MANUAL OF PROCEDURES
VOLUME VI
AIR MONITORING PROCEDURES
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1. GROUND-LEVEL MONITORING FOR SULFUR DIOXIDE AND HYDROGEN SULFIDE

REF: Regs. 1-510, 1-600
9-1-501, 9-1-604
9-2-501, 9-2-601

1.1 General. This section outlines the procedures to be used for atmospheric sampling of ground-level hydrogen sulfide (H_2S) and sulfur dioxide (SO_2) concentrations in order to fulfill the requirements of Regulation 1-510.

1.2 Instrumentation. When required under Regulation 9-1-501 or Regulation 9-2-501, the person responsible for emissions shall provide recording instrumentation at no fewer than three sites chosen to monitor the ambient air in the area surrounding the emission source and at least one meteorological station to record wind speed, wind direction, and, effective 6 months after the effective date of this Procedure, 1-minute shelter temperature measurements. Additional instruments may be required in specific cases where necessary to meet the intent of the appropriate section. Hydrogen sulfide (H_2S) and sulfur dioxide (SO_2) Ground-Level Monitoring sites established after December 31, 2016 shall include collocated meteorological instruments. The instruments shall be sufficient in number to give reasonable assurance that any ground-level limits exceeding the applicable standards will be detected. All analytical instrumentation shall be capable of detecting ground-level concentrations which exceed the allowable limits. All instrumentation shall be continuous and equipped with electronic data recorders which archive data at averaging intervals not to exceed one minute. Hydrogen sulfide and sulfur dioxide instruments shall be equipped with electronic data recorders that operate continuously. Instruments shall be housed in a climate-controlled environment with shelter temperatures maintained between 20° and 30°C unless a different shelter temperature range is approved by the APCO.

1.2.1 Sulfur Dioxide Instrument Specifications. The instruments shall be of a type which will continuously detect and record minute-by-minute fluctuations of concentrations of SO_2 in the range from 0.00 ppm (vol) to 1.00 ppm (vol).

1.2.2 Hydrogen Sulfide Instrument Specifications. The recording instruments shall be of a type which will continuously detect and record minute-by-minute fluctuations of concentrations of H_2S in the range from 0.00 ppm (vol) to 0.50 ppm (vol).

1.2.3 Meteorological Instrument Specifications. Meteorological instruments shall be capable of continuously measuring and recording wind direction and wind speed to comply with the latest edition of the Bay Area Air Quality Management District Meteorological Monitoring Guidance (Appendix A to this manual).

1.3 Siting. The instruments shall be installed and operated in locations which adequately represent maximum ground-level concentrations of the measured air pollutants. Sites will be chosen to intercept most frequent ground-level maximum concentrations, but in conformance with Regulation 1-510. Proper siting will be taken to require that a preponderant downwind exposure over the calendar year be accumulated by the instruments of a given network during their hours of operation. Downwind exposure exists when the mean wind direction lies in the arc within 22.5 degrees of a direct line from source to monitor. The effective source height and the prevalent stability class associated with the most frequent wind directions are used to calculate the most probable distances for maximum ground-level concentrations. A station may be placed at or within the property line if the location is otherwise acceptable and provided that the person responsible for the station agrees in writing that such location shall, for the purposes of Bay Area Air Quality Management District (Air District) requirements, be deemed to be off the property from which the emissions occur.

The wind-measuring site (or sites) shall be located within the general area encompassed by the source and the ground-level monitors. In any case, they must comply with the latest edition of the Bay Area Air Quality Management District Meteorological Monitoring Guidance. Final approval of the siting of ground-level monitors and meteorological instrumentation shall be with the APCO.

1.4 Maintenance. Regulation 1-510 requires that the person responsible for monitoring provide care and maintenance in order to assure that the instruments function properly and accurately measure ground-level concentrations. A record of consistent instrument downtime may be considered failure to meet this requirement. The APCO may require submission of maintenance records.

1.5 Quality Assurance. Regulation 1-510 requires that the person responsible for monitoring perform periodic quality-control measures, which include calibrations, verifications and one-point quality-control checks, to assure that the instruments provide acceptable monitoring of ground-level gas concentrations. Gas analyzer calibration methodology can be found in the EPA's QA Handbook for Air Pollution Measurement Systems, Volume II, EPA-454/B-13-003, and in the instrument's operations manual. Quality-control frequency shall conform to EPA one-point quality-control checks (40 CFR Part 58 Section 3.2.1). Additionally, a field calibration shall be performed after any relocation of an analyzer, after major repair work has been completed on an instrument, on routine intervals, and on an as-needed basis to check instrument accuracy.

The calibration procedure used shall be a method that follows the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, is defensible and is approved by the District. Meteorological data shall meet verification calibration and accuracy criteria as shown in EPA Meteorological Monitoring Guidance Volume IV (Table 0-6).

As one independent quality assessment measure, District personnel will periodically inspect sites and may conduct performance evaluations (dynamic gas audits) on the ground-level monitors to determine instrument accuracy. Accuracy of an instrument's response after a performance evaluation is expressed as the deviation between the GLM analyzer response, obtained under test conditions, and the results of the reference procedure. Deviation is calculated as a percent of the reference results.

$$\% \text{ Deviation} = \frac{\text{Analyzer Value - Reference Value}}{\text{Reference Value}} \times 100$$

The acceptable limit for sulfur dioxide analyzer calibrations is ±15% deviation.
The acceptable limit for hydrogen sulfide analyzer calibrations is ±15% deviation.

A record of unacceptable performance evaluations will be considered failure to meet the requirement. The APCO may require submission of calibration records, calibration procedures and data pertaining to quality assurance procedures.

1.6 Reporting. Data recorded by the required instrumentation shall be examined at least once every day to determine whether the allowable limits have been exceeded, and to determine whether the instrumentation has operated properly. Instrument downtime exceeding a continuous 24 hours period and recorded data exceeding allowable limits shall be reported to the APCO within the next normal working day following examination.

Hydrogen sulfide (H_2S), sulfur dioxide (SO_2) and meteorological data shall be made available to the APCO via a file transfer protocol (FTP) server within 24 hours. The FTP server shall be provided and maintained by the person responsible for monitoring. In addition, effective 6 months after the effective date of this Procedure, a real-time web-display of all monitored data shall be made available to the public by the person responsible for monitoring.

In addition, a summary of all raw H_2S, SO_2, and meteorological data obtained during each calendar month shall be submitted to the APCO via electronic medium within 30 days following the end of the month. The summary shall include excesses over allowable limits, mass emission rate from sources, and notations for instrument downtime or other loss of data. Unless a substitute summation of data is specified by the APCO, the monthly data summary shall be the one hour averages by summing one minute averages and dividing by the number of minutes (at least 45 valid samples per hour) from electronically collected data (e.g., data logger). Unless specified above, the format of the data and informational summaries shall be determined by the APCO.