

CONTROL OF SULFUR DIOXIDE
§§112.1-112.21, 112.31-112.34, 112.41, 112.43, 112.45, 112.47,
112.51, 112.53, 112.55, 112.57, 112.59
Effective July 16, 1997

§112.1. Definitions.

Unless specifically defined in Section 382.003 of the Texas Clean Air Act (TCAA) or in the rules of the Board, the terms used by the Board have the meanings commonly ascribed to them in the field of air pollution control. In addition to the terms which are defined by the TCAA, the following terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise.

Continuous emissions monitoring - sampling, analyzing, and recording at least one measurement of sulfur dioxide concentration in each 15-minute period from the effluent of each affected process or the emission control system serving each affected process.

Effective stack height - a value in feet calculated by the following equation:

$$He = H + 0.083 Ve De \left[1.5 + 0.82 \left(\frac{Te - 550}{Te} \right) \right] De$$

Where:

- He = Effective stack height in feet
- H = Physical stack height above ground level in feet
- Ve = Stack exit velocity in feet per second
- De = Stack exit inside diameter in feet
- Te = Stack exit temperature in degrees Rankine

In-stack concentration - the concentration of a pollutant inside the stack measured in parts per million by volume (ppmv) referenced at 0% stack gas oxygen on a dry basis averaged over a period of one hour with oxygen determined by the equation:

$$Ci = 20.9 Cx / (20.9 - Co)$$

Where:

- Ci = in-stack pollutant concentration corrected for 0% oxygen in ppmv
- 20.9 = % of oxygen in the air
- Cx = measured pollutant concentration
- Co = % dry oxygen measured in the stack

Short-stack reduction factor - the factor by which the allowable emission rate must be multiplied if the source has an effective stack height less than the standard effective stack height. The short-stack reduction factor is calculated by the following equation:

$$\text{Short-stack reduction factor} = \left(\frac{H_e}{H_s} \right)^2$$

Where:

He = Effective stack height
Hs = Standard effective stack height

Secondary metal recovery facility - a facility which recovers metals and alloys from new and used scrap and dross. It does not mean assembling, sorting, and breaking up scrap metal, without smelting and refining.

Adopted September 18, 1992

Effective October 23, 1992

§112.2. Compliance, Reporting, and Recordkeeping.

(a) When requested under §101.8(a) of this title (relating to Sampling), a facility that is subject to the sulfur dioxide (SO₂) limits of this chapter shall demonstrate compliance by Method 6, 6A, or 6C as described in 40 CFR, Part 60, Appendix A. Any person affected by this subsection may request approval by the Executive Director of the Texas Air Control Board (TACB) and by the U.S. Environmental Protection Agency of alternative test methods, including sampling and analysis of fuel or raw material feedstock, as described in Method 19 of 40 CFR, Part 60, Appendix A, to determine compliance.

(b) A facility that is required to demonstrate compliance with SO₂ emission limits under this chapter shall report the results so obtained, when requested, to the appropriate regional office of the TACB within a reasonable time specified by and on forms furnished by the Executive Director.

(c) A facility that is required to demonstrate compliance with SO₂ emission limits under this chapter shall maintain records on site of any SO₂ emissions data, fuel sampling data, or sampling data of fuel oil used as raw material for two years. These records shall be available for inspection by federal, state, or local air pollution control agencies.

Adopted September 18, 1992

Effective October 23, 1992

§112.3. Net Ground Level Concentrations.

(a) Except as specified in subsections (b) or (c) of this section or §112.4 of this title (relating to Net Ground Level Concentration - Exemption Conditions), no person in the State of Texas may cause, suffer, allow, or permit emissions of sulfur dioxide (SO₂) from a source or sources operated on a property or

multiple sources operated on contiguous properties to exceed a net ground level concentration of 0.4 part per million by volume (ppmv) averaged over any 30-minute period.

(b) No person in Galveston or Harris County may cause, suffer, allow, or permit emissions of SO₂ from a source or sources operated on a property or multiple sources operated on contiguous properties to exceed a net ground level concentration of 0.28 ppmv averaged over any 30-minute period.

(c) No person in Jefferson or Orange County may cause, suffer, allow, or permit emissions of SO₂ from a source or sources operated on a property or multiple sources operated on contiguous properties to exceed a net ground level concentration of 0.32 ppmv averaged over any 30-minute period.

Adopted September 18, 1992

Effective October 23, 1992

§112.4. Net Ground Level Concentration - Exemption Conditions.

The Executive Director, in consideration of a request from an affected party, may find that, except in El Paso County, a property or contiguous properties are exempt from the requirements of §112.3(a) of this title (relating to Net Ground Level Concentrations), if the new or modified emission source is constructed and operated on such property or properties under all the following conditions:

(1) The construction and operation of the new or modified emission source meets all applicable federal New Source Performance Standards and uses best available control technology, with consideration to the technical practicability and economic reasonableness of reducing or eliminating the emissions from the facility.

(2) The permit application contains a demonstration using appropriate diffusion modeling, as approved by the U.S. Environmental Protection Agency and the Texas Air Control Board Modeling Division, that the construction and operation of the new or modified emission source does not cause or contribute to a condition such that either the primary or the secondary sulfur dioxide National Ambient Air Quality Standards are exceeded in the area.

(3) Those sources proposed for an exempt property and those sources existing on an exempt property prior to the effective date of this section shall be in compliance with this section or with an area control plan obtained pursuant to §112.19 of this title (relating to Application for Area Control Plan).

Adopted September 18, 1992

Effective October 23, 1992

§112.5. Allowable Emission Rates - Sulfuric Acid Plant Burning Elemental Sulfur.

(a) No person may cause, suffer, allow, or permit emissions of sulfur dioxide (SO₂) from any sulfuric acid plant burning elemental sulfur to exceed the emission limits specified by the equation:

$$E = 0.01983 q$$

Where:

$$\begin{aligned} E &= \text{allowable emission rate in pounds per hour} \\ q &= \text{stack effluent flow rate in standard cubic feet per minute (scfm)} \end{aligned}$$

(b) If a source has an effective stack height less than the standard effective stack height determined by the equation:

$$He = 0.885 q^{0.5}$$

Where:

$$\begin{aligned} He &= \text{standard effective stack height in feet} \\ q &= \text{stack effluent flow rate in scfm} \end{aligned}$$

then, the allowable emission limit in subsection (a) of this section must be reduced by multiplying it by the short-stack reduction factor.

(c) Beginning September 30, 1994, sulfuric acid plants of greater than 300 tons per day production capacity, with production being expressed as 100% acid, and to which this section applies, shall be equipped with a continuous emissions monitoring system (CEMS) for SO₂. The CEMS shall be installed, calibrated, and operated as specified in 40 CFR Part 51, Appendix P, hereby incorporated by reference.

Adopted September 18, 1992

Effective October 23, 1992

§112.6. Allowable Emission Rates - Sulfuric Acid Plant.

(a) Except as provided in §112.5 of this title (relating to Allowable Emission Rates - Sulfuric Acid Plant Burning Elemental Sulfur), and in §112.14 of this title (relating to Allowable Emission Rates - Nonferrous Smelter Processes), no person may cause, suffer, allow, or permit emissions of sulfur dioxide (SO₂) from any sulfuric acid plant to exceed the emission limits specified by the equation:

$$E = 0.0347 q$$

Where:

$$\begin{aligned} E &= \text{allowable emission rate in pounds per hour} \\ q &= \text{stack effluent rate in standard cubic feet per minute (scfm)} \end{aligned}$$

(b) If a source has an effective stack height less than the standard effective stack height determined by the equation:

$$He = 1.17 q^{0.5}$$

Where:

He = standard effective stack height in feet
q = the stack effluent flow rate in scfm

then, the allowable emission limit in subsection (a) of this section must be reduced by multiplying it by the short-stack reduction factor.

(c) Beginning September 30, 1994, sulfuric acid plants of greater than 300 tons per day production capacity, with production expressed as 100% acid, and to which this section applies, shall be equipped with a continuous emissions monitoring system (CEMS) for SO₂. The CEMS shall be installed, calibrated, and operated as specified in 40 CFR Part 51, Appendix P, hereby incorporated by reference.

