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## RULE 431.1

### Sulfur Content of Gaseous Fuels

#### (A) General

##### (1) Purpose

- (a) The purpose of this rule is to reduce sulfur oxides (SO<sub>x</sub>) emissions from the burning of gaseous fuels in stationary equipment.

##### (2) Applicability

- (a) The provisions of this rule shall apply to any burning, transferring, selling or the offering for sale of any gaseous fuels containing sulfur compounds in excess of 16 parts per million by volume (ppmv), calculated as hydrogen sulfide (H<sub>2</sub>S), in stationary equipment requiring a Permit to Operate (PTO) by the Antelope Valley Air Quality Management District (District).

#### (B) Definitions

- (1) “Air Pollution Control Officer” (APCO) – The person appointed to the position of Air Pollution Control Officer of the District pursuant to the provisions of California Health & Safety Code §40750, and his or her designee.
- (2) “Authority to Construct Permit” (ATC) – A District permit required pursuant to the provisions of District Rule 201 which must be obtained prior to the building, erecting, installation, alteration or replacement of any Permit Unit. Such permit may act as a temporary PTO pursuant to the provisions of District Rule 202.
- (3) Burn – To combust any gaseous fuel, whether for useful heat or by incineration without heat recovery, except for flaring of emergency vent gases.
- (4) “California Air Resources Board” (CARB) – The California State Air Resources Board the powers and duties of which are described in Part 2 of Division 26 of the California Health & Safety Code (commencing with section 39500).
- (5) Continuous Emission Monitoring System (CEMS) – A system of equipment that continuously measures and records all parameters necessary to directly determine

concentrations and/or mass emissions of selected pollutants, and which meets all of the requirements of Attachment A, Section II.

- (6) Continuous Fuel Gas Monitoring System” (CFGMS) – A system of equipment that continuously measures and records total sulfur concentration in the gaseous fuel prior to burning, and which meets all the requirements of Attachment A, Section I.
- (7) “Continuous Monitor” – a CEMS or CFGMS.
- (8) Daily Average – An arithmetic mean of all of a facility’s sulfur compounds readings within a calendar day obtained according to the guideline specified in Attachment A.
- (9) “District” – The Antelope Valley Air Quality Management District, the geographical area of which is described in District Rule 103.
- (10) Emergency Vent Gas – Any gas released from a process unit as a result of any process upset or breakdown.
- (11) Gaseous Fuel – Any gaseous material which releases heat when burned including, but not limited to, any natural, refinery, field produced, process, synthetic, landfill, sewage digester, or waste gases with a gross heating value of 2670 kilocalories per cubic meter (300 BTU per cubic foot) or higher, at standard conditions.
- (12) Landfill Gas – Any gas derived through any biological process from the decomposition of organic waste buried within a waste disposal site.
- (13) Monthly Weighted Average Sulfur Content – The result of the summation of average daily sulfur contents of the fuel(s) consumed multiplied by the average daily consumption rates of the fuel(s) consumed in any month divided by the total gaseous fuel consumption rate for that month.
- (14) Natural Gas – A mixture of gaseous hydrocarbons, with at least 80 percent methane (by volume), and of pipeline quality, such as the gas sold or distributed by any utility company regulated by the California Public Utilities Commission.
- (15) “Permit to Operate” (PTO) – A District permit required pursuant to the provisions of District Rule 203 which must be obtained prior to operation of a Permit Unit. An ATC may function as a temporary PTO pursuant to the provisions of District Rule 202.
- (16) Refinery Gas – Any combustible gaseous by-product generated from a petroleum refinery process unit operation, with a gross heating value of 2670 kilocalories per cubic meter (300 BTU per cubic foot) or higher, at standard conditions.

- (17) Sewage Digester Gas – Any gas derived from anaerobic decomposition of organic sewage within its containment.
- (18) “South Coast Air Quality Management District” – The air quality district created pursuant to Division 26, Part 3, Chapter 5.5 of the California Health & Safety Code (commencing with §40400).
- (19) Standard Conditions – The atmospheric state where the temperature is 60°F and barometric pressure is 14.7 pounds per square inch absolute.
- (20) Stream Day – Any day or part of a day when a facility or a process unit is in operation.
- (21) “United States Environmental Protection Agency” (USEPA) - The United States Environmental Protection Agency, the Administrator of the USEPA and his or her authorized representative.

(C) Requirements

- (1) Natural gas

A person shall not sell or offer for sale for use in the jurisdiction of the District natural gas containing sulfur compounds, calculated as H<sub>2</sub>S, in excess of 16 parts per million by volume (ppmv).

- (2) Other Gaseous Fuels

A person shall not burn in equipment requiring a PTO, purchase, transfer, sell or offer for sale for use in the jurisdiction of the District, any gaseous fuel containing sulfur compounds, calculated as H<sub>2</sub>S, in excess of the concentration limits as measured over the averaging periods for various gaseous fuels as specified in Table 1.

