IN THE MATTER OF:)
)
PROPOSED AMENDMENTS TO CHAPTER) R75-5
2, PART II, SULFUR DIOXIDE) R74-2
EMISSIONS)

ORDER OF THE BOARD (by Mr. Goodman):

The Board hereby proposes the following amendments to the Air Pollution Regulations, subject to a 60-day public comment period. The Board notes that an addendum attached to this Order (p.12) contains the Rule 204(e)(1) formula using metric units for the input parameters.

PROPOSED FINAL DRAFT ORDER

Rule 204: Sulfur Standards and Limitations

(a) Stet

(b) Stet

(c) Sulfur Dioxide Emission for Existing Fuel Combustion Sources.

(1) Solid Fuel Burned Exclusively.

(A) Stet

(B) Existing Fuel Combustion Sources Located Outside the Chicago, St. Louis (Illinois) and Peoria Major Metropolitan Areas. No person shall cause or allow the emission of sulfur dioxide into the atmosphere in any one hour period from any existing fuel combustion source, burning solid fuel exclusively, located outside the Chicago, St. Louis (Illinois) and Peoria major metropolitan areas, to exceed the following:

(i) 6.8 pounds of sulfur dioxide per million btu of actual heat input, ~~on-and-after May-30,-1975~~; and

(ii) the emission limit provided by Rule 204 (e); and

(iii) 1.8 pounds of sulfur dioxide per million btu of actual heat input for all such fuel combustion emission sources located within any MMA other than Chicago, Peoria, and St. Louis (Illinois) which, according to any one ambient air monitoring station operated by or under supervision and control of the Agency within such MMA, has an annual arithmetic average sulfur dioxide level greater than:

60 ug/m^3 (0.02 ppm) for any year ending prior to May 30, 1976, or 45 ug/m^3 (0.015 ppm) for any year ending on or after May 30, 1976.

Compliance with this paragraph (ii) of Rule 204(c)(1)(B) shall be on and after three years from the date upon which the Board promulgates an Order for compliance.

Before promulgation of such Order for Compliance, the Board shall:

(aa) publish in the Environmental Register within 21 days of receipt from the Agency, a proposed Order for Compliance along with the data used to obtain said annual arithmetic average sulfur dioxide level; and,

(bb) serve a copy of such proposed Order and supporting data, within 21 days of receipt from the Agency, upon the owner or operator of each such emission source located within the MMA; and,

(cc) defer promulgation of the Order for Compliance for at least 45 days from the date of publication to allow submission and consideration of additional written comments.

(d) Stet

Delete Rule 204(e)

Add:

(e) Fuel Combustion Emission Sources Located Outside of the Chicago, St. Louis (Illinois), and Peoria Major Metropolitan Areas.

No person shall cause or allow the total emissions of sulfur dioxide into the atmosphere in any one hour period from all fuel combustion emission sources owned or operated by such person and located within a 1 mile radius (1.6 Km) from the point of any such fuel combustion emission source to exceed the emissions determined by the following Rules 204(e)(1), 204(e)(2) or 204(e)(3), whichever is applicable.

(1) $E = \frac{(H_A)^{0.11}(H_E)^2}{128}$

where: E = Total allowable emission of sulfur dioxide in pounds per hour into the atmosphere in any one-hour period from all fuel combustion emission sources owned or operated by such person and located within a 1 mile radius from the center point of any such emission source.

H_A (feet) = Average actual stack height as determined by method outlined below.

H_E (feet) = Effective height of effluent release as determined by method outlined below.

Method used to determine H_A and H_E:

Q_H (BTU/sec) = Heat emission rate as determined by method outlined below.

ΔH (feet) = Plume rise.

H = Physical height in feet, above grade of each stack, except that for purposes of this calculation the value used for such stack height shall not exceed 2-1/2 times the height of the emission source serviced by the stack or any obstacle capable of causing downwash or fumigation conditions unless the owner or operator of the source demonstrates to the Agency that a greater height is necessary to prevent such conditions.

T (Degrees Rankine) = Exit temperature of stack gases from each source during operating conditions which would cause maximum emissions.

V (feet/sec) = Exit velocity of stack gases from each source under operating conditions which would cause maximum emissions.

D (feet) = Diameter of stack.

P = Percentage of total emissions expressed as decimal equivalents, emitted from each source. Example: 21% = 0.21. NOTE: the sum of $P_1 + P_2 \ldots + P_n = 1$. The emission values to be used are those which occur during operating conditions which would cause maximum emissions.