Adopted September 18, 1992

Effective October 23, 1992

§112.7. Allowable Emission Rates - Sulfur Recovery Plant.

(a) No person may cause, suffer, allow, or permit emissions of sulfur dioxide from any sulfur recovery plant to exceed the emission limits specified for stack effluent flow rates less than or equal to 4,000 standard cubic feet per minute (scfm) as determined by the equation:

$$E = 123.4 + 0.091 q$$

and the emission limits, specified for stack effluent flow rates in excess of 4,000 scfm, as determined by the equation:

$$E = 0.614 q^{0.8042}$$

Where:

E = allowable emission rate in pounds per hour
q = stack effluent flow rate in scfm

(b) If a source has an effective stack height less than the standard effective stack height determined for stack effluent rates less than or equal to 4,000 scfm by the equation:

$$He = 7.4 (123.4 + 0.091 q)^{0.5}$$

and determined for stack effluent rates greater than 4,000 scfm, by the equation:

$$He = 5.8 q^{0.402}$$

Where:

He = standard effective stack height in feet
q = stack effluent flow rate in scfm

then, the allowable emission limit in subsection (a) of this section must be reduced by multiplying it by the short-stack reduction factor.

Adopted September 18, 1992

Effective October 23, 1992

§112.8. Allowable Emission Rates From Solid Fossil Fuel-Fired Steam Generators.

(a) Except as provided in subsection (b) of this section, no person may cause, suffer, allow, or permit emissions of sulfur dioxide (SO₂) from any solid fossil fuel-fired steam generator to exceed 3.0 pounds per million Btu (MMBtu) heat input averaged over a three-hour period.

(b) No person may cause, suffer, allow, or permit emissions of SO₂ from any solid fossil fuel-fired steam generator located in Milam County, which began operation prior to January 1, 1955, to exceed 4.0 pounds per MMBtu heat input averaged over a three-hour period.

(c) Except as provided in subsection (d) of this section, beginning September 30, 1994, solid fossil fuel-fired steam generators of greater than 250 MMBtu heat input per hour which are equipped with SO₂ control equipment shall be equipped with a continuous emissions monitoring system (CEMS) for SO₂. The CEMS shall be installed, calibrated, and operated as specified in 40 Code of Federal Regulations, Part 51, Appendix P, hereby incorporated by reference.

(d) In lieu of the requirements of subsection (c) of this section, beginning September 30, 1994, sources subject to the Federal Clean Air Act, §412(c) as amended in 1990 shall meet the requirements of §412(c) and the regulations promulgated thereunder.

Adopted June 25, 1997

Effective July 16, 1997

§112.9. Allowable Emission Rates - Combustion of Liquid Fuel.

(a) No person may cause, suffer, allow, or permit emissions of sulfur dioxide (SO₂) from any liquid fuel-fired steam generator, furnace, or heater to exceed 440 parts per million by volume (ppmv) at actual stack conditions and averaged over a three-hour period.

(b) If a source has an effective stack height less than the standard effective stack height as determined from the equation:

$$He = 0.49 q^{0.50}$$

Where:

He = standard effective stack height in feet
q = stack effluent flow rate in standard cubic feet per minute

then, the allowable emission concentration must be reduced by multiplying it by the short-stack reduction factor.

(c) No later than July 31, 1993, no person in Harris or Jefferson County may cause, suffer, allow, or permit the use of liquid fuel for combustion from any stationary liquid fuel-fired steam generator, furnace, or heater with a sulfur content greater than 0.3% by weight or emissions of SO₂ from any liquid fuel-fired steam generator, furnace, or heater to exceed 150 ppmv, as calculated based on 20% excess air and as averaged over a three-hour period. The requirements of this subsection are not intended to apply to sulfuric acid plants.

(d) Except as provided in subsection (e) of this section, beginning September 30, 1994, liquid fossil fuel-fired steam generators of greater than 250 MMBtu heat input per hour which are equipped with SO₂ control equipment shall be equipped with a continuous emissions monitoring system (CEMS) for SO₂. The CEMS shall be installed, calibrated, and operated as specified in 40 CFR Part 51, Appendix P, hereby incorporated by reference.

(e) In lieu of the requirements of subsection (d) of this section, beginning September 30, 1994, sources subject to §412(c) of the Federal Clean Air Act as amended in 1990 shall meet the requirements of §412(c) and the regulations promulgated thereunder.

Adopted September 18, 1992

Effective October 23, 1992

§112.10. Reserved.

Adopted September 18, 1992

Effective October 23, 1992

§112.11. Reserved.

Adopted September 18, 1992

Effective October 23, 1992

§112.12. Reserved.

Adopted September 18, 1992

Effective October 23, 1992

§112.13. Reserved.

Adopted September 18, 1992

Effective October 23, 1992

§112.14. Allowable Emission Rates - Nonferrous Smelter Processes.

(a) This section is applicable to all processes in nonferrous smelters, including, but not limited to, roasters, smelting furnaces, converters, sintering machines, blast furnaces, fuming furnaces, retorts, slag treatment plants, and sulfuric acid plants.

(b) No person may cause, suffer, allow, or permit emissions of sulfur dioxide (SO₂) to the atmosphere from any process as specified in this section to exceed the applicable concentration of SO₂ as follows:

		SO ₂ Parts Per Million by Volume (ppmv) Maximum	
		Two-Hour Average	Three-Hour* Average
(1)	Primary Copper Smelter for all purposes other than those listed below:		650
	(A) Reverberatory Furnace		6,000
(2)	Primary Zinc Smelter	1,000	
(3)	Primary Lead Smelter		
	(A) Sinter Machine Discharge End (provided gases do not pass through Sinter bed),	2,500	
	(B) Sinter Handling Equipment Emission Collecting Systems	2,500	
	(C) All Other Processes	650	
(4)	Other Primary Smelter	2,500	
(5)	Secondary Metal Recovery Facility	3,500	
(6)	Sulfuric Acid Plant		650

*The three-hour standards will be based on a six-hour average until September 30, 1994.

(c) Each stack or emission point in a primary smelter or secondary metal recovery facility shall have a standard effective stack height not less than that determined by the equation:

$$He = K(q)^{0.5}$$

Where:

- He = standard effective stack height in feet
- q = effluent flow rate in standard cubic feet per minute (scfm)
- K = a constant dependent on the type of facility as follows:

<u>Type of Facility</u>	<u>K</u>
Primary Copper Smelter	0.50
Primary Lead Smelter (all processes except Sintering Machine, Discharge End, and Equipment Ventilation)	0.61
Metallurgical Sulfuric Acid Plant	0.61
Primary Zinc Smelter	0.61
Other Primary Smelters	0.90
Primary Lead Smelter Sintering Machine Discharge End and Equipment Ventilation	1.17
Secondary Metal Recovery Facilities	1.17

When two or more gas streams either wholly or in part are discharged through a single stack, the combined flow rate of all streams shall be used to determine the required standard effective stack height. If streams with different SO₂ concentration allowables, as determined in subsection (b) of this section, are combined into a single stream, the required effective stack height is determined as follows:

- (1) Calculate a total combined stream SO₂ concentration allowable as follows:

$$\text{PPM}_t = \frac{(\text{PPM}_1)(\text{SCFM}_1) + (\text{PPM}_2)(\text{SCFM}_2) + \dots + (\text{PPM}_n)(\text{SCFM}_n)}{(\text{SCFM}_1 + \text{SCFM}_2 + \dots + \text{SCFM}_n)}$$

Where:

- PPM_t = Allowable SO₂ concentration in total combined stream, ppmv
- PPM₁ = Allowable SO₂ concentration in stream No.1, ppmv
- PPM₂ = Same as PPM₁ except for stream No. 2
- PPM_n = Same as PPM₁ except for Nth stream
- SCFM₁ = Effluent flow rate of stream No. 1, scfm
- SCFM₂ = Same as SCFM₁ except for stream No. 2
- SCFM_n = Same as SCFM₁ except for Nth stream

(2) Calculate interpolation constant (Kt) for the total combined stream as follows:

$$K_t = \frac{(PPM_t - PPM_x)(K_h - K_x)}{(PPM_h - PPM_x)} + K$$

Where:

Kt = Interpolation constant for use in the following standard effective stack height equation

PPMt = Allowable SO₂ concentration in total combined stream previously calculated and for the stated total ppmv, the other parameters are:

PPMt	PPMx	PPMh	Kx	Kh
650 to 1,000	650	1,000	0.50	0.61
1,000 to 2,500	1,000	2,500	0.61	0.90
>2,500	2,500	3,500	0.90	1.17

(3) Calculate standard effective stack height for total combined stream as follows:

$$H_e = K_t(q)^{0.5}$$

Where:

He = Standard effective stack height in feet

Kt = Interpolation constant calculated previously

q = Total stack effluent flow rate in scfm
 (SCFM1 + SCFM2 + ... SCFMn)

(d) If a stack or emission point has an effective stack height less than the standard effective stack height as determined in subsection (c) of this section, the allowable concentration of SO₂ must be reduced by multiplying it by the short-stack reduction factor.

