(**Adopted:** 1/ 9/76; **Amended:** 4/1/77; **Amended:** 8/5/77; **Amended:** 4/6/79; **Amended:** 8/7/81)

RULE 218
Stack Monitoring

(a) Stack Monitoring Requirements

(1) The owner or operator of any equipment described below shall provide; properly install, maintain in calibration, in good working order and in operation; approved stack monitoring systems to measure the concentration of the following air contaminants and diluent gases in the emissions from the sources indicated. The owner or operator shall also provide any other data necessary for calculating air contaminant emission rates.

(A) Oxides of nitrogen (NO_x), and carbon dioxide (CO_2) or oxygen (0_2), from steam generators with a heat input of 63 million kilogram calories (250 million British Thermal Units) or more per hour and with a use factor of at least 30 percent.

(B) Sulfur dioxide (SO_2) from steam generators with a heat input of 63 million kilogram calories (250 million British Thermal Units) or more per hour and with a use factor of at least 30 percent if control equipment is used.

(C) Oxides of nitrogen (NO_x) from all nitric acid production plants.

(D) Gaseous sulfur compounds calculated as sulfur dioxide (SO_2) from all sulfuric acid production plants, carbon monoxide boilers or furnaces of the regenerators of fluid catalytic cracking units, and all fluid cokers.

(E) Sulfur dioxide (SO_2) from sulfur recovery plants with oxidizing tail gas units, and with reducing tail gas units using continuous incineration for control of hydrogen sulfide (H_2S).

(2) The Executive Officer may require a person to provide, properly install, maintain in calibration, in good working order and in operation, an approved stack monitoring system to measure air contaminants in emission gases when that person installs, operates, or uses any equipment which emits 900,000 kilograms (992 tons) or more per year of carbon monoxide (CO) or 90,000 kilograms (99 tons) or more per year of any air contaminant except carbon monoxide (CO). The Executive Officer shall report to the District Board in writing when he requires the installation of a stack monitoring system under the provisions of this subpart.

(b) Approval of Monitoring Systems

(1) All monitoring systems to be installed after April 6, 1979, require an initial approval by the Executive Officer, prior to installation. The Executive Officer shall act upon an application for initial approval within 30 days after filing or within 30 days after the applicant furnishes further information, plans and specifications requested to complete an application. Upon completion of installation, a person operating or using a stack monitoring system shall undertake a series of tests to demonstrate the acceptability of the system's performance pursuant to (c) below. Within 6 months of initial operation, data from such tests shall be submitted to the Executive Officer for approval. If satisfactory performance is demonstrated, a final approval of the system shall be granted.

(2) A person operating a monitoring system installed on or before April 6, 1979, shall, by June 1, 1979, submit a plan to the Executive Officer outlining steps to achieve compliance with the performance specifications of (c) below as expeditiously as practicable, but in no event later than March 2, 1981.
Each plan shall include, but shall not necessarily be limited to, dates and methods for achieving the following increments of progress:

1. Submit test results.
2. Negotiate and sign contracts.
3. Commence modification or replacement of non-complying systems.
4. Complete modification or replacement of non-complying systems.
5. Submit final test results.
6. Achieve final compliance with (c) below on or before March 2, 1981.

Non-complying systems shall be operated at the level of performance indicated by test results. Each system shall be operated in accordance with the plan.

(3) A person operating an approved monitoring system shall affix such written notice of approval or a legible facsimile upon the equipment in a manner such that it is clearly visible and legible. In the event that the equipment is so constructed or operated that the notice of approval or its legible facsimile cannot be so placed, such notice or legible facsimile shall be mounted on a location approved by the Executive Officer.

(c) Monitoring System Standards

(1) The monitoring system shall be installed at a location such that air contaminant and diluent gas concentration measurements can be made which are representative of the stack emissions of the affected facility.