STEP 1: Determine weighted average stack parameters utilizing the following formulae:

$$D = P_1D_1 + P_2D_2 + \ldots + P_nD_n$$

$$V = P_1V_1 + P_2V_2 + \ldots + P_nV_n$$

$$T = P_1T_1 + P_2T_2 + \ldots + P_nT_n$$

$$H_A = P_1H_1 + P_2H_2 + \ldots + P_nH_n$$

NOTE:

P_1, D_1, V_1, T_1, and H_1, are the percentage of total emissions, stack diameter, exit velocity of gases, exit temperature of stack gases, and physical stack height, respectively, for the first source, P_2, D_2, V_2, T_2, and H_2 are the respective values for the second source; similarly, P_n, D_n, V_n, T_n, and H_n are the respective values for the nth source, where n is the number of the last source.

STEP 2: Calculate heat emission rate utilizing the following formula and the weighted average stack parameters obtained in Step 1:

$$Q_H = 7.54 D^2 V \left(\frac{T - 515}{T}\right)$$

STEP 3: Calculate plume rise utilizing the appropriate formula given below and the total heat emission rate obtained in Step 2:

$$\Delta H = \frac{2.58\ (Q_H)^{0.6}}{(H_A)^{0.11}} \quad \text{for } Q_H \geq 6000 \text{ BTU/sec}$$

$$\Delta H = \frac{0.718\ (Q_H)^{0.75}}{(H_A)^{0.11}} \quad \text{for } Q_H < 6000 \text{ BTU/sec.}$$

STEP 4: Calculate the weighted average facility effective height of effluent release utilizing the plume rise obtained in Step 3, the average stack height obtained in Step 1 and the formula given below:

$$H_E = H_A + \Delta H$$

STEP 5: Calculate the total facility hourly emission limitation utilizing the weighted actual stack height obtained in Step 1, the effective stack height given in Step 4, and the following formula:

$$E = \frac{(H_A)^{0.11}\ (H_E)^2}{128}$$

(2) If the total emissions of sulfur dioxide into the atmosphere in any one hour period from all existing fuel combustion emission sources owned or operated by any person and located within a 1 mile (1.6 Km.) radius from the center point of any such fuel combustion emission sources exceed, during peak periods of operation resulting from normal cyclical operations, the emissions allowed under Rule 204(e)(1) but, as of April 1, 1978, were in compliance with either the formula detailed below or a Board Order, such person shall not cause or allow such emissions to exceed the emissions allowed under either Rule 204 (e)(1) or the formula detailed below, whichever such person determines shall apply. In order for the formula detailed below to apply, any person making such determination shall reapply to the Agency for an operating permit, specifying such determination, within 60 days of the effective date of Rule 204(e)(1).

$$E = 20{,}000 \ \frac{(H_S)^2}{(300)}$$

$$H_S = \frac{P_1H_1 + P_2H_2 + \ . \ . \ . \ P_nH_n}{100}$$

(Note: $P_1 + P_2 + \ldots P_n = 100$)

Where:

E = total emission of sulfur dioxide, in pounds per hour, into the atmosphere in any one hour period from all fuel combustion emission sources owned or operated by such person and located within a 1 mile radius from the center point of any such emission source,

P_i, i = 1,2, ..., n = percentage of total emissions E emitted from source i, and

H_i, i = 1,2, ..., n = physical height in feet above grade of stack i.

(3) Any owner or operator of an existing fuel combustion emission source may petition the Board for approval of an emission rate applicable to any one hour period for all fuel combustion emission sources owned or operated by such person and located within a one mile radius from the center point of any such fuel combustion emission source. Such person shall prove in an adjudicative hearing before the Board that the proposed emission rate will not under any potential operating and meteorological conditions cause or contribute to a violation of any applicable Primary or Secondary Sulfur Dioxide Ambient Air Quality Standard. An emission rate approved pursuant to this paragraph shall be a substitute for that standard determined by Rule 204(e)(1) or Rule 204(e)(2).

(A) Every owner or operator of a fuel combustion emission source petitioning the Board for approval of an emission standard pursuant to Rule 204(e)(2) shall follow the procedures described in Part X of the Procedural Rules, Chapter 1 of the Board's Rules and Regulations.

(B) Any emission standard approved pursuant to Rule 204(e)(2) shall be included as a condition to operating permits issued pursuant to Rule 103 of this Chapter. Any owner or operator of a fuel combustion emission source who receives Board approval of an emission standard pursuant to this Rule 204(e)(2) shall apply to the Agency within 30 days of approval of such standard for a revision of its operating permit for such source.

(C) The Agency shall impose as a condition to a permit to operate a source pursuant to an emission standard approved pursuant to Rule 204(e)(2) an ambient sulfur dioxide monitoring and dispersion modeling program designed to determine if such emission standard will cause or contribute to violations of any applicable Primary or Secondary Sulfur Dioxide Ambient Air Quality Standard. Such ambient monitoring and dispersion modeling program shall be operated for at least one year.