(e) The owner or operator of a nonferrous smelter shall utilize best engineering techniques to capture and vent fugitive SO₂ emissions through a stack or stacks. Such techniques shall include, but not be limited to, the following:

(1) Operating and maintaining all ducts, flues, and stacks in a leak-free condition.

(2) Operating and maintaining all process equipment and gas collection systems in such a fashion that leakage of SO₂ gases will be prevented to the maximum extent possible.

(3) Collecting SO₂ emissions through the tallest stack or stacks serving the facility, whenever possible, using gas collection systems and/or ducting.

(f) The owner or operator of any primary smelter subject to the provisions of this section shall install, calibrate, maintain, and operate a measurement system or systems approved by the Executive Director for continuously monitoring SO₂ emissions in the effluent of each process subject to subsection (a) of this section. The Executive Director shall not require continuous monitoring for sources emitting less than 25 tons per year of SO₂ into the atmosphere.

Adopted September 18, 1992

Effective October 23, 1992

§112.15. Temporary Fuel Shortage Plan Filing Requirements.

(a) Any person may file with the Texas Air Control Board (TACB) a temporary fuel shortage control plan if unable to comply with §112.3 of this title (relating to Net Ground Level Concentrations), §112.9 of this title (relating to Allowable Emission Rates - Combustion of Liquid Fuel), or with any permit requirements, other than those required under Section 111 of the Federal Clean Air Act, which limit sulfur dioxide emissions from any combustion unit solely because of the nonavailability of low sulfur fuels. The plan shall include all of the following:

(1) Evidence of the nonavailability of low sulfur fuels, including, but not be limited to, statements from fuel suppliers which address the availability and prices of lower sulfur fuels and the expected duration of any period of nonavailability of particular fuels. The person filing the plan must annually request and receive an extension from the Executive Director or the plan will automatically expire one year after receipt of the plan by the TACB.

(2) A statement that all emissions inventory data required by the TACB are complete, accurate, and on file with the TACB.

(3) Data for each source within the entire plant that uses the higher sulfur fuel. The data shall include the type, quantity, and sulfur content of all the fuels to be burned, excess air to be used, and the associated sulfur abatement procedure to be used, if any.

(4) Any other information as specified by the Executive Director. The Executive Director may require more frequent and extensive monitoring for persons affected by this section than would normally be required for persons affected by §112.3 and §112.9.

(b) The Executive Director may make an independent determination of a need to operate under the temporary fuel shortage control plan based on the evidence of the nonavailability of low sulfur fuel. This determination/approval shall be effective on the date specified in the Executive Director's written notification of such determination.

(c) The requirements of this section and §112.16 of this title (relating to Temporary Fuel Shortage Plan Operating Requirements), §112.17 of this title (relating to Temporary Fuel Shortage Plan Notification Procedures), and §112.18 of this title (relating to Temporary Fuel Shortage Plan Reporting Requirements) shall also apply to shortages of low sulfur fuel oils where those oils are used as raw material in the production of a saleable product.

Adopted September 18, 1992

Effective October 23, 1992

§112.16. Temporary Fuel Shortage Plan Operating Requirements.

(a) Following the approval of a temporary fuel shortage plan filed pursuant to §112.15 of this title (relating to Temporary Fuel Shortage Plan Filing Requirements), the provisions of a plan will govern the operation of the source with regard to emissions of sulfur dioxide (SO₂) during the periods of low sulfur fuel shortages.

(1) During operation under an approved fuel shortage plan, the source shall continue to comply with the following:

(A) Permit conditions required under Section 111 of the Federal Clean Air Act (FCAA).

(B) The National Ambient Air Quality Standard (NAAQS) for SO₂ or an SO₂ increment for Prevention of Significant Deterioration (PSD) of Air Quality.

(C) Section 112.17 of this title (relating to Temporary Fuel Shortage Plan Notification Procedures).

(2) During operation under an approved fuel shortage plan, the source will be exempt from the following:

(A) Section 112.3 of this title (relating to Net Ground Level Concentrations).

(B) Section 112.9 of this title (relating to Allowable Emission Rates - Combustion of Liquid Fuel).

(C) Existing permit conditions regulating emissions of SO₂, except as specified in subsection (a) subparagraph (1)(A) of this section.

(b) An evaluation of the plan will be made by the applicant using appropriate diffusion modeling, as approved by the U.S. Environmental Protection Agency and the Texas Air Control Board Modeling Section, and following a signed modeling protocol agreement. If the plan can not adequately demonstrate that the burning of higher sulfur fuels will not cause or contribute to a violation of any NAAQS and/or any PSD increment for SO₂, then the person filing the plan shall request that the Governor file a petition for relief under Section 110(f) of the FCAA with the President of the United States.

Adopted September 18, 1992

Effective October 23, 1992

§112.17. Temporary Fuel Shortage Plan Notification Procedures.

Any person who operates a source under a temporary fuel shortage control plan filed pursuant to §112.15 of this title (relating to Temporary Fuel Shortage Plan Filing Requirements), shall comply with the following notification procedures:

(1) The Executive Director and the appropriate local air pollution control agency shall be notified in writing as soon as practicable of a fuel shortage or impending fuel shortage which causes or may cause an excessive emission that contravenes §112.3 of this title (relating to Net Ground Level Concentrations), and §112.9 of this title (relating to Allowable Emission Rates - Combustion of Liquid Fuel), or any permit requirements. The notification shall include an estimate of the expected duration of the fuel shortage.

(2) The Executive Director of the Texas Air Control Board and the appropriate local air pollution control agency shall be notified in writing as soon as practicable of the termination of a fuel shortage which would allow the resumption of operations in compliance with §112.3 and §112.9 and any permit requirements.

Adopted September 18, 1992

Effective October 23, 1992

§112.18. Temporary Fuel Shortage Plan Reporting Requirements.

Any person who files a temporary fuel shortage control plan under §112.15 of this title (relating to Temporary Fuel Shortage Plan Filing Requirements), and operates a source under that plan pursuant to §112.16 of this title (relating to Temporary Fuel Shortage Plan Operating Requirements), and §112.17 of this title (relating to Temporary Fuel Shortage Plan Notification Procedures), must submit to the Texas Air Control Board, on a semi-annual basis, a written report detailing the types, quantity, and sulfur content of fuels burned during the previous six months, the sources at which these fuels were burned, and the dates on which the higher sulfur fuels were burned.

Adopted September 18, 1992

Effective October 23, 1992

§112.19. Application for Area Control Plan.

The owner or operator a source which emits sulfur dioxide (SO₂) may petition the Texas Air Control Board for relief from the requirements of §112.3(a) of this title (relating to Net Ground Level Concentrations), by filing with the Executive Director, an application for an area control plan. An application for an area control plan shall include, but is not limited to, a combination of evidence that best available control technology is being employed at all the affected sources, having due regard for the technical practicability and the economic reasonableness of reducing or eliminating the emissions of SO₂ from the affected source, and an ambient air sampling system to record SO₂ levels in the affected area. Any person who files an application for an area control plan shall demonstrate the capability of all sources in the affected area of the state to maintain all promulgated SO₂ ambient air quality standards.