TABLE 1

| Fuel Type           | Sulfur Limits ppmv | Averaging Periods      |
|---------------------|--------------------|------------------------|
| Refinery Gas        | 40                 | 4 hrs                  |
| Landfill Gas        | 250                | Daily                  |
| Sewage Digester Gas | 40 or              | Daily or               |
|                     | 40 and 500         | Monthly and 15-minutes |
| Other Gases         | 40                 | 4 hrs                  |

(3) Previously Exempt or Previously Compliant Facilities

A person burning gaseous fuel containing sulfur compounds in excess of the limits specified in Table 1 and whose facility had been previously exempt from this rule pursuant to subsection (G)(6); or any person who, without the use of any sulfur removal or control system, had been previously in compliance with the limits specified in Table 1, shall:

- (a) Submit for approval by the APCO within 30 days from the time of exceedance or non-compliance, a plan to demonstrate compliance with the requirements of the rule;
- (b) Submit to the APCO an application for a fuel gas control system within six months of the time of exceedance of the exemption criteria specified in subsection (G)(6), or non-compliance with the limit;
- (c) Demonstrate compliance with the limit specified in Table 1 no later than 18 months after the time of exceedance; and
- (d) Comply with subsections (D)(1) and (D)(2), or (D)(3).

(D) Monitoring Requirements

- (1) Except as provided in subsection (D)(3), a person burning gaseous fuels, other than exclusively natural gas, in stationary equipment requiring a PTO by the District shall have a properly operating continuous fuel gas monitoring system (CFGMS) to determine the sulfur content, calculated as H<sub>2</sub>S, of the fuel gas prior to burning, or a continuous emission monitoring system (CEMS) to determine SO<sub>x</sub> emissions after burning. All continuous monitors, require District approval, which shall be based on the requirements as specified in Attachment A.
  - (a) A person shall install the CFGMS upstream of any mixing of refinery gases with natural gas, propane or other fuels.
  - (b) A person subject to subsection (C)(3) of this rule shall comply with subsections (D)(1) and (D)(2) no later than twelve months after the date an ATC is issued by the District for a sulfur removal system or comply with subsection (D)(3).
  - (c) Compliance with the Table 1 sulfur limits shall be determined based on readings obtained from an approved Continuous Monitor.
- (2) A person installing a Continuous Monitor shall submit to the District for approval, a quality assurance procedure as specified in USEPA 40 CFR Part 60, Appendix F, Procedure 1 for CEMS and, as applicable, for CFGMS.

- (a) The quality assurance procedure specified above shall be submitted to the District for written approval by the APCO prior to the CFGMS or CEMS final certification.
- (b) Any CFGMS or CEMS deemed to be out of control, as specified in Attachment A, according to the facility quality assurance procedure approved by the APCO shall be corrected within 72 hours.
  - (i) The person operating the CFGMS or CEMS shall notify the APCO by telephone or facsimile of any breakdown(s) of the monitoring systems if the duration of the breakdown is in excess of 60 minutes or if there are three (3) or more breakdowns in any one day within 24 hours of the occurrence of the breakdown which triggers notification. Such report shall identify the time, location, equipment involved, and contact person.
  - (ii) The person who complies with the provisions of subsection (D)(2)(b)(i) and subsection (E) (3) shall not be considered in violation of this rule for the 72 hour period of breakdown provided that the breakdown did not result from operator error, neglect or improper operation or maintenance procedures.
- (3) A person burning landfill gas or sewage digester gas, or who is subject to subsection (C)(3) of this rule may use an alternative monitoring method, in lieu of the requirements in subsections (D)(1) and (D)(2), that ensures compliance with the daily total sulfur content limitation as specified in Table 1. Alternative monitoring methods shall not be used unless first approved in writing by the APCO, the California Air Resources Board (CARB), and the Regional Administrator of the Environmental Protection Agency (EPA), Region IX, or their designees.
  - (a) At a minimum, the alternative monitoring method shall meet the guidelines of Attachment A, Section III.
  - (b) A person subject to subsection (C)(3) of this rule shall submit an alternative monitoring method for approval no later than 45 days after the date an ATC for a sulfur removal system is issued.
  - (c) All monitoring must comply with the approved alternative monitoring method.
  - (d) District personnel shall use the approved alternative monitoring method to determine compliance with the limits of this rule.