(f) Sulfur Standards and Limitations for Process Emission Sources.

(1) Sulfur Dioxide Standards and Limitations.

(A) Except as further provided by paragraphs (f)(1)(B), (f)(1)(C), (f)(1)(D), and (f)(1)(E) of this Rule 204, no person shall cause or allow the emission of sulfur dioxide into the atmosphere from any process emission source to exceed 2000 ppm.

(B) Paragraph (f)(1)(A) of this Rule 204 shall not apply to new sulfuric acid manufacturing processes. No person shall cause or allow the emission of sulfur dioxide into the atmosphere from any new sulfuric acid manufacturing plant to exceed 4.0 pounds of sulfur dioxide per ton of acid produced.

(C) Paragraph (f)(1)(A) of this Rule 204 shall not apply to processes designed to remove sulfur compounds from the flue gases of fuel combustion emission sources.

(D) Paragraph (f)(1)(A) of this Rule 204 shall not apply to existing processes designed to remove sulfur compounds from the flue gases of petroleum and petro-chemical processes. **~~providing that the sulfur dioxide emissions from such removal processes do not exceed the emissions determined by the equations of Rule 204(e).~~**

Delete Rule 204(h)

Add:

(h) Compliance Dates.

Every owner or operator of an emission source subject to Rule 204 shall comply with the standards and limitations thereof in accordance with

the dates shown in the table below:

Table of Compliance Dates

Rule	Type of Source	Compliance Date
204(a) and 204(b)	New fuel combustion emission sources	April 14, 1972
204(c)(1)(a)	Existing sources in Chicago, St. Louis (Illinois) and Peoria	May 30, 1975
204(c)(1)(B)(i)	Existing sources in MMA's other than Chicago, St. Louis (Illinois) and Peoria complying with Rule 204(e)	See Rule 204(e)(1) and 204(e)(2)
204(c)(1)(B)(ii)	Existing sources in MMA's other than Chicago, St. Louis (Illinois) and Peoria complying with Pollution Control Board order to limit emissions to 1.8 lb/million BTU	Three years after Board Order
204(c)(2)	Existing liquid fuel sources	May 30, 1975
204(d)	New Sources	April 14, 1972
	Existing Sources	May 30, 1975
204(e)(1)	Fuel Combustion sources located outside Chicago, St. Louis (Illinois) and Peoria MMA's	
	(a) If source is, prior to the effective date of Rule 204(e)(1) and continuously for 3 years thereafter, in compliance with the previous Rule 204(e) (effective from April 14, 1972, until effective date of current Rule)	3 years after effective date of Rule

Rule	Type of Source	Compliance Date
	(b) If source is not in compliance with the previous Rule 204(e) (effective from April 14, 1972, until effective date of current Rule) prior to effective date of Rule 204(e)(1)	Effective date of Rule
204(e)(2)	Existing sources located outside Chicago, St. Louis (Illinois) and Peoria MMA's maintaining actual emission levels	See Rule 204(e)(2)
204(e)(3)	Existing Sources located outside Chicago, St. Louis (Illinois) and Peoria MMA's	
	(a) If source is, prior to the effective date of Rule 204(e)(1) and continuously for three years thereafter, in compliance with the previous Rule 204(e) (effective April 14, 1972 until effective date of current Rule)	3 years after date of approval of alternative standard
	(b) If source is not in compliance with the previous Rule 204(e) (effective from April 14, 1972 until effective date of current Rule) prior to effective date of Rule 204(e)(2)	Date of approval of alternative standard
204(f)	Sulfur Standards and Limitations for Process Emission Sources	
	Existing sources	December 31, 1973
	New Sources	Effective date of Regulation

(i) Intermittent Control Systems for Fuel Combustion Emission Sources Located Outside of the Chicago, St. Louis (Illinois), and Peoria Major Metropolitan Areas

Intermittent Control Systems as defined in Title 1 Section 3 of the Environmental Protection Act (Illinois Revised Statutes Chapter 111-1/2 Sections 1001 - 1051 as amended) may be required to be installed in addition to a constant emission control system as the result of a Board ordered emission control program; or, if necessary to prevent the fuel combustion emission source from causing or contributing to a violation of any applicable Primary or Secondary Sulfur Dioxide Ambient Air Quality Standard, such Intermittent Control System may be required to be installed in addition to a constant emission control system as a condition to obtaining an operating or construction permit from the Agency.