Adopted September 18, 1992

Effective October 23, 1992

§112.20. Exemption Procedure.

Upon recommendation by the Executive Director, the Texas Air Control Board may enter a board order exempting a source from the requirements of §112.3(a) of this title (relating to Net Ground Level Concentrations), if the owner/operator has filed an application pursuant to §112.19 of this title (relating to Application for Area Control Plan), contingent upon the continued compliance by the owner/operator with the remaining terms of the board order.

Adopted September 18, 1992

Effective October 23, 1992

§112.21. Allowable Emission Rates Under Area Control Plan.

No person or persons who have been issued a board order establishing an area control plan pursuant to §112.20 of this title (relating to Exemption Procedure), may cause or contribute to a condition in which the ambient air quality in the affected areas of the state will exceed 0.5 parts per million by volume of sulfur dioxide averaged over a one-hour period.

Adopted September 18, 1992

Effective October 23, 1992

CONTROL OF HYDROGEN SULFIDE

§112.31. Allowable Emissions - Residential, Business, or Commercial Property.

No person may cause, suffer, allow, or permit emissions of hydrogen sulfide from a source or sources operated on a property or multiple sources operated on contiguous properties to exceed a net ground level concentration of 0.08 parts per million averaged over any 30-minute period if the downwind concentration of hydrogen sulfide affects a property used for residential, business, or commercial purposes.

Adopted December 19, 1973

Effective January 19, 1974

§112.32. Allowable Emissions - Other Property.

No person may cause, suffer, allow, or permit emissions of hydrogen sulfide from a source or sources operated on a property or multiple sources operated on contiguous properties to exceed a net ground level concentration of 0.12 parts per million averaged over any 30-minute period if the downwind concentration of hydrogen sulfide affects only property used for other than residential, recreational, business, or commercial purposes, such as industrial property and vacant tracts and range lands not normally occupied by people.

Adopted December 19, 1973

Effective January 19, 1974

§112.33. Calculation Methods.

(a) Applicability. Determination of the net ground level concentration shall be performed in accordance with the procedures outlined in this section for hydrogen sulfide (H₂S) and §112.32 of this title (relating to Allowable Emissions - Other Property) for sulfuric acid.

(b) Determination of compliance with emission limits. In most cases downwind samples will suffice; however, if the sampled properties are suspected of being influenced by an upwind source of H₂S, then both upwind and downwind samples will be taken. The concentration of H₂S in the "downwind sample" less the concentration in the "upwind sample" shall be used in determining whether the emissions from the property comply with the requirements of §112.31 of this title (relating to Allowable Emissions - Residential, Business, or Commercial Property) and §112.32 of this title (relating to Allowable Emissions - Other Property). Calculated maximum allowable emission rates or ground level concentrations which are obtained by the method in subsection (b) of this section may be used in determining whether a property is in compliance with the emission limits specified.

(c) Calculations of H₂S concentrations from stack samples and measurements. The maximum allowable H₂S emission rate which may be made from a stack on a property to comply with the emission limit set forth in §112.31 of this title (relating to Allowable Emissions - Residential, Business, or Commercial Property) and §112.32 of this title (relating to Allowable Emissions - Other Property) may be calculated by Sutton's equation which has been modified to consider the critical wind speed and to correspond to a 30-minute air sample. Additional credit on stack emissions can be obtained if the distance from the stack to the property line is greater than 30 stack heights. Those properties with greater than 30 stack heights to the property line should contact the Executive Director to obtain the proper correction factor.

(1) For exit stack gas for temperatures of less than 125°F. The following calculations shall be used for exit stack gas for temperatures of less than 125°F:

(A) The H₂S ambient air level is 0.08 parts per million (ppm) for 30 minutes.

$$Q_a = 8 \times 10^{-4} V_s d_s^2 \frac{1}{\dots}$$

$$\left[\frac{d_s}{h_s} \right]^{1.29}$$

(Equation 1)

Where:

- Q_a = emission rate, pounds per hour
- V_s = stack exit velocity, feet per second
- d_s = exit stack diameter, feet
- h_s = physical stack height, feet.

(B) The H₂S ambient air level of 0.12 ppm for 30 minutes.

$$Q_a = 12 \times 10^{-4} V_s d_s^2 \frac{1}{\left[\frac{d_s}{h_s} \right]^{1.29}}$$

(Equation 2)

Symbols same as in equation (1) above.

(C) To plot Graph II, assume a basic stack height of 100 feet and plot

$$\left[\frac{d_s}{100} \right]^{1.29}$$

for various stack diameters versus stack velocity.

(2) For exit stack gas for temperatures greater than 125 °F. The following calculations shall be used for exit stack gas for temperatures greater than 125 °F:

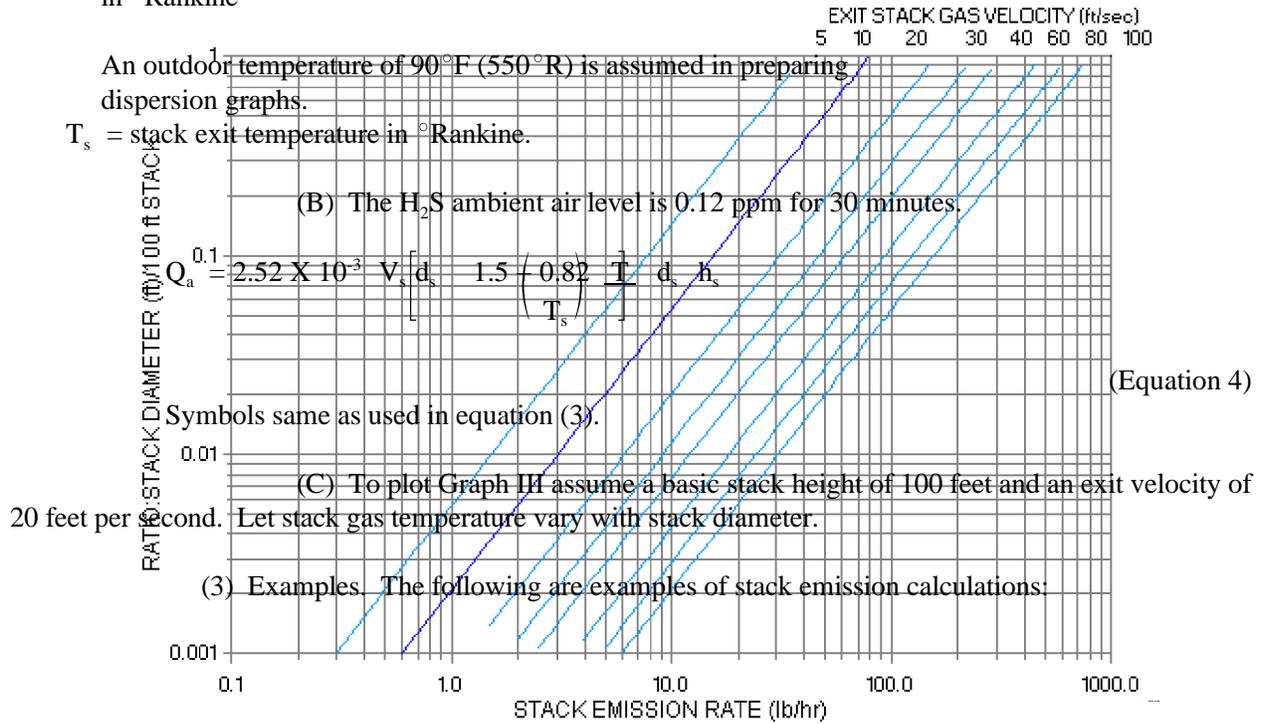
(A) The H₂S ambient air level is 0.08 ppm for 30 minutes.

$$Q_a = 1.68 \times 10^{-3} V_s d_s \left[\frac{T}{T_s} + 0.82 \right] T d_s h_s$$

