



Air Resources Board



Matthew Rodriguez
Secretary for
Environmental Protection

Mary D. Nichols, Chair
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Edmund G. Brown Jr.
Governor

QUALITY ASSURANCE BULLETIN – 005

Post-AQS Data Confirmation April 2016

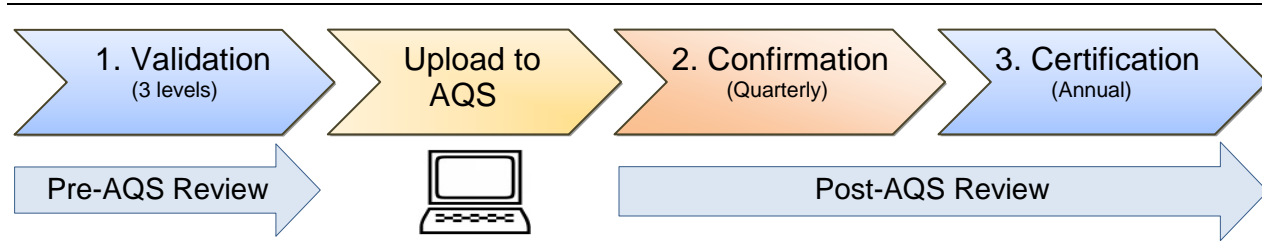
INTRODUCTION

The [Roles and Responsibilities \(R&R\) documents](#) created in collaboration with each District in ARB's Primary Quality Assurance Organization (PQAO) delegated specific responsibilities to each organization to enable the PQAO monitoring network to collect consistent and reliable data that meets or exceeds data quality objectives. ARB's Data Management Standard Operating Procedure ([AQSB SOP 610](#)) provides procedures and criteria for data acceptability but does not describe the review process after upload into the U.S. Environmental Protection Agency's (U.S. EPA) Air Quality System (AQS).

SCOPE

Determining data acceptability includes three levels of data review: 1) validation, 2) data confirmation, and 3) certification (see Figure 1.).

Figure 1. Data Review Process for Continuous Data



All three review steps are part of the data management process. This QA bulletin describes the post-AQS data confirmation process for continuous and filter based instruments. For Districts that send PM filters to a separate laboratory, important validation steps (i.e., parameter comparison, seasonal trends, and sample completeness) are unable to be performed by the District as a consequence of the District relinquishing custody of the filters and resulting data to the laboratories. As a result, the data confirmation step is critical for validating the data in these situations since Districts lack access to their data until after they are uploaded to AQS. For Districts in this situation, roles, responsibilities, and communication between the District and the laboratory (including validation responsibilities) should be clearly outlined and documented. Completing the extra steps during the confirmation process described in this document is designed to improve the data quality.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.

PROCEDURE

Data Confirmation Post-AQS Upload

Data confirmation is the process of ensuring data uploaded into AQS are accurate and complete by reviewing AQS reports (AMP 256 and 430) for transcription errors, missing values, or values associated with incorrect codes. In addition, the AMP350 (raw data report) and the data graphs that are reviewed on a quarterly and semi-annual basis will help strengthen the data confirmation process (Table 1). Some of the procedures outlined below could be reduced to simply spot checking the various data fields. View highlighted examples of AQS reports for continuous monitoring at arb.ca.gov/aaqm/qa/pqao/pdfs/aqs-expls.pdf and for filter based monitoring at arb.ca.gov/aaqm/qa/pqao/pdfs/aqs-frm.pdf.

Steps to confirm AQS upload

1. After data are uploaded to AQS, review the reports listed in Table 1 to verify accuracy and completeness of the upload. Reviewing these reports at least quarterly helps identify data issues and makes data certification easier. At a minimum, Districts should obtain read-only access to AQS. Districts can request training through their liaison for downloading the specific reports.
2. The data confirmation review should be documented. The documentation method can be determined individually by each District.
3. If erroneous data are found during the review, contact the entity (e.g., ARB, laboratory, or other agency) responsible for uploading the data to AQS (See Appendix J of ARB's Quality Management Plan for data upload responsibilities). Additionally, perform the appropriate corrective action and documentation required.

Table 1. Review Process for Data Confirmation

Report	Minimum Review Process
AMP 256 <u>Data Quality</u> <u>Indicator</u> <u>Report</u> (Formerly AMP 255).	<p>For gaseous pollutant monitoring:</p> <ol style="list-style-type: none"> 1. The <i>One Point Quality Control</i> section shows both the minimum number of required precision points and number performed. Review the "% Complete" column to ensure all one-point QC checks are reported to AQS and completeness meets or exceeds the minimum criteria of 75%, with a goal of 100% for each calendar year. 2. Check the Coefficient of Variation (CV) Upper Bound and bias columns. The CV should be less than 7% for O3, 15% for NO2, and 10% for SO2 and CO. 3. For bias, the criteria are +/- 7% for O3, +/- 15% for NO2, and +/- 10% for SO2 and CO. <p>For PM monitoring:</p> <ol style="list-style-type: none"> 4. Examine the <i>Flow Rate Verifications</i> "% difference" column to determine whether the % difference between the instruments and the transfer standards are "too high." (Criteria is 7% for continuous or Hi-Vol PM10, 4% for Low-Vol PM10 or PM2.5). 5. Also ensure the "% complete" meets data quality objectives (DQO) (75% EPA; 85% ARB). Although current federal regulations only require the upload of routine Flow Rate Verification (FRV) data into AQS for continuous PM10 samplers, we encourage all PM FRVs be uploaded, as regulations will likely change in the future to require these data to be collected. 6. Check the "Bias" to determine if it is within +/-10%.