(2) Prior to final approval of the monitoring system, it shall meet, and it shall thereafter be operated in accordance with, the following performance and equipment specifications:

(A) Monitors for Gaseous Air Contaminants

	Parameter	Specifications
(i)	Operational Period*	Greater than or equal to 168 hours.
(ii)	Calibration Error**	Less than or equal to 5 percent.
(iii)	Response Time	Less than or equal to 10 minutes.
(iv)	Zero Drift (2-hour)**	Less than or equal to 2 percent of full scale reading.
(v)	Zero Drift**(24-hour)	Less than or equal to 2 percent of full scale reading.
(vi)	Calibration Drift (2-hour)**	Less than or equal to 2 percent of scale reading.
(vii)	Calibration Drift (24-hour)**	Less than or equal to 2.5 percent of full scale reading.
(viii)	Relative Accuracy**	Less than or equal to 20 percent of the mean value of the reference method test data or less than or equal to 10 percent of the allowed concentration, whichever is greater.

(B) Monitors for Diluent Gases

	Parameters	Specifications
(i)	Operational Period*	Greater than or equal to 168 hours.
(ii)	Calibration Error**	Less than or equal to 5 percent.
(iii)	Response Time	Less than or equal to 10 minutes.
(iv)	Zero Drift (2-hour)**	Less than or equal to 0.4 percent CO_2 or 0_2.
(v)	Zero Drift (24-hour)**	Less than or equal to 0.5 percent CO_2 or 0_2.
(vi)	Calibration Drift (2-hour)**	Less than or equal to 0.4 percent CO_2 or 0_2.
(vii)	Calibration Drift (24-hour)**	Less than or equal to 0.5 percent CO_2 or 0_2.

(3) The monitoring system shall be operated according to the following standards:

(A) Calibration gases shall meet the following criteria:

(i) For gaseous air contaminant monitors, the mixture shall be certified to be within 2 percent of the stated value.

(ii) For carbon dioxide and oxygen monitors, the mixture shall be certified to be within 0.2 percent carbon dioxide or oxygen of the stated value. Ambient air may be used for oxygen monitors if the span is higher than 21 percent oxygen.

(B) Zero gases used shall meet the following criteria:

(i) For gaseous air contaminant monitors, the gas shall be certified by the manufacturer to contain less than 1 part per million of the air contaminant (except carbon monoxide, less than 10 parts per million), or alternately, ambient air may be used.

(ii) For carbon dioxide and oxygen monitors, the gas shall be certified by the manufacturer to contain less than 100 parts per million of carbon dioxide or oxygen.

(C) Every six months, calibration gases shall be reanalyzed by the National Bureau of Standards procedures.

(D) Calibration checks shall be performed at least once each day at regular intervals.

(E) The instrument full scale reading shall be equivalent to approximately 200 percent of the concentration limit specified in the applicable rule, or at a value approved by the Executive Officer. Oxygen and carbon dioxide instruments full scale readings shall be such that the full range of concentrations encountered can be measured.

(F) Regular scheduled maintenance of the monitoring system shall be deferred until the report required under Section (e)(2) is made, if the system is measuring a concentration equal to or exceeding the emission standard, and if such deferral will not reasonably be expected to result in damage to the system.

(G) The monitoring system shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording), for each successive 15-minute period.

(H) The requirements of section (c)(3)(G) shall not apply to the following conditions:

(i) Regular calibration checks of the system.
(ii) Routine maintenance and repair of 60 minutes or less duration.

(4) Following final approval, if significant modifications are made to the system, a demonstration of the ability of the system to operate in accordance with the specifications of (c)(2) may be required at the discretion of the Executive Officer.

(5) Span cell calibration techniques may be employed with in situ monitors, not extracting the gas sample from the stack if the criteria of (c)(2)(A)(ii), (vi) and (vii) can be met and if the use of the cell provides a check of all analyzer internal mirrors and lenses and all electronic circuitry including the source and detector assembly which are normally used in sampling and analysis.

(6) Zero calibration reflector techniques may be employed with in situ monitors, not extracting the gas sample from the stack, if the criteria of (c)(2)(A)(iv) and (v) can be met.