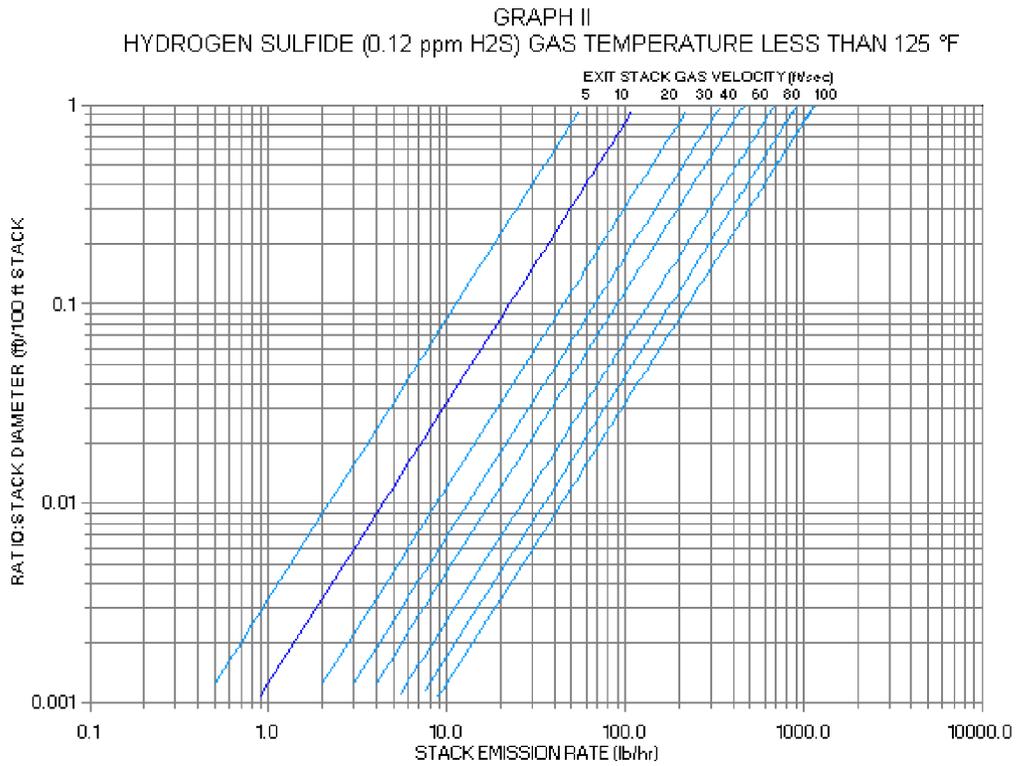
(Equation 3)

Where:

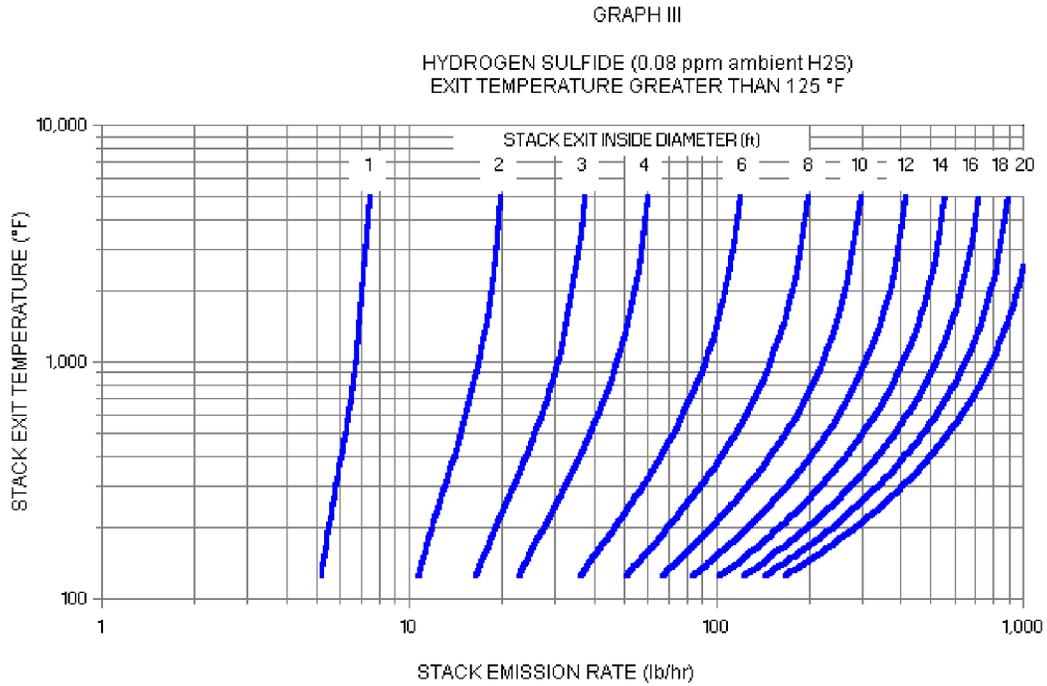
- Q_a = emission rate, pounds per hour
- V_s = stack exit velocity, feet per second
- d_s = exit stack diameter, feet
- T = temperature difference between stack gas and the outdoor atmosphere, in °Rankine



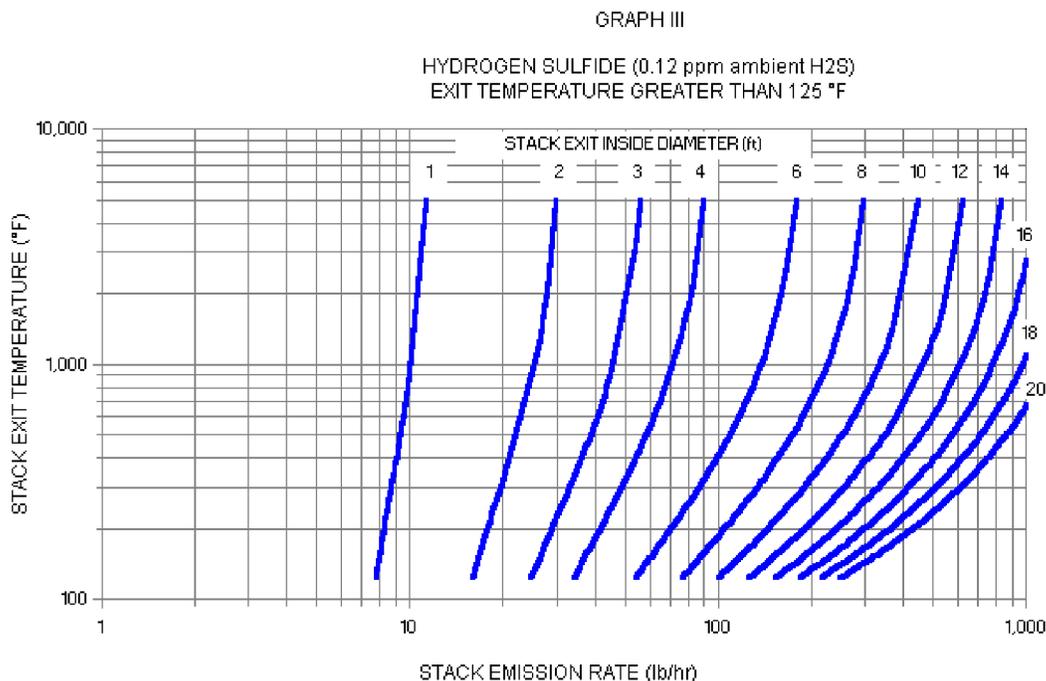
112.33(c)(1)(C) - Part 2



112.33(c)(2)(C) - Part 1



112.33(c)(2)(C) - Part 2



(A) Example 1. (Temperature of stack gas less than 125 °F.) How many pounds per hour of H₂S can be discharged from a 200 feet stack having a 4 feet exit diameter (ID) and a 30 feet per second exit gas velocity? The stack gases temperature is 100 °F and the distance to property line is 3000 feet. Emissions under §112.31 of this title (relating to Allowable Emissions - Residential, Business, or Commercial). Solution:

(i) The ratio of stack diameter to 100 feet is $\frac{4}{100} = 0.04$.

(ii) Enter ordinate of Graph II with 0.04; go horizontally to intersection of 30 feet per second velocity curve. At the intersection read on the abscissa 24 pounds per hour on the scale set forth in §112.31 of this title (relating to Allowable Emissions - Residential, Business, or Commercial). This is the permitted value for a 100 feet stack.

