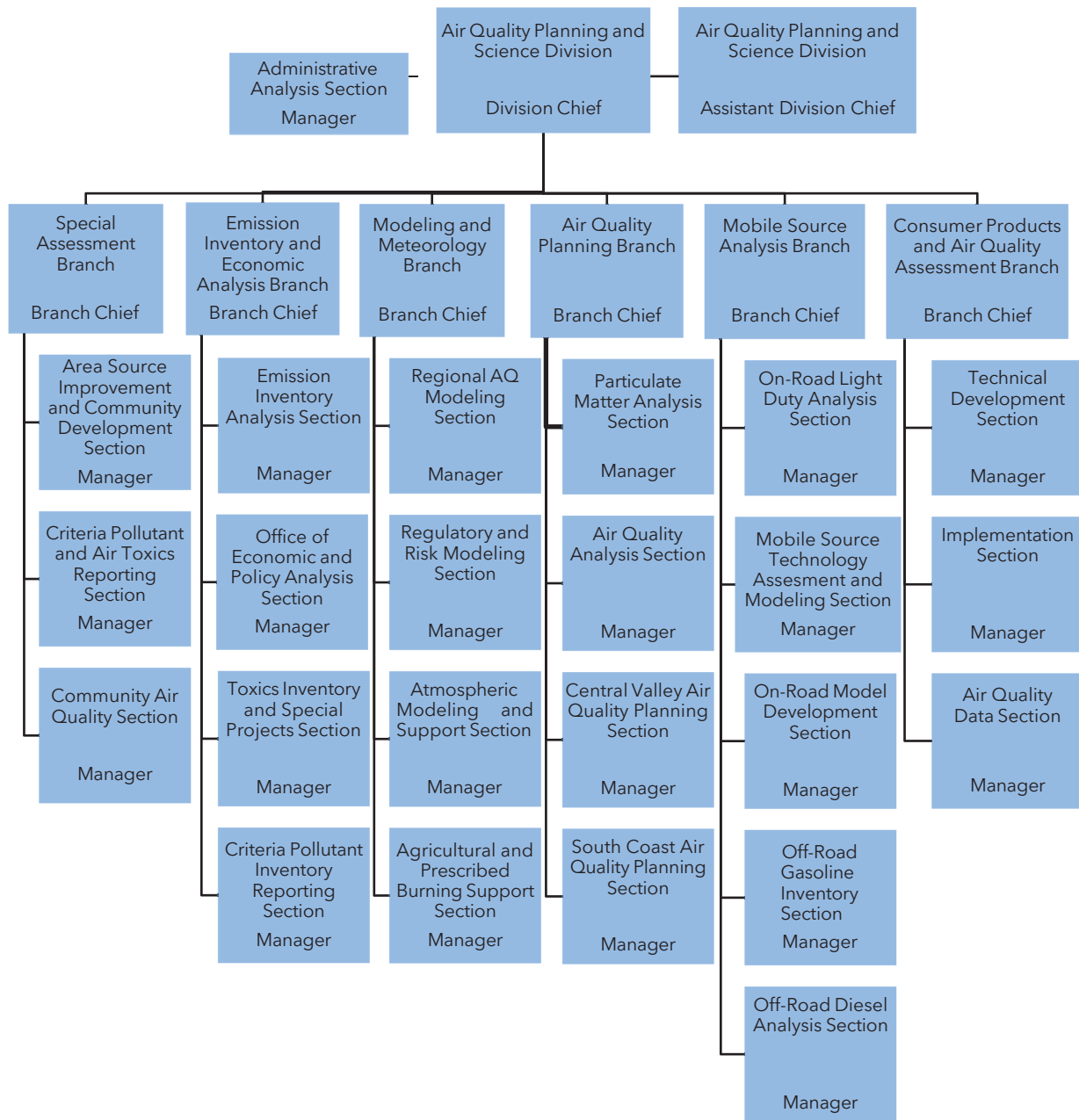