(d) Retention of Records

(1) The records of the data obtained from the recording devices of the stack monitoring system shall clearly indicate concentrations as specified by the Executive Officer. Records shall be maintained by the owner or operator of a monitoring system for a period of at least two years and shall be made available to the Executive Officer upon request.

(2) All records of the occurrence and duration of any start up, shutdown or malfunction, performance test, evaluation, calibration, adjustment and maintenance of the monitoring system as well as calibration gas traceability or span cell specifications documents, shall be retained by the monitoring system operator for a period of at least two years and shall be made available to the Executive Officer upon request.

(e) Reporting

(1) A person operating a stack monitoring system shall provide a summary of the concentration and emission data obtained from such system, as well as any additional information specified by the Executive Officer to evaluate the accuracy and precision of the measurements. The summary shall be submitted monthly to the Executive Officer within 30 days of the end of the month being reported, in the form and manner prescribed by him. The summary shall be available for public inspection at the office of the Air Quality Management District.

(2) A person operating a monitoring system shall report any concentration level in excess of the regulated limit to the Executive Officer within 96 hours after such occurrence in the form and manner prescribed by him. The report shall include the following information:

(A) Time intervals, date, and magnitude of the excess concentration level; nature and cause of the excess (if known), corrective actions taken and preventive measure adopted.

(B) Averaging period used for data reporting shall correspond to the averaging period specified in the rule governing the concentration limit in question.

(3) Reports of Monitoring System Failure or Shutdown

(A) A person operating a monitoring system shall notify the Executive Officer within 96 hours, in a form and manner prescribed by him, in the event of a system failure or shutdown for repair, which exceeds 60 consecutive minutes. Zero and calibration checks and routine maintenance do not require reporting.

(B) In the case of a monitoring system failure or shutdown for repair, compliance with the provisions of subsection (a) is waived for a period not to exceed 96 consecutive hours. Such waiver is extended beyond 96 consecutive hours only if a petition for an interim variance is filed in accordance with Regulation V and shall terminate at the time the Hearing Board acts upon such variance petition.

(f) Exemption

Any source subject to the provisions of (a)(1) above may obtain an exemption from the provisions of (a)(1) above upon demonstration to the satisfaction of the Executive Officer that the source is not subject to a District rule or regulation prohibiting or limiting the discharge of any air contaminants which are the subject of (a)(1).

(g) Definitions

(1) CALIBRATION is an operating condition of the monitoring system whereby the system is accurately recording the concentration of the specific air contaminant or diluent gas as evidenced by calibration checks, achieved by periodic manual or automatic adjustment.

(2) CALIBRATION CHECK is a procedure to determine the response of the system to a given gaseous compound concentration by means of injecting a certified

calibration gas mixture into the system, or the insertion of a span cell into the internal light path of the analyzer.

(3) CALIBRATION DRIFT** is the change in the monitoring system output over a stated time period of normal continuous operation when the air contaminant or diluent gas concentration at the time of the measurements is the same known upscale value, or simulated to be the same upscale value by use of a span cell.

(4) CALIBRATION ERROR** is the difference between the air contaminant or diluent gas concentration indicated by the monitoring system and the known concentration of the span gas or the equivalent rating of the span cell.

(5) CALIBRATION GAS is a mixture of the air contaminant gas, or carbon dioxide or oxygen in a diluent gas, which, when periodically introduced into the monitoring system, is used to check that system's accuracy.

(6) CERTIFIED GAS MIXTURE is a mixture analyzed, by replicate samples, by the manufacturer by referring to National Bureau of Standards Reference Materials, such that a statement of the precision of the analysis can be made.

(7) DILUENT GAS is a gas present in a calibration gas mixture or in the emissions from a source which is present in quantities significantly larger than the air contaminant.

(8) NINETY-FIVE PERCENT CONFIDENCE INTERVAL is the statistically determined range within which there is a 95 percent probability all values determined will lie.

(9) OPERATIONAL PERIOD is a minimum period of time during which the monitoring system shall operate, according to the performance and equipment specifications, without unscheduled maintenance, repair, or adjustment.