(iii) Correct emissions for a 200 feet stack. Enter Graph I at 200 feet and obtain correction factor of 2.3. Thus the emissions become $24 \times 2.3 = 55$ pounds per hour.

(iv) Note: Less than 30 stack heights to property line - no credit. Figure: 30 TAC §112.33(c)(3)(iv).

(B) Example 2. (Temperature of stack gas greater than 125°F.) How many pounds per hour of H₂S can be discharged from a 200 feet stack having a 4 feet exit diameter (ID) and a 30 feet per second exit gas velocity? The temperature of the exit gases is 400°F. Emissions under §112.31 of this title (relating to Allowable Emissions - Residential, Business, or Commercial). Solution:

(i) Enter ordinate of Graph III with 400; go horizontally to intersection of 4 feet diameter, read on the abscissa on the scale set forth in §112.31 of this title (relating to Allowable Emissions - Residential, Business, or Commercial) 36 pound per hour emission. This is permitted value for 100 feet stack and exit velocity of 20 feet per second.

(ii) Correct for stack height of 200 feet. This is direct ratio and becomes

$$\frac{200'}{100'} = 2.$$

The emission now becomes $36 \times 2 = 72$ pounds per hour.

(iii) Correct for stack exit velocity of 30 feet per second. This is direct ratio and becomes $\frac{30}{20} = 1.5$.

The allowed emission now becomes $72 \times 1.5 = 108$ pounds per hour.

(iv) Note: Less than 30 stack heights to property line - no credit.

Adopted December 19, 1973

Effective January 19, 1974

§112.34. Effective Date.

Sections 112.31-112.34 of this title (relating to Control of Hydrogen Sulfide) shall be in force immediately and shall supersede the previous Regulation III of the Texas Air Control Board which became effective on February 22, 1968, with regard to hydrogen sulfide.

Adopted December 19, 1973

Effective January 19, 1974

CONTROL OF SULFURIC ACID

§112.41. Emissions Limits.

(a) No person may cause, suffer, allow, or permit emissions of sulfuric acid (H_2SO_4) from a source or sources operated on a property or multiple sources operated on contiguous properties to exceed:

(1) a net ground level concentration of $15 \mu g$ per cubic meter of air averaged over any 24-hour period;

(2) a net ground level concentration of $50 \mu g$ per cubic meter of air averaged over a one-hour period of time more than once during any consecutive 24-hour period; or

(3) one hundred μg per cubic meter of air maximum at any time.

(b) No person may cause, suffer, allow, or permit emissions of H_2SO_4 mist from any H_2SO_4 or oleum facility that burns elemental sulfur, alkylated acid, hydrogen sulfide, organic sulfides, mercaptans, or acid sludge by the contact process to exceed 0.50 pound per ton (0.25 gram per kilogram) of 100% H_2SO_4 produced.

(1) H_2SO_4 mist emissions affected by this subsection shall be expressed as H_2SO_4 and shall include liquid mist, sulfur trioxide, and H_2SO_4 vapor as measured by Test Method 8 (40 Code of Federal Regulations 60, Appendix A) or an equivalent measurement method which has been approved by the Executive Director.

(2) H_2SO_4 plants or facilities used exclusively as sulfur dioxide control systems, chamber process plants, acid concentrators, or oleum storage and transfer facilities are exempt from this section.

Adopted May 12, 1989

Effective July 14, 1989

§112.43. Calculation Methods.

(a) Application. Determination of the net ground level concentration shall be performed in accordance with the procedures outlined in §112.33 of this title (relating to Calculation Methods) for hydrogen sulfide and this section for sulfuric acid (H_2SO_4).

(b) Determination of compliance with emission limits. In most cases downwind samples will suffice; however, if the sampled properties are suspected of being influenced by an upwind source of H_2SO_4 , then both upwind and downwind samples will be taken. The concentration of H_2SO_4 in the "downwind sample" less the concentration in the "upwind sample" shall be used in determining whether the emissions from the property comply with the requirements of §112.41 of this title (relating to Allowable Emissions). Calculated maximum allowable emission rates or ground level concentrations which are obtained by the

method in subsection (c) of this section below may be used in determining whether a property is in compliance with the emission limits specified.

(c) Calculations of H₂ SO₄ concentrations from stack samples and measurements. The maximum allowable H₂ SO₄ emission rate which may be made from a stack on property to comply with the emission limit set forth in §112.41 of this title (relating to Allowable Emissions) may be calculated by Sutton's equation which has been modified to consider the critical wind speed and to correspond to one-hour sample. Additional credit on stack emissions can be obtained if the distance from the stack to the property line is greater than 30 stack heights. Those properties with greater than 30 stack heights to the property line should contact the Executive Director to obtain the proper correction factor.

(1) For exit stack gas for temperature of less than 125°F. The following calculations shall be used for exit stack gas for temperatures of less than 125°F:

(A) The H₂ SO₄ ambient air level of 80 µg/m³ for one hour is used.

$$Q_a = 5.56 \times 10^{-4} V_s d_s^2 \left[\frac{d_s}{h_s} \right]^{1.29}$$

(Equation 1)

Where:

- Q_a = emission rate, pounds per hour
- V_s = stack exit velocity, feet per second
- d_s = exit stack diameter, feet
- h_s = physical stack height, feet.

(B) To plot Graph IV assume a basic stack height of 100 feet and plot

$$\left[\frac{d_s}{100} \right]^{1.29}$$

for various stack diameters versus stack velocity.

(2) For exit stack gas for temperature greater than 125°F. The following calculations shall be used for exit stack gas for temperatures greater than 125°F:

(A) The H₂ SO₄ ambient air level of 80 µg/m³ for one hour is used.

$$Q_a = 12.32 \times 10^{-4} V_s \left[d_s^{1.5 + 0.82 \left(\frac{d_s}{T_s} \right)} \right] \frac{T}{h_s}$$

(Equation 2)

Where:

Q_a = emission rate, pounds per hour

V_s = stack exit velocity, feet per second

d_s = exit stack diameter, feet

h_s = physical stack height, feet

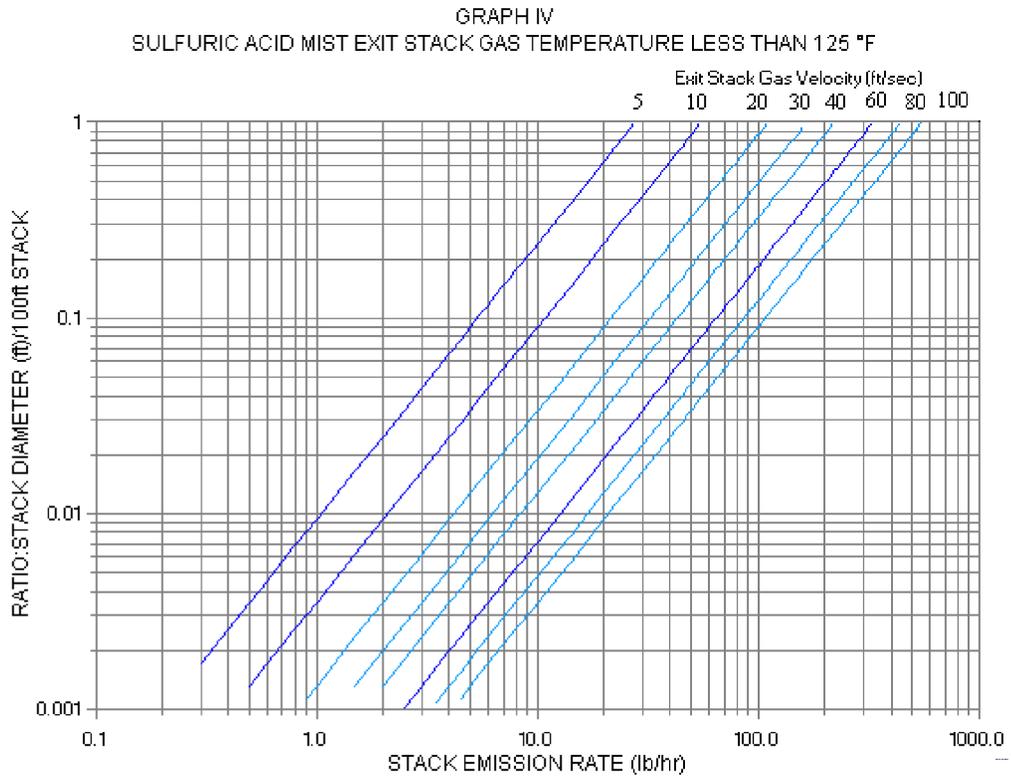
T = temperature difference between stack gas and the outdoor atmosphere
in °Rankine.

