This SOP is subject to
review and revision in 2015.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

TECHNICAL SERVICES DIVISION

QUALITY ASSURANCE PROJECT PLAN

STANDARD OPERATING PROCEDURE

# DATA MGT SOP 602

# PM 10

REVISION 602.2.00 8/29/2012

Kurt Malone 8/29/12

Kurt Malone, Supervisor Date
MQA Group

Mark Stoelting 8/29/12

Mark Stoelting, QA Officer Date
Technical Services Division

Technical Services Division 939 Ellis Street San Francisco CA 94109

STANDARD OPERATING PROCEDURE
BAAQMD Technical Services Division

# $PM_{10}$ Sampler Data Management

August 2012

## Table of Contents



## Purpose

The purpose of this Data Management Standard Operating Procedure (SOP) is to document data validation procedures for the $PM_{10}$ Samplers used by BAAQMD to measure daily $PM_{10}$ mass concentrations. The goal is to define the staff persons responsible for the review, a review timeline, and the specific steps and objectives of the review process.

## Background

The District has installed High Volume $PM_{10}$ samplers to measure daily $PM_{10}$ mass concentrations at several sites. At San Jose, a Low Volume $PM_{10}$ sampler is installed so that PM coarse ($PM_{10}$ minus $PM_{2.5}$) can be determined. Both instruments are certified by EPA as a reference method for $PM_{10}$. EPA requires that when PM coarse is determined from subtraction of $PM_{2.5}$ from $PM_{10}$, the same type of sampler must be used for both measurements. PM coarse is submitted to the Air Quality System (AQS) following quality assurance procedures.

## Procedure Summary

Data review begins with the Air Monitoring (AM) Section staff that installs, operates and maintains the $PM_{10}$ samplers. AM is responsible for following approved $PM_{10}$ sampling SOPs and is the final authority in determining whether the $PM_{10}$ instrument is operating correctly and thus providing valid data. Instrument parameters (such as Start/Stop time, Run Time Duration, and Actual Flow Rate) shall be utilized by AM to assist in the data validation process. AM is responsible for noting the local sampling conditions, and inspecting the filters to determine that they meets EPA and CARB quality control standards.

A second data review is conducted by the Laboratory staff that analyzes the $PM_{10}$ filters. The Laboratory is responsible for following approved filter handling SOPs. The Laboratory

conducts a secondary visual inspection of the filter, and reviews the field sampling parameters to determine compliance with quality control standards. The Laboratory also reviews $PM_{10}$ data entries, and forwards the monthly $PM_{10}$ dataset that has passed AM and Laboratory validation checks to the Meteorology and Quality Assurance Section (MQA).

A third data review is conducted by MQA. In general, MQA is responsible for all data review not specifically related to the operation of the $PM_{10}$ sampler, but may also review instrument sampling measurements for determination of data validity.

## Air Monitoring Data Review

$PM_{10}$ data reviewers include the Air Monitoring Station Operator and the Field Supervisors if needed. Station Operators and Field Supervisors have the authority to edit data values and modify data validation codes.

### Station Operator

The Station Operator shall:

- Complete the 24-Hour Air Sample Report form:
  - Include local sampling conditions and sampling collection data.
  - Indicate whether the sample meets quality control standards, or invalidate the sample for any of the following reasons, indicating the reason(s):
    - The sample is taken during periods of equipment malfunction, maintenance, or interference from other activities at the station.
    - The filter is damaged, torn, or shows signs of contamination.
    - The Start/Stop time is irregular (valid is 0000 $\pm$ 60 minutes).
    - The Run Time is less than 23 hours or more than 25 hours.
    - The sample is taken during a Power Failure, and the total time out exceeds 1.0 hours.
    - The Actual Flow Rate is outside of the range of 40 cubic feet per minute (CFM) $\pm$ 10%. The average actual flow rate should be within 10% of the design flow rate of 40.0 CFM to be acceptable. If the average actual flow rate is less than 36.0 CFM or greater than 44.0 CFM, then the sample is invalid.
    - The filter shows evidence of leakage (air leakage due to a worn or improperly seated gasket)
  - If the sample is invalidated, notify the Field Supervisor. Schedule and note a date for a make-up sample that falls before the next scheduled sampling date (the make-up sample should occur within the same calendar quarter).
  - Provide further explanation in the Remarks sections if the sample is invalidated or the sampling conditions are unusual.
- If an Operations Data Action Monitoring Notification (ODAMN) is issued by the QA group, determine when the faulty condition started, if possible. Send an e-mail to the Meteorology Supervisor (copy to the Laboratory Manager, and the Data Assessment AQIS) indicating the data invalidation interval, starting at an identifiable failure or at the last good instrument check and ending with completion of corrective action.