	<p>For both:</p> <p>7. At least once per year: Review <i>Annual Performance Audits</i> and <i>Semi-Annual Flow Rate Audits</i> to ensure AQS was updated by ARB and that a “Y” flag appears at “Criteria Met?” and results agree with the audit report. If not, contact ARB.</p> <p>Note: The report also includes a collocation summary, U.S. EPA Performance Evaluation Program (PEP) audits, and lead audit strip analysis. Collocation will be reviewed at the time of data certifications. District’s participating in the audits should ensure results are uploaded to AQS, the statistics are reviewed, and are correct.</p>
<p>AMP 430 <u>Data</u> <u>Completeness</u> <u>Report</u></p>	<p>1. Check monitoring data completeness to verify that the DQO’s are met or exceeded (75% EPA; 85% ARB – for the quarter).</p> <p>2. Investigate low completeness numbers to identify issues such as incorrectly closed monitors, improper method codes, or wrongly assigned parameter occurrence codes. Completeness less than 50% may be due to errors in AQS data entry or mismatched sampling frequency between monitoring schedules and AQS. Utilize the AMP 350 and the AMP 435 (SO₂ - especially for 5 minute data) to follow up on issues.</p> <p>For filter based PM:</p> <p>3. Investigate instances where the number of samples reported does not match the number of samples submitted to the lab.</p>
<p>AMP 350 <u>Raw Data</u> <u>Report</u></p>	<p>Fully validated data may only require verification that data was entered into AQS accurately.</p> <p>1. Review the site, parameter, month, and year to ensure the report correctly reflects the data uploaded by the District or ARB.</p> <p>2. Check the monthly maximum concentration at the bottom of the report to examine if the value was above any State or federal standards or if it was unusual for the site. For continuous data, spot check the number of observations, daily max (right side), and the hourly max (bottom) for unusual numbers (e.g., high values following 1-pt checks or calibrations) and to ensure the data reflect the values in the District’s DMS.</p> <p>3. Review QA qualifiers and null codes to ensure the correct ones were utilized.</p> <p>4. Spot check the report for data flags, high and low data points, gaps in data, and repeating values.</p> <p>For filter based PM (assumes the following was completed for continuous data during validation):</p> <p>5. Inspect the data for noteworthy or exceptional events to ensure the values match expectations (known events, situations noted in logbook etc.).</p> <p>6. When reasonable, compare companion sites and parameters to ensure the data are correlated. This could also be accomplished using the data graphs described next (page 4).</p>

Graph data	<p>This tool may be useful before generating AQS reports for determining if District data have been uploaded.</p> <ol style="list-style-type: none"> 1. Graph data at least semi-annually. U.S. EPA provides an easy to use tool at www3.epa.gov/airquality/airdata/ad_viz.html. Use the concentration plot tool to chart data for a specific site and pollutant. 2. Look for unexpected data trends, compare companion sites/parameters and inspect for missing or additional data points. PM data do not clearly display single missing samples since the tool draws a line between points and does not show gaps. 3. Data values can also be viewed or graphed in AQMIS (real-time for continuous data), iADAM (post-AQS for filter data) and at AirNow Tech.
-------------------	--

Some of the information presented in the AQS reports reflects the type of monitor, the sampling frequency, or other data entered into AQS for that particular monitor. If the general information for the monitor is incorrect within AQS, the report may be applying the incorrect statistics to determine compliance with a particular requirement. If data are suspicious (e.g., meeting just 50% completeness) upon reviewing the AMP reports or when certifying data in April, then it would be beneficial to review the Monitor Description Report (AMP 390) to ensure the monitor is correctly identified.

RESOURCES AND LINKS

ARB PQAQO module 2 training - arb.ca.gov/aaqm/qa/pqao/repository/module2.htm
 ARB's Data Management SOP 610 - arb.ca.gov/airwebmanual/amwmn.php?c=6&t=sop
 Other PQAQO Data Management SOPs - arb.ca.gov/aaqm/qa/pqao/repository/table_6.htm
 EPA QA Volume II, Appendix D - arb.ca.gov/aaqm/qa/papers/epa-vol2i.pdf
 EPA AQS terminology - www2.epa.gov/sites/production/files/2015-10/documents/aqs_data_dictionary.pdf
 Data certification web page - arb.ca.gov/aaqm/qa/pqao/certification/cert.htm
 Validation to certification pathways - arb.ca.gov/aaqm/qa/pqao/pdfs/valid-cert-pathway-final.pdf
 iADAM - <http://www.arb.ca.gov/adam/>
 AQMIS - <http://www.arb.ca.gov/aqmis2/aqmis2.php>
 AirNow Tech - <http://www.airnowtech.org/>