

Minnesota Attorney General: Administrative Rules Proceedings

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APC 11 RESTRICTION OF EMISSION OF VISIBLE AIR CONTAMINANTS

(a) Applicability

The standards of performance in this regulation apply to any emission facility for which a specific standard of performance has not been promulgated in another regulation.

(b) Visible Emission Restrictions for Existing Facilities

No owner or operator of an existing emission facility to which this regulation is applicable shall cause to be discharged into the atmosphere from the facility any gases which exhibit greater than 20% opacity; except that a maximum of 40% opacity shall be permissible for four minutes in any 60 minute period.

(c) Visible Emission Restrictions for New Facilities

No owner or operator of a new emission facility to which this regulation is applicable shall cause to be discharged into the atmosphere from the facility any gases which exhibit greater than 20% opacity.

(d) Performance Tests

Unless another method is approved by the Agency, any person required to submit performance tests for emission facilities for which this regulation is applicable shall utilize Method 9 for visual determination of opacity.

APPROVED AS TO FORM AND LEGALITY
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STATE OF MINNESOTA
DEPARTMENT OF STATE
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December 2, 1976

- APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

CHAPTER 4: APC 4

APC 4 STANDARDS OF PERFORMANCE FOR FOSSIL FUEL-BURNING INDIRECT HEATING EQUIPMENT

(a) Definitions

As used in this regulation, the following words shall have the meanings defined herein:

(1) "Actual heat input" means the number of BTU per hour (cal/hr) determined by multiplying the gross heating value of the fuel by the rate of fuel burned.

(2) "Coal refuse" means waste-products of coal mining, cleaning, and coal preparation operations (e.g. culm, gob, etc.) containing coal, matrix material, clay, and other organic and inorganic material.

(3) "Direct heating equipment" means a furnace, kiln, dryer, or other combustion equipment used in the burning of a fossil fuel for the purpose of processing a material where the products of combustion have direct contact with the heated material.

(4) "Distillate oil" means grades of oils known as No. 1 & No. 2, as defined in the A.S.T.M. D 396 (1973).

(5) "Fossil fuel" means natural gas, petroleum, coal, wood, peat, and any form of solid, liquid, or gaseous fuel derived from such materials for the purpose of creating useful heat.

(6) "Gross heating value" means the gross calorific value (cal/g or BTU/lb) of the fuel combusted as determined by A.S.T.M. test methods D 2015-66(72) for solid fuels; D 1826-64(70) for gaseous fuels, and D 240-64(73) for liquid fuels.

(7) "Indirect heating equipment" means a furnace, a boiler or other unit of combustion equipment used in the process of burning fossil fuel for the purpose of producing steam, hot water, hot air, or other hot liquid, gas, or solid, where the products of combustion do not have direct contact with the heated medium.

(8) "Rated heat input" means the number of BTU per hour (cal/hr) which the manufacturer has determined to be the continuous rated capability of the indirect heating equipment, or, where the rated heat input is not specified by the manufacturer, the number of BTU per hour (cal/hr) determined by dividing the rated heat output by the overall thermal efficiency.

(9) "Residual oil" means grades of oils known as No. 4, No. 5 (Light), No. 5 (Heavy), and No. 6, as listed in A.S.T.M. D 396 (1973).

(10) "Steam generating unit" means indirect heating equipment used to produce steam.

(b) Determination of Applicable Standards of Performance

(1) This regulation shall apply to indirect heating equipment for which a standard of performance has not been promulgated in a specific regulation.

(2) The applicable standards of performance in Table I or Table II shall be determined by using the rated heat input of the specific indirect heating equipment and the total rated heat inputs of all indirect heating equipment and all direct heating equipment of one owner or operator at that particular location.

(3) When different fossil fuels are burned simultaneously in any combination, the applicable sulfur dioxide standard shall be determined by proration using the following formula:

$$w = \frac{y(a) + z(b)}{x + y + z}$$

where:

w is the maximum allowable emissions of sulfur dioxide gases in lbs. per million BTU (g/million cal), and

x is the percentage of total heat input derived from gaseous fossil fuel, and

y is the percentage of total heat input derived from liquid fossil fuel, and

z is the percentage of total heat input derived from solid fossil fuel, and

a is the allowable SO_2 standard for liquid fossil fuels expressed in lbs per million BTU (g/million cal), and

b is the allowable SO_2 standard for solid fossil fuels expressed in lbs per million BTU (g/million cal).

(4) When different fossil fuels are burned simultaneously in any combination, the application nitrogen oxides standard shall be determined by proration using the following formula:

$$w = \frac{x(c) + y(a) + z(b)}{x + y + z}$$

where:

w, x, y and z mean the same as in the formula in paragraph (3) for determining the applicable sulfur dioxide standard; and

a is the allowable NO_x standard for liquid fossil fuels expressed in lbs per million BTU (g/million cal); and

b is the allowable NO_x standard for solid fossil fuels expressed in lbs per million BTU (g/million cal); and

c is the allowable NO_x standard for gaseous fossil fuels expressed in lbs per million BTU (g/million cal).