- Send the sample and the completed report to the Laboratory no later than 5 days after the sampling date.

## Laboratory Data Review

The Laboratory Analyst conducts a secondary check of a $PM_{10}$ sample's validity. The Laboratory also enters the field sampling parameters into the Laboratory database. The Laboratory Analyst shall:

- Enter the validation status of the filter into the Laboratory database, as indicated by the station operator on the 24-Hour Air Sample Report form.
- If a sample is not received within 29 days after the sampling date, note in the remarks on the 24-Hour Air Sample Report form. Post-weigh and analyze the sample as usual. If the sample is from a Low Volume sampler, invalidate the sample.
- Invalidate the sample if it shows signs of air leakage, indicating a worn or improperly seated gasket. It is not necessary to post-weigh the filter or do any analysis.
- Invalidate the sample if it shows signs of damage or contamination that may have occurred during or after the sampling. It is not necessary to post-weigh the filter or do any analysis.
- Do not process the sample if the 24-Hour Air Sample Report form is not available. Verify that the station operator is aware of the missing report, so that a make-up sample can be scheduled if it has been less than seven days since the scheduled sampling date or the next sampling date has not yet been reached.
- Review the field sampling parameters while entering into the Laboratory database. If any irregularities in the Start/Stop time, Run Time Duration, or Actual Flow Rate are observed (per invalidation criteria noted in the Air Monitoring Data Review section above), but the station operator has not invalidated the sample, then notify the station operator to confirm the validation status of the sample.
- If the sample is invalidated by the Laboratory, indicate a status of void when entering into the Laboratory database. Inform the station operator so that a make-up sample can be arranged, if possible, and corrective actions can be taken, if necessary.
- Maintain the monthly login sheet for $PM_{10}$ samples returned from the field. Invalidated samples are indicated in the remarks, along with sample make-up dates.
- Generate the Monthly Dust Loading Report in AIRSAM and forward to the Air Monitoring Manager.
- Prepare monthly datasets of mass and ion analysis. Delete records for voided filters. Check these datasets for integrity and inform MQA.

## MQA Data Review

A member of the Meteorology/Quality Assurance staff conducts the final review of District $PM_{10}$ data before uploading data into the EPA Air Quality System (AQS) database. The MQA reviewer shall:

- Review Operations Data Action Monitoring Notifications (ODAMNs) issued by the QA group against $PM_{10}$ Samplers indicating a failed Quality Assurance audit and resulting in data invalidation. ODAMN documents are stored in the P:\Techdata\MQA\QA directory. Reviewer shall invalidate all data collected since the last valid leak/flow check until corrective action was completed by Air Monitoring. If, in consultation with Air Monitoring, a definable moment can be identified when the $PM_{10}$ sampler failure occurred after the last leak/flow check, data invalidation may begin at the time of failure.
- Examine the data each month to ensure that the values appear reasonable. The data are compared between sites, and may be compared to historical data, $PM_{2.5}$ data, and meteorological conditions. Excessively high values and anomalies are investigated and resolved.
- Examine precision data by comparing measurements from primary monitors to respective collocated monitors on a daily basis. If the agreement in not within 5 $\mu g/m^3$, it is District policy to contact the station operator, to obtain information about any unusual circumstances on the sampling date.
- Report any samples voided by MQA to Laboratory staff so that the voided status can be entered into the Laboratory database. Also notify the Air Monitoring Manager of any samples voided by MQA.
- For data from the San Jose Jackson NCore site and any other site where PM coarse is submitted to AQS, report all samples even if the data has been voided, and include the null code with each voided record.
- Complete review and posting of $PM_{10}$ data to AQS no later than 75 days after the end of the month.

## Authors, Revisions, and Approvals

Revision: June 2007 (original)
Author: Ken Crysler, AQ Meteorologist
Approved: Dick Duker, Meteorology and Quality Assurance Manager
Approved: Eric Stevenson, Air Monitoring Manager
Approved: Jim Hesson, Laboratory Manager
Approved: Gary Kendall, Technical Division Director

## References

EPA QA Handbook Vol. II, Part II, Section 2.11 - $PM_{10}$ High Volume, Subsections 3.4.1, 3.4.2 and 4.6
CARB Air Monitoring Quality Assurance Manual Vol. II, Appendix P - Sierra-Anderson 1200 Size Selective Inlet PM10 Sampler, Section P.1.1.4