## (E) Reporting and Recordkeeping Requirements

- (1) All records required by this rule shall be maintained at the facility for at least five (5) years, and be made available to District staff upon request.
- (2) Except at electric utility generating facilities and refineries, a person burning gaseous fuel, other than exclusively natural gas, in stationary equipment requiring a PTO, shall submit to the APCO annual reports of the monthly fuel consumption and the total sulfur content of the fuel consumed. The annual report shall be submitted no later than 60 days following the end of the reporting year, and shall consist of the amount of any gaseous fuel consumed monthly, the applicable hourly, daily or monthly average sulfur content as determined by the Continuous Monitor or approved alternative monitoring method as specified in subsections (D)(1), (D)(2), or (D)(3) of this rule, and total SO<sub>x</sub> emissions, calculated as SO<sub>2</sub>.
- (3) A person burning gaseous fuel in stationary equipment located at electric utility generating facilities or refineries shall submit to the APCO monthly reports of the daily fuel consumption, the monthly weighted average sulfur content (except for natural gas), and the maximum four (4)-hour average sulfur content of the fuel consumed, as determined by the device specified in subsection (D)(2) of this rule and the total SO<sub>x</sub> emissions, calculated as SO<sub>2</sub>. The report shall be submitted no later than 30 days following the end of the reporting month.
- (4) The person operating a continuous monitor shall keep records as specified in clause (D)(2)(b)(i) for monitor breakdown (s)

## (F) Test Methods

The following may be used by the APCO to verify compliance with the provisions of this rule:

- (1) For determination of compliance with sulfur content requirements of section (C):
  - (a) The reference method for determining the concentration of sulfur compounds in a gaseous fuel, calculated as H<sub>2</sub>S, shall be South Coast Air Quality Management District (SCAQMD) Method 307-91 - Determination of Sulfur in a Gaseous Matrix, or any other method demonstrated by the applicant to be equivalent and approved in writing by the APCO, the CARB, and the Regional Administrator of the EPA, Region IX, or their designees, or

- (b) Data obtained from a continuous monitor, which is required to be installed and properly operated according to section (D) and as approved by the APCO pursuant to the requirements specified in Attachment A.
- (2) The gross heating value of gaseous fuels shall be determined by ASTM Method D 3588-91 or, if applicable, ASTM Method D 4891-89.
- (3) The methane content of gaseous fuels shall be determined by ASTM Method D 1945-81.

## (G) Exemptions

Unless otherwise specified, and provided that the person seeking the exemption supplies proof and verification upon request of applicable criteria to the satisfaction of the APCO, the provisions of this rule shall not apply to the following:

- (1) A person selling, for use in the jurisdiction of the District, any gaseous fuel not complying with subsections (C)(1) and (C)(3) provided that:
  - (a) The gaseous fuel is delivered directly to a sulfur removal unit which is in full operation and which reduces the sulfur content to the limits specified in subsections (C)(1) and (C)(3);
  - (b) The seller notifies the APCO prior to any such sale of the quantity, heating value, and composition of the gaseous fuel to be sold; and
  - (c) The buyer has an approved ATC and/or PTO for the sulfur removal unit that will be used to treat the purchased gas.
- (2) Gaseous fuels containing sulfur used in the production of sulfur or sulfur compounds.
- (3) Waste gases being burned provided that:
  - (a) The gross heating value of such gases is less than 2670 kilocalories per cubic meter (300 British Thermal Units per cubic foot) at standard conditions; and
  - (b) Any supplemental fuel used to burn such waste gases does not contain sulfur or sulfur compounds in excess of the amount specified in this rule.
- (4) Gases vented to a control system pursuant to District Rule 1173.
- (5) Gases vented intermittently to fuel gas or waste disposal system from pressure control valves, sight glasses, compressor bottles, sampling systems, and pump and compressor case vents.

- (6) Any facility which emits less than five (5) pounds per day total sulfur compounds, calculated as H<sub>2</sub>S, from the burning of gaseous fuels other than natural gas. Emissions of total sulfur compounds shall be measured based on fuel analysis, using the test method specified in subsection (F)(1), and the maximum daily gaseous fuel consumption. This exemption shall not apply to the requirement of subsection (C)(1).
- (7) A person is exempt from the requirements of subsection (D)(1) if the person demonstrates to the satisfaction of the APCO that the supplier of the gaseous fuel has complied with the requirements of section (D) for such fuel.
- (8) On or after July 1, 1997, a person previously in compliance with the limits specified in Table 1 of this rule shall be exempt from the requirements of subsection (C)(3) provided that: the alternative monitoring method pursuant to section (D) yields no more than three individual readings in a calendar year in excess of the limits specified in Table 1; that no single reading exceeds a fuel sulfur limit by 25 percent; and that the sampling frequency is no longer than once per week.