(10) PARTS PER MILLION is a volume concentration measurement, indicating the volumetric quantity of the gas in question, dispersed in one million volumes of gas mixture, reported on a dry basis.

(11) REFERENCE METHOD is the official test method employed by the District to determine compliance with the rules.

(12) RELATIVE ACCURACY is the degree of correctness with which the monitoring system yields the value of gas concentration of a sample relative to the value given by the reference method or to the allowed concentration. This accuracy is expressed in terms of error, which is the absolute value of the mean of the differences between the pared concentration measurements plus the absolute value of the 95 percent confidence interval. It is expressed as a percentage of the mean reference method value or of the allowed concentration. When a rule requires a correction of the air contaminant concentration to a specific O_2 or CO_2

concentration, the relative accuracy requirement shall apply to the corrected concentration value.

(13) RESPONSE TIME is the time interval from a step change in the air contaminant or gas diluent concentration at the input to the monitoring system to the time at which 95 percent of the corresponding final value is reached as displayed on the monitoring system data recorder.

(14) ROUTINE MAINTENANCE is an operation, recommended by the manufacturer, to be performed at specified intervals, to preclude system failure. Repairs to a malfunctioning system are excluded from this definition.

(15) SPAN CELL is a sealed cell of fixed length, containing a known concentration of an air contaminant, which is inserted into the internal light path of the analyzer to provide a measurement output that corresponds to a known concentration of that air contaminant.

(16) STACK MONITORING SYSTEM, or MONITORING SYSTEM, is the total equipment required for the determination of concentrations of air contaminants and diluent gases in a source effluent. The system consists of three major subsystems:

(A) Sampling Interface - that portion of the monitoring system that performs one or more of the following operations: delineation, acquisition, transportation, and conditioning of a sample of the source effluent or protection of the analyzer from the hostile aspects of the sample or source environment.

(B) Analyzer

(i) Air Contaminant Analyzer - that portion of the monitoring system that senses the air contaminant and generates a signal output that is a function of the concentration of that gas.

(ii) Diluent Analyzer - that portion of the monitoring system that senses the concentration of oxygen or carbon dioxide and generates a signal output that is a function of the concentration of that gas. This subsystem is required only for sources noted in a (a)(1)(A).

(C) Data Recorder - that portion of the monitoring system that provides a permanent record of the output signal in terms of concentration units, including additional equipment such as computers required to convert the original recorded value to any value required for reporting.

(17) SYSTEM FAILURE occurs anytime the monitoring system is suspected or known to be unable to meet the requirements of (c)(2) or (b)(2), as applicable.

(18) USE FACTOR is the amount of time used per year divided by the amount of time available for use per year, expressed as a percent.

(19) ZERO CALIBRATION REFLECTOR is a device which is inserted into the internal light path of the analyzer to provide a measurement output that simulates a zero gas concentration.

(20) ZERO DRIFT** is the change in the monitoring system over a stated period of time of normal continuous operation when the air contaminant or diluent gas concentration at the time of the measurements is zero, or is simulated to be zero by use of a zero calibration reflector.

(21) ZERO GAS is a gas containing less than a specified amount of the air contaminant or diluent gas which, when periodically injected into the monitoring system, is used to check that system's response to the absence of the air contaminant or diluent gas.

*The operational period test performed prior to final approval shall be preceded by a 168 hour (minimum) conditioning period during which the system shall be operated without unscheduled maintenance, repair, or adjustment.

**Expressed as the sum of the mean value plus the 95 percent confidence interval of a series of tests.

[SIP: Approved 7/6/82, 47 FR 29231, 40 CFR 52.220(c)(103)(xviii)(A); Approved 9/28/81, 46 FR 47451, 40 CFR 52.220(c)(65)(ii); Approved _____, _____, 40 CFR 52.220(c)(42)(xiv)(A); Approved 9/8/78, 43 FR 40011, 40 CFR 52.220(c)(39)(iii)(C)]

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