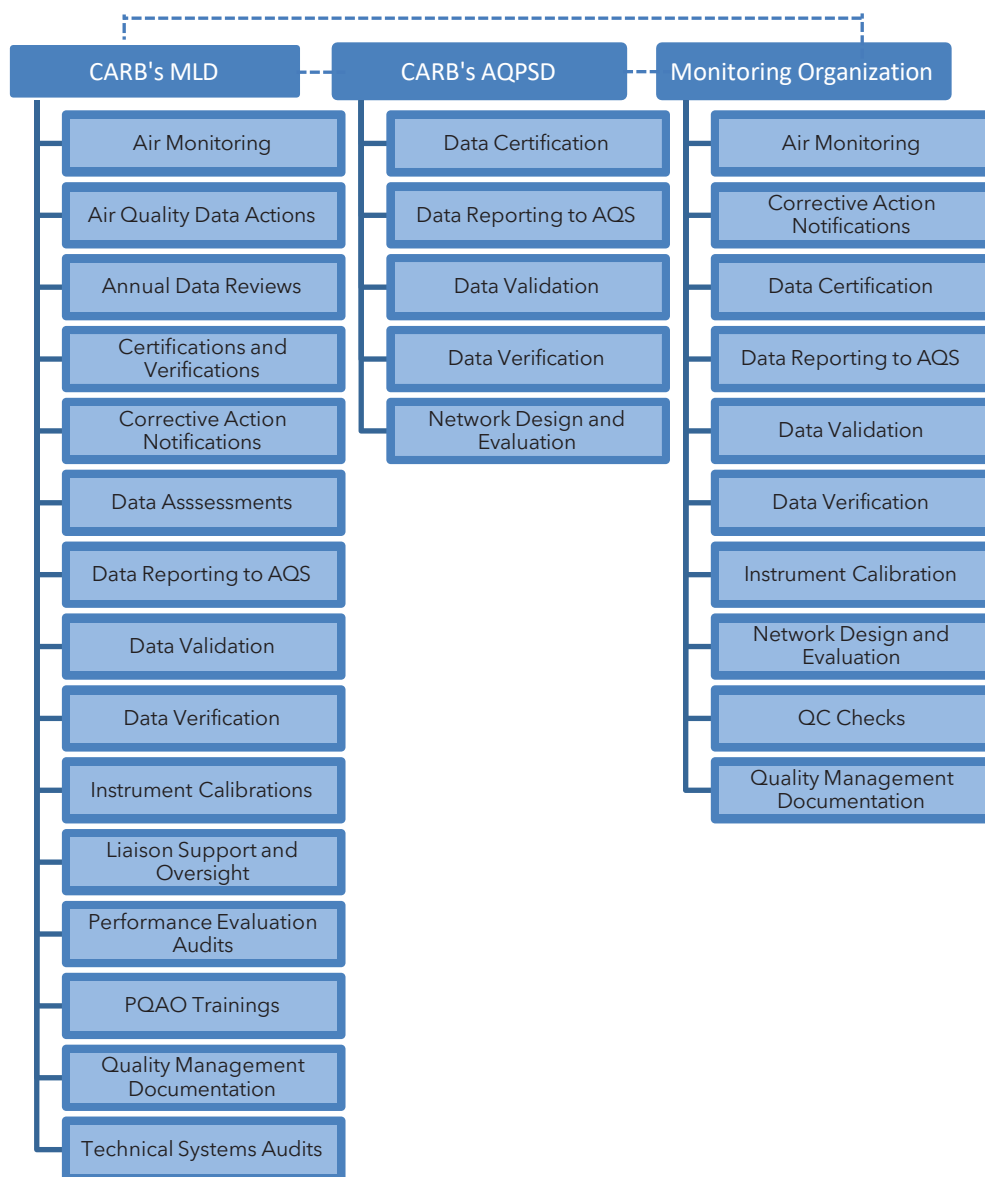