See SIP Table at <http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=921>



## ATTACHMENT A

### SECTION I REQUIREMENTS FOR CONTINUOUS FUEL GAS MONITORING SYSTEM (CFGMS)

A continuous fuel gas monitor used for determining the sulfur content of any gaseous fuel shall:

- (1) Continuously monitor and record the concentration by volume (dry basis) of sulfur compounds in ppmv as H<sub>2</sub>S in the gaseous fuel.
- (2) Have the span value of the monitor set so that all readings fall between 20 and 95 percent of scale.
- (3) Check for calibration drift of the monitoring system at least once daily (approximately 24-hr interval) at two concentrations, one high level and one low level. Whenever the daily high level or low level calibration drift exceeds 5% of analyzer full scale span, the monitoring system shall be deemed to be out of control and subject to the requirements of subsection (D)(2)(b) of this rule.
- (4) Determine the relative accuracy of the monitor which shall be no greater than 20 percent of the mean value of the reference method test data.
- (5) Be able to record negative values of zero drift.
- (6) Report the concentration of the sulfur compounds calculated as H<sub>2</sub>S.

### SECTION II REQUIREMENTS FOR CONTINUOUS EMISSIONS MONITORING SYSTEMS (CEMS)

A stack CEMS used for monitoring the sulfur dioxide emissions from the burning of any gaseous fuel shall:

- (1) Continuously monitor and record the concentration by volume (dry basis, zero percent excess air) of sulfur compounds in ppmv as SO<sub>2</sub> emitted into the atmosphere;
- (2) Include either an oxygen monitor for correcting the data for excess air or a fuel gas and exhaust gas flowmeter for the determination of mass emissions;
- (3) Have the span value of all the monitors set so that all readings fall between 20 and 95 percent, for four-hour and daily averages, and between 10 and 95 percent, for monthly averages, of full scale;
- (4) When using an oxygen monitor for the correction of excess air, be able to measure a sulfur compound concentration emission limit of 5 ppm (dry basis, zero percent excess air), which is stoichiometrically equivalent to the limit of sulfur compound content of 40 ppm calculated as hydrogen sulfide in the gaseous fuels;
- (5) Use District Methods 100.1 or 6.1 (as applicable for sulfur compound analysis) and SCAQMD Method 3.1 (for oxygen content analysis), or SCAQMD Method 2.1 (for flowrate determination), whichever is applicable, or any other methods demonstrated by

the applicant to be equivalent and approved in writing by the APCO and the CARB, and the Regional Administrator of the EPA, Region IX, or their designees, for conducting the relative accuracy evaluations. The relative accuracy limit shall be 1 ppm and zero drift (2-hour and 24-hour) and calibration drift (2-hour and 24-hour) limits for sulfur compounds monitor shall be 5 percent of the span range; and

- (6) Check for calibration drift of the monitoring system at least once daily (approximately 24-hr interval) at two concentrations, one high level and one low level. Whenever the daily high level or low level calibration drift exceeds 5% of analyzer full scale span, the monitoring system shall be deemed to be out of control and subject to the requirements of subsection (D)(2)(b) of this rule.
- (7) Facilities burning fuel gas subject to this rule shall comply with the requirements of Rule 218 and 218.1(proposed) except where specific requirements have been incorporated into this rule.

SECTION III –  
GUIDELINES FOR APPROVAL OF  
ALTERNATIVE MONITORING PLAN  
BY THE APCO

In lieu of a continuous fuel gas monitoring system (CFGMS) or a continuous emission monitoring system (CEMS), a person subject to this rule may submit an alternative monitoring plan to the APCO, the California Air Resources Board (CARB), and the Regional Administrator of the Environmental Protection Agency (EPA), Region IX, or their designees. for their review and decision.

- (1) A test program to determine the correlation between H<sub>2</sub>S and total sulfur in the fuel gas using SCAQMD Method 307-91. If a correlation is established, a colorimetric test, or other alternative method approved by the APCO as being equivalent or better in establishing such correlation, may be conducted regularly to determine total sulfur using H<sub>2</sub>S as a surrogate.
- (2) An error analysis between colorimetric, or other approved alternative method readings and the total reduced sulfur analysis obtained from SCAQMD Method 307-91. To demonstrate equivalency between the two methods of analyses, the relative accuracy shall not exceed 20 percent of average SCAQMD Method 307-91 readings.
- (3) A schedule for a daily or more frequent analysis of the fuel gas for H<sub>2</sub>S using the colorimetric test, or other approved alternative method, and a minimum weekly analysis of the fuel gas using SCAQMD Method 307-91. A different frequency of analysis may be used if the APCO determines that such frequency will ensure compliance with the daily total sulfur limits of this rule.
- (4) When the sulfur level is suspected to be at or above the sulfur content requirements of Table 1 as determined by the colorimetric or other alternative method, a procedure to obtain at minimum a daily sample to be tested according to SCAQMD Method 307-91 until three consecutive daily samples show that total sulfur is below the sulfur content requirements of Table 1.