An outdoor temperature of 90°F (550°R) is assumed in preparing
dispersion graphs.

T_s = stack exit temperature in °Rankine.

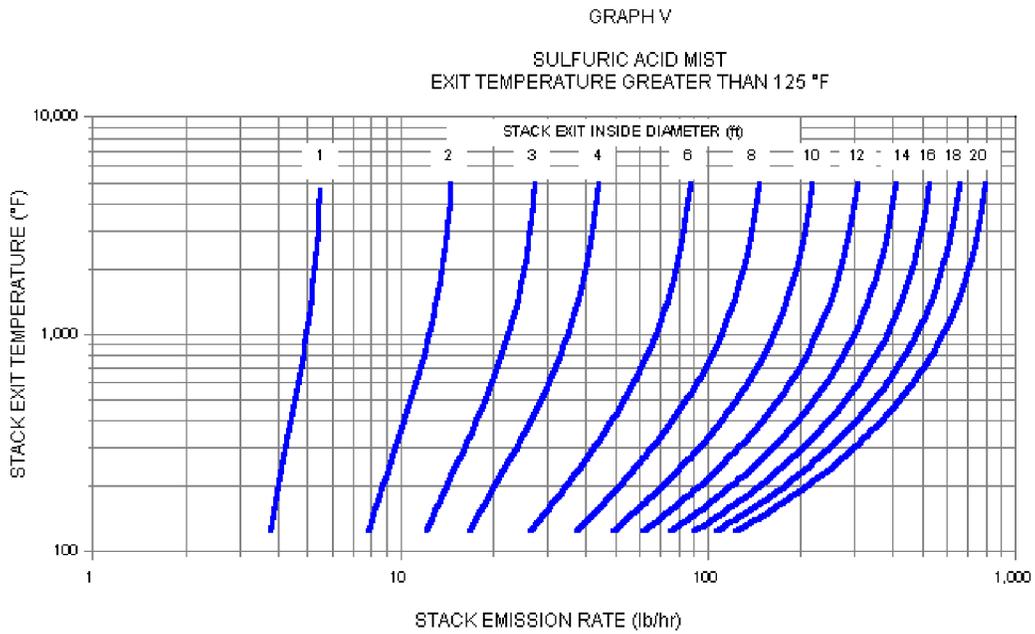
(B) To plot Graph V, assume a basic stack height of 100 feet and an exit velocity
of 20 feet per second. Let stack gas temperature vary with stack diameter.

GRAPH IV
SULFURIC112.43(c)(1)(C)



GRAPH V

SULFURIC112.43(c)(B)iii



(3) Examples. The following are examples of stack emission calculations:

(A) Example 1. (Temperature of stack gas less than 125°F.) How many pounds per hour of H_2SO_4 can be discharged from a 200 feet stack having a 4 feet exit diameter (ID) and a 30 feet per second exit gas velocity? The temperature of the exit gases is 100°F. Solution:

(i) The ratio of stack diameter to 100 feet is $\frac{4}{100} = 0.04$.

(ii) Enter ordinate of Graph IV with 0.04; go horizontally to intersection of 30 feet per second velocity curve. At this intersection read on the abscissa 17 pounds per hour. This is the permitted value for a 100 feet stack.

(iii) Correct emissions for a 200 feet stack. Enter Graph I at 200 feet and obtain correction factor of 2.3. Thus the emissions become $17 \times 2.3 = 39$ pounds per hour.

(B) Example 2. (Temperature of stack gas greater than 125°F.) How many pounds per hour of H_2SO_4 can be discharged from a 200 feet stack having a 4 feet exit diameter (ID) and a 30 feet per second exit gas velocity? The temperature of the exit gases is 400°F. Solution:

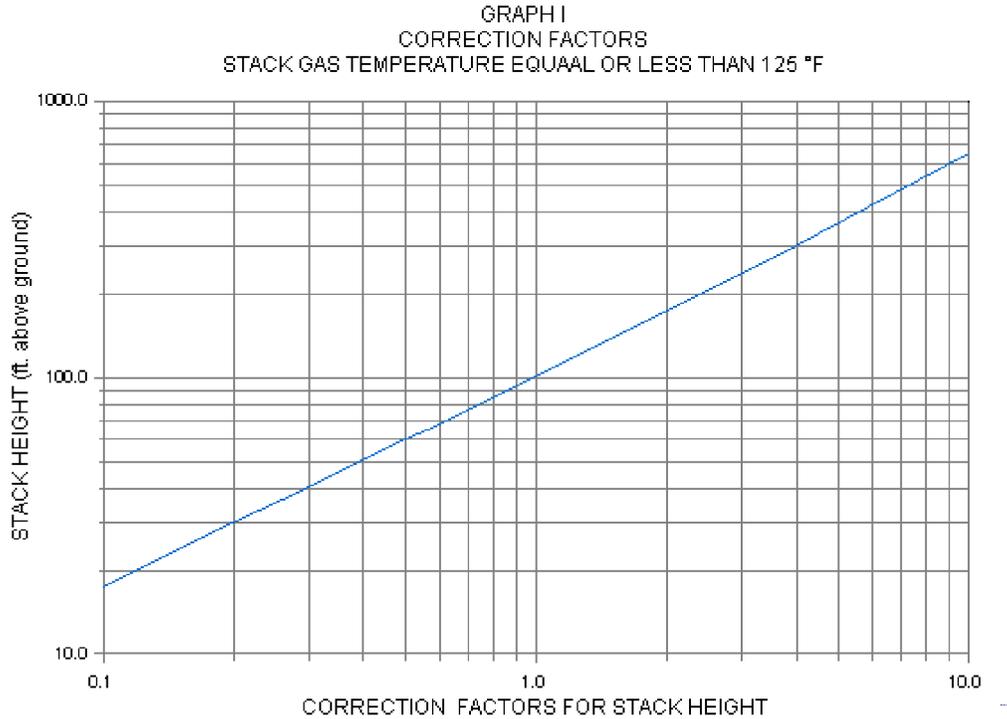
(i) Enter ordinate of Graph V with 400; go horizontally to intersection of 4 feet diameter and read on abscissa 26 pounds per hour emission. This is permitted value for 100 feet stack and exit velocity of 20 feet per second.

(ii) Correct for stack height. Thus, $\frac{200}{100} = 2$. We now have
 $26 \times 2 = 52$ pounds per hour.

(iii) Correct for stack exit velocity of 30 feet per second. This is a direct ratio and becomes $\frac{30}{20} = 1.5$.

The emission now is $52 \times 1.5 = 78$ pounds per hour.

112.43(c)(3)(B)iii



Adopted May 12, 1989

Effective July 14, 1989

§112.45. Inspection and Recordkeeping Requirements.

(a) The owner or operator of any sulfuric acid plant subject to the provisions of §112.41(b) of this title (relating to Emissions Limits) shall conduct a complete visual inspection of all applicable emission control devices at least once per calendar year to ensure physical integrity and proper operation of the control system.

(b) The owner or operator of any sulfuric acid plant subject to the provisions of §112.41(b) of this title (relating to Emissions Limits) shall maintain the following records for two years and make available to authorized representatives of the Texas Air Control Board (TACB) and/or local air pollution control agencies, upon request:

(1) The average monthly sulfuric acid mist emissions calculated using the most recent stack test and expressed as pounds of sulfuric acid mist per ton of 100% sulfuric acid produced;

(2) The results of annual inspections as required by subsection (a) of this section; and

(3) Readings from a device for the continuous measurement of the pressure differential between the inlet and outlet gas streams of any fiber mist eliminator:

(A) Immediately following each annual inspection of the control device required by subsection (a) of this section and all other process start-ups in order to establish a reference pressure differential indicative of a properly functioning control device; and

(B) At least once per calendar month in order to indicate the relative operating condition of the control device.