Figure D-3. Organizational Chart - Air Quality Planning and Science Division

Appendix E - Function Summary

The regulatory ambient air monitoring responsibilities and functions relevant to CARB and monitoring organizations within CARB's PQAO are summarized in Figure E-1.



- Dotted lines indicate oversight.

Figure E-1. Function Summary - CARB and Monitoring Organization

Appendix F - Data Pathways and Responsibilities

CARB is committed to the review, verification, validation, certification, and assessment of data generated or utilized within its PQAO. Figure F-1 describes the data pathways for validating, reporting, verifying, and certifying data generated by CARB's PQAO. Monitoring organizations responsible for site operation are also responsible for data management from data generation through data validation, except as noted in Table F-1.

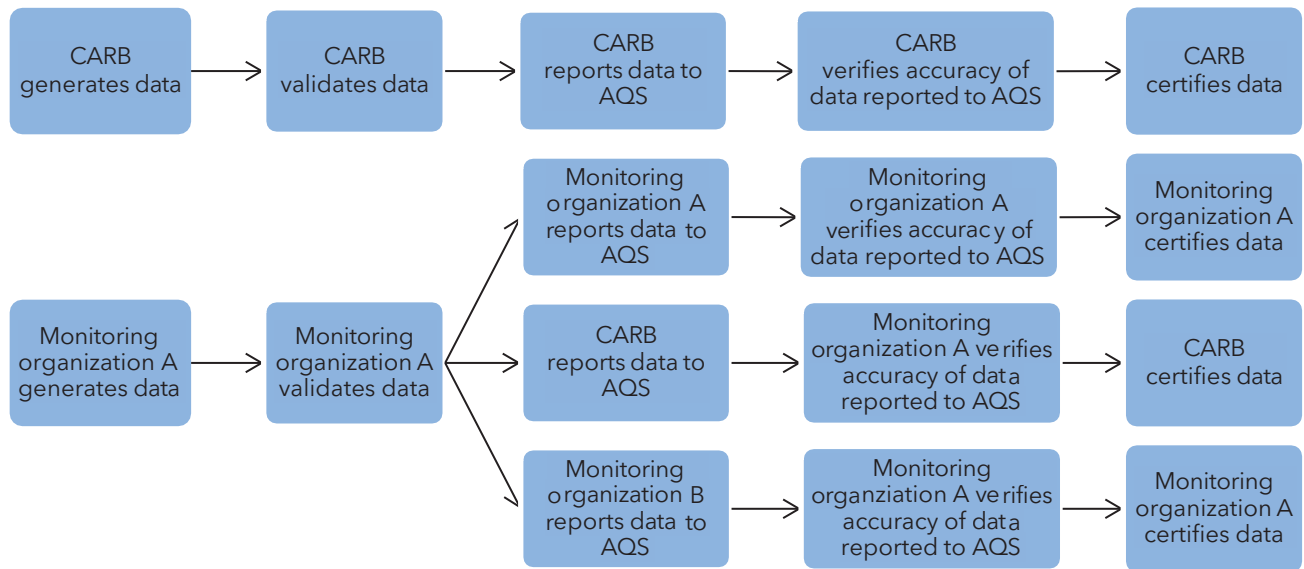


Figure F-1. Data Pathways

Table F-1. Data Reporting and Certification Responsibilities

Monitoring Organization Responsible for:				
Site Operation	Continuous Data Reporting	Continuous Data Certification	Particulate Matter Filter-based Laboratory Data Reporting	Particulate Matter Filter-based Laboratory Data Certification
Antelope Valley AQMD	Antelope Valley AQMD	Antelope Valley AQMD	N/A	N/A
CARB	CARB	CARB	CARB	CARB
Eastern Kern APCD	Eastern Kern APCD	Eastern Kern APCD	N/A	N/A
Great Basin Unified APCD	Great Basin Unified APCD	Great Basin Unified APCD	Great Basin Unified APCD	Great Basin Unified APCD
Imperial County APCD	CARB	CARB	N/A	N/A
Lake County APCD	CARB	CARB	CARB*	CARB
Mendocino County AQMD	CARB	CARB	N/A	N/A
Mojave Desert AQMD	Mojave Desert AQMD	Mojave Desert AQMD	N/A	N/A
Monterey Bay ARD	Monterey Bay ARD	Monterey Bay ARD	Bay Area AQMD	Monterey Bay ARD
North Coast Unified AQMD	CARB	CARB	CARB	CARB
Northern Sierra AQMD	Northern Sierra AQMD	Northern Sierra AQMD	CARB	CARB
Northern Sonoma County APCD	CARB	CARB	N/A	N/A
Placer County APCD	CARB	CARB	N/A	N/A
Sacramento Metropolitan AQMD	Sacramento Metropolitan AQMD	Sacramento Metropolitan AQMD	CARB - PM _{2.5} , PM _{2.5} Coarse, and PM ₁₀ Coarse Sacramento - PM ₁₀	CARB - PM _{2.5} , PM _{2.5} Coarse, and PM ₁₀ Coarse Sacramento - PM ₁₀
San Joaquin Valley APCD	San Joaquin Valley APCD	San Joaquin Valley APCD	N/A	N/A

Table F-1. Data Reporting and Certification Responsibilities (cont.)

Monitoring Organization Responsible for:				
Site Operation	Continuous Data Reporting	Continuous Data Certification	Particulate Matter Filter-based Laboratory Data Reporting	Particulate Matter Filter-based Laboratory Data Certification
San Luis Obispo County APCD	San Luis Obispo County APCD	San Luis Obispo County APCD	N/A	N/A
Santa Barbara County APCD	Santa Barbara County APCD	Santa Barbara County APCD	N/A	N/A
Shasta County APCD	Shasta County APCD	Shasta County APCD	CARB	CARB
Siskiyou County APCD	CARB	CARB	N/A	N/A
Tehama County APCD	CARB	CARB	N/A	N/A
Ventura County APCD	Ventura County APCD	Ventura County APCD	N/A	N/A
Yolo-Solano AQMD	CARB	CARB	CARB	CARB

- * = means data are weighed by the monitoring organization responsible for site operation but are reported by CARB.
- N/A = means this responsibility is not applicable for this monitoring organization.

