



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

TECHNICAL SERVICES DIVISION
QUALITY ASSURANCE PROJECT PLAN
STANDARD OPERATING PROCEDURE

DATA MGT SOP 607
TOXICS 924

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STANDARD OPERATING PROCEDURE
BAAQMD Technical Services Division

Xontech 924 Toxics Data Management

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Purpose

The purpose of this Data Management Standard Operating Procedure (SOP) is to document data validation procedures for formaldehyde and acetaldehyde. 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

In 2003 the EPA established the National Air Toxics Trends Stations (NATTS) nationwide network and designated the San Jose station as a NATTS site. The NATTS network was created to expand and improve national toxics monitoring with the major goal of identifying toxics trends in urban and rural settings throughout the United States. Formaldehyde and acetaldehyde are collected using the Xontech 924 sampler as part of the NATTS program.

When the NATTS program began in 2003, CARB was already analyzing for formaldehyde and acetaldehyde at San Jose on a one in twelve day schedule. Because NATTS sampling is a one in six day schedule, EPA requested BAAQMD set up its own NATTS samplers at San Jose to supplement CARB’s program and conduct sampling on a one in six day schedule. BAAQMD began sampling for formaldehyde and acetaldehyde on a one in six day schedule on November 1, 2006. The CARB program continues on a one in twelve day sampling schedule.

Procedure Summary

The BAAQMD toxics network samples for formaldehyde and acetaldehyde at the San Jose NATTS site and may monitor these compounds at Special Purpose Monitoring sites. A Xontech 924 sampler is used to collect the integrated 24-hour ambient sample once every six days in sample cartridges.

After the samples are collected they are sent to the BAAQMD lab for analysis. Lab personnel analyze the samples, check the results, and forward the results to Meteorology and Quality Assurance (MQA) staff. MQA staff reviews this data monthly and archive it in the EPA AQS database.

Air Monitoring Data Collection

The station operator runs the Xontech 924 instrument and fills out the COC form. The station operator is authorized to invalidate a cartridge due to breakage or contamination or invalidate a run if an instrument malfunction occurs. The station operator will note such invalidations on the COC sheet.

The station operator will note on the COC sheet if:¹

- the average flow rate, as printed on the Xontech 924 printout is less than 9.0 LPM for the high flow channels or .600 LPM for the low flow channel
- the average flow rate, as printed on the Xontech 924 printout, exceeds 14.0 LPM for high flow channels or .800 LPM for the low flow channel
- If start and stop flow rates, as printed on the Xontech 924 printout, differ by more than $\pm 10\%$
- the total time of the sample, as printed on the Xontech 924 printout, exceeds 1440 ± 60 minutes
- the sample start time, as printed on the Xontech 924 printout, begins before 23:00 or ends after 01:00.

The Laboratory chemist responsible for the COC sheets shall notify the Lab Manager when the Toxics COC sheet shows comments from the station operator.

Laboratory Analysis

Sample cartridges and duplicate cartridges, field and trip blanks and the COC sheets are brought to the BAAQMD Laboratory Services section for analysis. Samples are extracted from the cartridges and refrigerated until analysis is performed. Analysis is done using high performance liquid chromatography with UV detection.

The Lab Chemist shall:²

- Notify the Meteorology Supervisor and the Lab Manager if:
 - The extraction does not take place within 14 days³ of sampling
 - The volume air sample is outside defined limits as stated in the SOP
 - The cartridge is not run within 35 days of the cartridge date

- The extract from the cartridge is not analyzed within 30 days³
- Randomly select one sample extract from each batch and repeat the analysis a second time which is known as a replicate analysis
- Rerun a replicate analysis when the relative percent difference between the replicate analysis and the primary analysis is more than $\pm 10\%$, and the concentration is at least 5 times the minimum detectable limit. The source of the discrepancy and the validity of the data will be determined. Of the three analyses performed, the two closest results will be designated as the primary and replicate.

Lab Manager Data Review:

- Review the toxics data after the analysis and certify that the data is good by:
 - Confirming that all high and low values look reasonable
 - Confirming that field blanks are near zero
 - Confirming that results from cartridges used more than 35 days after the sample date are valid
 - Confirming that results from cartridges with volume air sample outside defined limits as stated in the SOP are valid
 - Comparing the replicate with the original value for consistency and to confirm that the data are reasonably close and unbiased
 - Confirming that all high and low values look reasonable
 - Comparing duplicate District samples
 - Comparing CARB toxic data at the San Jose station
- Authorize the archival of the data including duplicate, replicate and field data into the District database
- Send a list of toxics samples that were invalidated to the Air Monitoring and Meteorology Supervisor.

MQA Section Review

MQA Section staff shall:

- Review Operations Data Action Monitoring Notifications (ODAMNs) for possible invalidation if collected by an instrument that failed an audit. ODAMN documents are stored in the P:\Techdata\MQA\QA\ODAMN network directory.
- Discuss with Lab Manager if questionable values are found
- Flag toxics values that are below the SQL using EPA recommended methodology⁴:
 - Load all values between the SQL and MDL as the value with an SQL flag
 - Load all values less than the MDL as the value with as MDL flag
 - Load all non detects as zero with a ND flag
- Format toxics records and load into the AQS database within 90 days of the last sampling date of the month
- Format and load all replicate and duplicate data as precision records into AQS
- Review the AQS Statistical and Critical Review Report to look for outliers
- AQS toxics data collected by CARB and BAAQMD at collocated monitoring sites may be provided to the Laboratory Manager for review

Toxics Section Review

Toxics Section Staff shall:

- Annually review BAAQMD toxics data before presenting it in the District's annual toxics report and cancer risk calculations
- Inform the Lab Manager of unusual patterns in the data.

Authors, Revisions, and Approvals

July 2007 (original)

July 2012 (revision: removed review of field blank records from MQA Section Review, removed reference to MQA providing Lab Manager CARB collocated toxics records on a monthly basis, and replaced lab archival of data to a District Excel database to a District network directory)

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References

CARB's Xontech Model 924 Sampler SOP

<http://www.arb.ca.gov/airwebmanual/aqsdocs1/801sop200401.pdf>

¹ BAAQMD Air Monitoring Section Xontech 924 SOP

² BAAQMD Lab Standard Operating Procedures for the Analysis of Formaldehyde and Acetaldehyde in Ambient Air Samples

³ EPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method TO-11A, Determination Of Formaldehyde in Ambient Air Using Adsorbent Cartridge Followed by High Performance Liquid Chromatography (HPLC) [Active Sampling Method], January 1999

⁴ Air Toxics Flagging and reporting Guidance for EPA's Air Quality Systems Database Version 1.1 and amended by the 2007 Mike Jones e-mail