(j) Dispersion Enhancement Techniques

No owner or operator of an existing fuel combustion emission source shall comply with the emission standard of Rule 204(e)(1), Rule 204(e)(2), or Rule 204(e)(3) by the use of dispersion enhancement techniques. For the purpose of this rule, disperson enhancement techniques shall include, but not be limited to, an increase of: stack height in excess of good engineering practice necessary to prevent downwash or fumigation conditions, stack diameter, exit gas velocity, or exit gas temperature, except as provided by Section 123 of the Clean Air Act. Flue gas may be reheated where air pollution control equipment results in a reduction of flue gas temperature, provided that the degree of reheat does not exceed the temperature drop across such air pollution control equipment.

Rule 101: Definitions

Air Pollution Control Equipment: any equipment including intermittent control systems (ICS's) or facility of a type intended to eliminate, prevent, reduce or control the emission of specified air contaminants to the atmosphere.

Addendum: Rule 204(e)(1) converted to Metric Units

(e) Fuel Combustion Emission Sources Located Outside of the Chicago, St. Louis (Illinois), and Peoria Major Metropolitan Areas.

No person shall cause or allow the total emissions of sulfur dioxide into the atmosphere in any one hour period from all fuel combustion emission sources owned or operated by such person and located within a 1 mile (1.6 Km) radius from the center point of any such fuel combustion emission source to exceed the emissions determined by the following Rules 204(e)(1), 204(e)(2) or 204(e)(3), whichever is applicable.

(1) $E = 0.096(H_A)^{0.11}(H_E)^2$

where: E = Total allowable emission of sulfur dioxide in pounds per hour into the atmosphere in any one-hour period from all fuel combustion emission sources owned or operated by such person and located within a 1 mile radius from the center point of any such emission source.

H_A (meters) = Average actual stack height as determined by method outlined below.

H_E (meters) = Effective height of effluent release as determined by method outlined below.

Method used to determine H_A and H_E:

Q_H (KCal/sec) = Heat emission rate as determined by method outlined below.

ΔH (meters) = Plume rise.

H = Physical stack height in meters, above grade of each stack, except that for purposes of this calculation the value used for such stack height

shall not exceed 2-1/2 times the height of the emission source serviced by the stack or any obstacle capable of causing downwash or fumigation conditions unless the owner or operator of the source demonstrates to the Agency that a greater height is necessary to prevent such conditions.

T (Degrees Kelvin) = Exit temperature of stack gases from each source during operating conditions which would cause maximum emissions.

V (meters/sec) = Exit velocity of stack gases from each source under operating conditions which would cause maximum emissions.

D (meters) = Diameter of stack.

P = Percentage of total emissions expressed as decimal equivalents, emitted from each source. Example: 21% = 0.21. NOTE: the sum of $P_1 + P_2 \ldots + P_n = 1$. The Emission values to be used are those which would occur during operating conditions which would cause maximum emissions.

STEP 1: Determine weighted average stack parameters utilizing the following formulae:

$$D = P_1D_1 + P_2D_2 + \ldots + P_nD_n$$

$$V = P_1V_1 + P_2V_2 + \ldots + P_nV_n$$

$$T = P_1T_1 + P_2T_2 + \ldots + P_nT_n$$

$$H_A = P_1H_1 + P_2H_2 + \ldots + P_nH_n$$

NOTE:

P_1, D_1, V_1, T_1, and H_1, are the percentage of total emissions,

stack diameter, exit velocity of gases, exit temperature of stack gases, and physical stack height, respectively, for the first source, P_2, D_2, V_2, T_2, and H_2 are the respective values for the second source; similarly, P_n, D_n, V_n, T_n, and H_n are the respective values for the nth source, where n is the number of the last source.

STEP 2: Calculate heat emission rate utilizing the following formula and the weighted average stack parameters obtained in Step 1:

$$Q_H = 67D^2V \left(\frac{T - 286}{T}\right)$$

STEP 3: Calculate plume rise utilizing the appropriate formula given below and the total heat emission rate obtained in Step 2:

$$H = \frac{1.58(Q_H)^{0.6}}{(H_A)^{0.11}} \text{ for } Q_H \geq 1500 \text{ KCal/sec}$$

$$H = \frac{0.54(Q_H)^{0.75}}{(H_A)^{0.11}} \text{ for } Q_H < 1500 \text{ KCal/sec}$$

STEP 4: Calculate the weighted average facility effective height of effluent release utilizing the plume rise obtained in Step 3, the average stack height obtained in Step 1 and the formula given below:

$$H_E = H_A + \Delta H$$

STEP 5: Calculate the total facility hourly emission limitation utilizing the weighted actual stack height obtained in Step 1, the effective stack height given in Step 4, and the following formula:

$$E = .096(H_A)^{0.11}(H_E)^2$$

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Order was adopted on the 11th day of May, 1978 by a vote of 3-2.

Christan L. Moffett

Christan L. Moffett, Clerk
Illinois Pollution Control Board