Appendix G - Revision History

Table G-1 provides a summary of the modifications, including the nature of the changes for this QMP from Revision 0 (July 2013) to Revision 1.0 (March 2019) and to Revision 2.0 (December 2025).

Table G-1. Quality Management Plan Revision History

Section Number	Section Description	Revision Description
Revision 2.0 (December 2025) Updates		
N/A	Throughout the document	Updated nomenclature, hyperlinks, and organization structure. Reformatted to follow the 2023 EPA standard.
N/A	Approvals	Updated to reflect current organization at CARB and U.S. EPA Region 9.
N/A	List of Acronyms	Updated acronyms.
5.1	PQAO Structure	Updated definition of PQAO.
5.2	PQAO Responsibilities	Added PQAO Liaison website.
5.4	Network Plan Management and Design	Updated to reflect the most current Annual Network Plan.
		Updated the information included in the Ambient Air Monitoring Network Assessment.
5.5	CARB Organization	Updated the number of divisions and offices in CARB's Executive Office.
		Updated the sections and their roles in MLD and AQPSD.
7.4	Annual Review and Planning	Added a reference to the 2024 Annual Data Quality Report.
9.4	Air Quality System	Updated Air Quality Analysis Section to Air Quality Data Section to reflect current section responsibilities.
		Added a reference to CARB's Quality Management Document Repository.
		Updated data modification requests and data retention policies.
12.2	Training Overview	Updated 'Training Section' to 'Workforce Development Unit.'
		Updated references for CARB's Training Hub, Air Quality Training, and PQAO Training Resources.

Table G-1. Quality Management Plan Revision History (cont.)

Section Number	Section Description	Revision Description
12.3	New Employee Orientation and Training	Added a reference for CARB’s Air Quality Training website.
12.4	Continuing Education and Training	Added references for CARB’s Training Hub and Learning Management System.
13.1	Procurement Policy	Updated reference to CARB’s IT Procurements and Contracts website.
13.2	Procurement Policy	Added reference to IT Procurements and Contracts website.
13.5	Acceptance Test Procedure	Updated AQSBS ‘Instrument Laboratory’ to ‘Operation and Data Support Section.’
13.3	CARB Document Retention Policy	Updated the retention policy for site operators.
13.4	CARB Document Tracking	Updated the indexing label to match the SOP Checklist.
13.5	Document Distribution	Added a reference to CARB’s Quality Management Document Repository website.
N/A	Assessment of Precision and Bias Results	Removed this section and incorporated the information into Section 15.3, Annual Data Quality Report.
15.5	Performance Evaluation Audits of Gaseous, Particulate Matter, and Meteorological Equipment	Updated information on CARB’s PE audits.
N/A	National Performance Audit Program Training	Removed this section as CARB no longer performs NPAP audits. NPAP discussion is incorporated into Section 15.5, Performance Evaluation Audits of Gaseous, Particulate Matter, and Meteorological Equipment.

Table G-1. Quality Management Plan Revision History (cont.)

Section Number	Section Description	Revision Description
N/A	Technical Systems Audit and Data Assessment Reports	Removed this section and incorporated the information into Section 15.6, Technical Systems Audits.
15.9	Technical Systems Audits	Updated section title to change 'system' to 'systems.'
		Added a reference for the Technical Systems Audit webpage.
16.1	Dispute Resolution	Added QMB Chief's authority for dispute resolution.
18.4	Quality Assurance Communication	Added a reference to CARB's PQAO website.
19	Revision History	Updated revision history for Revision 2.0.
20	References	Updated all references.
Appendix A	Air Districts in CARB's PQAO	Added Table A-1. to show all air districts within CARB's PQAO and the organizations (CARB, monitoring organization, both) that operate the monitoring sites.
Appendix B	California Air Basins	Added a description of California's Air Basins.
		Labelled Table B-1. California Air Basins and associated Counties and PQAOs.
Appendix C	Annual Network Plans	Added description of the Annual Network Plans.
		Labelled Table C-1. Annual Network Plans for Air Districts within CARB's PQAO.
		Updated air districts included in CARB's 2025 ANP.
Appendix D	Organizational Charts	Updated the organizational charts for CARB, MLD, and AQPSD.
		Labelled CARB's Organizational Chart Figure D-1, MLD's Organizational Chart Figure D-2, and AQPSD's Organizational Chart Figure D-3.
Appendix E	Function Summary	Added a description of the function summary.
		Updated the responsibilities and functions of CARB and the monitoring organizations within CARB's PQAO.
		Labelled Figure E-1. Function Summary - CARB and Monitoring Organization.