(4) The emissions testing and/or corrective actions performed in response to excessive variations in the observed pressure differential, to malfunctions detected during inspections of the control device, or to TACB requests.

Adopted May 12, 1989

Effective July 14, 1989

§112.47. Compliance Schedules.

All facilities affected by §112.41(b) of this title (concerning Emissions Limits) shall be in compliance by July 31, 1990. Sulfuric acid plants not subject to 40 Code of Federal Regulations 60, Subpart H, shall submit by December 31, 1989 a demonstration of compliance or a compliance plan and schedule for achieving compliance, including legally enforceable increments of progress toward compliance as described at 40 CFR 60.21(h).

Adopted May 12, 1989

Effective July 14, 1989

CONTROL OF TOTAL REDUCED SULFUR

§112.51. Emissions Limits for Total Reduced Sulfur (TRS) Compounds from Kraft Pulp Mills.

(a) The definitions promulgated at 40 Code of Federal Regulations (CFR) 60.281 shall apply to all sections within this undesignated head and are hereby incorporated by reference.

(b) Except as provided in §112.53 of this title (relating to Alternate Emissions Limitations), no person may cause, suffer, allow, or permit emissions of TRS from kraft pulp mills to exceed the following limits:

(1) Recovery furnaces -

(A) Old design (furnaces without membrane wall or welded wall construction or emission-control designed air systems): 20 parts per million (ppm) TRS, as hydrogen sulfide (H_2S) on a dry basis, corrected to 8% oxygen (O_2);

(B) New design (furnaces with both membrane wall or welded wall construction and emission-control designed air systems): 5 ppm TRS, as H_2S on a dry basis, corrected to 8% O_2 ;

(C) Cross recovery (furnaces with green liquor sulfidities in excess of 28% and liquor mixtures of more than 7 weight percent of the total pulp solids from the neutral sulfite semichemical process): 25 ppm TRS, as H_2S on a dry basis, corrected to 10% O_2 ;

(2) Digester system, multiple-effect evaporator system, or condensate stripper system: 5 ppm TRS, as H_2S on a dry basis, corrected to 8% O_2 , unless gases are burned in a combustion device, such as an incinerator or power boiler, for at least 0.5 second at 1200°F, a lime kiln, or a recovery furnace;

(3) Lime kiln: 20 ppm TRS, as H_2S on a dry basis, corrected to 10% O_2 ; and

(4) Smelt dissolving tank: 0.033 lb/ton black liquor solids as H_2S (0.016 gram/kilogram black liquor solids as H_2S).

(c) Compliance with the emissions limitations in subsection §112.51(b) of this section or §112.53 (relating to Alternate Emissions Limitations) shall be determined by reference Methods 16, 16A, or 16B (40 CFR 60, Appendix A) or an equivalent measurement method approved by the Executive Director.

Adopted May 12, 1989

Effective July 14, 1989

§112.53. Alternate Emissions Limitations.

The owner or operator of any facility which is unable to meet the emission limitations of §112.51 of this title (relating to Emissions Limits for Total Reduced Sulfur Compounds from Kraft Pulp Mills) with technically available and economically reasonable control technology may apply to the Executive Director for approval of an alternate emission limit no later than July 31, 1990. The application may be approved if the applicant demonstrates that emissions resulting from the alternate emission limit will not result in an exceedance of any other emission limit prescribed by the Texas Air Control Board and will not cause or contribute to a nuisance as defined in §101.4 of this title (relating to Nuisance) and that:

(1) The facility has failed to meet the applicable emission limitation during performance tests which were conducted with both the affected facility and the technically available and economically reasonable control equipment operating in a manner consistent with good engineering practice for minimizing the emissions; and

(2) It is technically impractical or economically unreasonable for the facility to comply with the established emissions limits.

Adopted May 12, 1989

Effective July 14, 1989

§112.55. Inspection Requirements.

The owner or operator of any kraft pulp mill subject to §112.51 (relating to Emissions Limits for Total Reduced Sulfur Compounds from Kraft Pulp Mills) or §112.53 (relating to Alternate Emissions Limitations) shall inspect all emission control devices and properly calibrate the monitoring devices required by §112.57 of this title (relating to Monitoring and Recordkeeping Requirements) at least once per calendar quarter to ensure compliance.

Adopted May 12, 1989

Effective July 14, 1989

§112.57. Monitoring and Recordkeeping Requirements.

(a) The owner or operator of any kraft pulp mill subject to §112.51 of this title [relating to Emissions Limits for Total Reduced Sulfur (TRS) Compounds from Kraft Pulp Mills] or §112.53 (relating to Alternate Emissions Limitations) shall conduct continuous monitoring beginning July 31, 1991 in accordance with the Monitoring of Emissions and Operations promulgated by the U.S. Environmental Protection Agency at 40 Code of Federal Regulations (CFR) 60.284, hereby incorporated by reference, except:

- (1) Omit 40 CFR 60.284(a)(1), relating to opacity monitoring;
- (2) Omit 40 CFR 60.284(d)(1), relating to reporting of recovery furnace excess TRS emissions and opacities;
- (3) Omit 40 CFR 60.284(d)(2), relating to reporting of lime kiln emissions;
- (4) Omit 40 CFR 60.284(e)(1)(ii), relating to opacity violations;
- (5) Omit all references to the black liquor oxidation system and brown stock washing system;
- (6) Substitute emission standards in 40 CFR 60.284(d) with those stated in §112.51 of this title (relating to Emissions Limits for TRS Compounds from Kraft Pulp Mills) or approved under §112.53 of this title (relating to Alternate Emissions Limitations); and
- (7) Substitute the term Administrator with Executive Director.

(b) Emissions data from continuous monitors required by subsection (a) of this section shall be processed in the following manner:

- (1) Data shall be calculated on a 12-hour average basis for the two consecutive periods of each operating day. Each 12-hour average shall be determined as the arithmetic mean of the appropriate 12

consecutive one-hour average TRS concentrations provided by each continuous monitoring system required under subsection (a) of this section; and

(2) Data indicating exceedances of emissions standards specified in §112.51(b) of this title (relating to Emissions Limits for TRS Compounds from Kraft Pulp Mills) shall not be considered excessive if the Executive Director determines that the facility is maintained and operated in a manner consistent with good air pollution control practices and the following conditions are met:

(A) Excess emissions are associated with start-up, shutdown, or malfunction;

(B) No more than 1% of the 12-hour averages in each calendar quarter exceed applicable limits for recovery furnaces; or

(C) No more than 2% of the 12-hour averages in each calendar quarter exceed 20 parts per million for lime kilns.

(c) The owner or operator of any kraft pulp mill affected by subsection (a) of this section shall maintain the following records for two years and shall make such records available to authorized representatives of the Texas Air Control Board and/or local air pollution control agencies upon request:

(1) daily records of the continuous emissions monitoring data consisting of 12-hour averaged TRS emissions;

(2) results of any stack tests conducted in accordance with §112.51(c) of this title (relating to Emissions Limits for TRS Compounds from Kraft Pulp Mills); and

(3) results of quarterly inspections as required by §112.55 of this title (relating to Inspection Requirements).

Adopted May 12, 1989

Effective July 14, 1989

§112.59. Compliance Schedules.

All facilities affected by §112.51 of this title (relating to Emissions Limits for TRS Compounds from Kraft Pulp Mills) shall be in compliance with applicable recovery furnace emissions limits by July 31, 1992 and all other applicable limits by July 31, 1991. Kraft pulp mills not subject to 40 Code of Federal Regulations (CFR) 60, Subpart BB (New Source Performance Standards) shall submit, no later than July 31, 1990, a demonstration of continuous compliance with all applicable limits and requirements or a control plan and schedule for achieving compliance, including legally enforceable increments of progress toward compliance as described at 40 CFR 60.21(h).

Adopted May 12, 1989

Effective July 14, 1989