Table G-1. Quality Management Plan Revision History (cont.)

Section Number	Section Description	Revision Description
Appendix F	Data Pathways and Responsibilities	Added a description of the data pathways and responsibilities figure.
		Labelled Figure F-1. Data Pathways.
		Labelled Table F-1. Data Reporting and Certification Responsibilities.
		Updated the responsibilities of CARB and monitoring organizations.
Appendix G	Revision History	Added revision history for Revision 2.0.
Revision 1.0 (March 2019) Updates		
N/A	Throughout the document	Updated formatting, nomenclature, hyperlinks, and organizational structure. Corrected typographical errors.
N/A	Approvals	Updated to reflect current organization at CARB and EPA Region 9.
N/A	List of Acronyms Page	Updated acronyms.
N/A	Introduction	Added Morongo Band of Mission Indians and Pechanga Band of Luiseño Indians as their own PQAOs in California.
		Added language to clarify number of organizations within the PQAo that collect ambient air monitoring data.
		Updated names of the volumes of the Quality Assurance Manual to reflect the current naming convention.
1.4	Network Plan Management and Design	Updated information regarding the ANP and the Ambient Air Monitoring Network Assessment.
1.5	CARB Organization	Updated organization structures of CARB, MLD, AQSB, QMB, and AQPSD.
		Updated NLB's methods of analysis.
3.6	Air Monitoring Training Modules	Updated Training Module language to reflect current status since the original QMP approval.
4.4	Solicitation of Contracts	Updated information on contract processes.

Table G-1. Quality Management Plan Revision History (cont.)

Section Number	Section Description	Revision Description
4.5	Acceptance Test Procedures	Changed location of Acceptance Test Procedures from CARB's Air Monitoring Web Manual to Volume II of CARB's Quality Assurance Manual.
5.2	Responsibility for Document and Records	Added language to clarify that laboratory quality control documents are located in Volume III of CARB's Quality Assurance Manual.
5.3	CARB Document Retention Policy	Added that monitoring organizations within CARB's PQAO should include a specific record retention policy in QAPPs and SOPs submitted to CARB for approval.
5.5	Document Distribution	Removed hyperlink for CARB's PQAO List Serve, which is no longer in use.
6.3	Laboratory Information Systems	Updated server backup procedures and frequency for laboratory information systems.
6.6	Air Quality System	Added information about CARB's ADAM database.
8	Implementation of Work Processes	Removed hyperlink for CARB's PQAO List Serve, which is no longer in use.
9.1	Introduction of Assessment and Response	Added that monitoring organizations within CARB's PQAO are required to submit to performance evaluations and audits conducted by CARB and U.S. EPA.
9.4	Laboratory Performance Audit	Updated language on laboratory performance audits.
9.6	Technical Systems Audits	Updated language on TSA process and collaboration between CARB and monitoring organizations to develop corrective actions and timelines.
9.12	Annual Data Quality Report for CARB's PQAO	Updated Annual Data Quality Report responsibility.
9.15	Air Quality Data Action	Updated language for when AQDAs are issued.

Table G-1. Quality Management Plan Revision History (cont.)

Section Number	Section Description	Revision Description
9.16	Corrective Action Notification Process	Updated language about the CAN process to match language in CARB’s gaseous QAPP.
10.4	Quality Assurance Communication	Replaced the Air Monitoring Technical Advisory Committee with the California Air Pollution Control Officers Associate (CAPCOA) and included information regarding CAPCOA monthly conference calls.
		Added language about QMS district liaisons and their regularly scheduled conference calls with the local air districts to which they are assigned.
		Removed the email address pgao@arb.ca.gov , which is no longer in use.
11	Revision History	Updated the Revision History.
N/A	CARB References and Other References	Updated list of references to reflect current naming conventions and references in use.
Appendix C	Annual Network Plans	Updated which monitoring organizations develop their own ANP and which are included in CARB’s ANP.
		Updated name of the “Annual Monitoring Network Plan for Small Districts” to CARB’s ANP.
Appendices D, E, and F	CARB, MLD, and AQPSD Organizational Charts	Updated organizational charts.
Appendix G	CARB and Monitoring Organization Function Summary	Updated name of appendix and chart.
Appendix J	Data Upload and Certification by Monitoring Organization	Updated responsibilities for upload and certification by monitoring organization to reflect current status.