(5) When lignite or a solid fossil fuel containing 25 percent by weight, or more, of coal refuse is burned in combination with gaseous, liquid, or other solid fossil fuel, the standard of performance for nitrogen oxides shall not apply.

(c) Standards of Performance for Existing Indirect Heating Equipment

(1) No owner or operator of indirect heating equipment shall cause to be discharged into the atmosphere from said equipment any gases which contain particulate matter or sulfur dioxide in excess of the standards of performance shown in Table I.

(2) No owner or operator of indirect heating equipment shall cause to be discharged into the atmosphere from said equipment any gases which exhibit greater than 20% opacity; except that a maximum of 60% opacity shall be permissible for four (4) minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four (4) additional minutes in any 60 minute period.

(d) Standards of Performance for New Indirect Heating Equipment

(1) No owner or operator of new indirect heating equipment shall cause to be discharged into the atmosphere from said equipment any gases which contain particulate matter, sulfur dioxide or nitrogen oxides in excess of the standards of performance shown in Table II.

(2) No owner or operator of new indirect heating equipment or greater than 250 million BTU per hour rated heat input shall cause to be discharged into the atmosphere from said equipment any gases which

exhibit greater than 20% opacity; except that a maximum of 40% opacity shall be permissible for not more than two (2) minutes in any 60 minute period.

(3) No owner or operator of new indirect heating equipment of 250 million BTU per hour or less rated heat input shall cause to be discharged into the atmosphere from said equipment any gases which exhibit greater than 20% opacity; except that a maximum of 60% opacity shall be permissible for four (4) minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four (4) additional minutes in any 60 minute period.

(e) Allowance for Stack Height for Indirect Heating Equipment

(1) The owner or operator of any indirect heating equipment shall determine and install a stack of such height that will not cause pollutant concentrations at ground levels to exceed any applicable ambient air quality standard or regulation.

(2) The determination of the ground level concentrations shall be based upon applicable dispersion calculations approved by the Agency.

(f) High Heating Value

The High Heating Value of a fossil fuel shall mean the same as the Gross Heating Value

(g) Performance Test Methods

Unless another method is approved by the Director, any person required to submit performance tests for indirect heating equipment shall utilize the following test methods:

(1) Method 1 for selection of sampling site and sample traverses.

(2) Method 3 for gas analysis.

(3) Method 5 for concentration of particulate matter and the associated moisture content.

(4) Method 6 for concentration of SO_2.

(5) Method 7 for concentration of NO_x.

(6) Method 9 for visual determination of opacity.

(h) Performance Test Procedures

(1) The sampling site, as selected by Method 1, shall be the same for each pollutant during a performance test.

(2) For Method 5, the sampling time for each run shall be at least 60 minutes and the minimum sampling volume shall be 0.85 dscm (30 dscf) except that smaller sampling times or volumes, when necessitated by process variables or other factors, may be approved by the Agency. The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature between 120°C and 160°C (250°F and 320°F).

(3) For Methods 6 and 7, the sampling point in the duct shall be at the center of the cross section or at a point no

closer to the walls than 1 m (3.28 ft.). For Method 6 the sample shall be extracted at a rate proportional to the gas velocity at the sampling point.

(4) For Method 6, the minimum sampling time shall be 20 minutes and the minimum sampling volume 0.02 dscm (0.71 dscf) for each sample. The arithmetic mean of two samples shall constitute one run. Samples shall be taken at approximately 30-minute intervals.

(5) For Method 7, each run shall consist of at least four grab samples taken at approximately 15-minute intervals. The arithmetic mean of the samples shall constitute the run value.

(6) For each performance test, the emissions expressed in g/million cal (lb/million BTU) shall be determined by the following procedure if the actual heat input is used:

$$E = CF \left(\frac{20.90}{20.9 - \%O_2} \right)$$

where:

(aa) E = pollutant emission, g/million cal (lb/million BTU.

(bb) C = pollutant concentration, g/dscm (lb/dscf), determined by Methods 5, 6 or 7.

(cc) $\%O_2$ = oxygen content by volume (expressed as percent), dry basis. Percent oxygen shall be determined by using the integrated sampling procedures of Method 3 and by analyzing the sample with a continuous monitoring system, or with the Orsat analyzer. The sample shall be obtained as follows:

(i) For determination of sulfur dioxide and nitrogen oxides emissions, the oxygen sample shall be obtained at approximately the same point in the duct as used to obtain the samples for Methods 6 and 7 determinations, respectively.

(ii) For determination of particulate emissions, the oxygen sample shall be obtained simultaneously by traversing the duct at the same sampling location used for each run of Method 5, in accordance with Method 1, except that 12 sample points shall be used in all cases.

(dd) F = factor representing a ratio of the volume of dry flue gases generated to the calorific value of the fuel combusted. Values of F are given as follows:

(i) For anthracitic coal according to A.S.T.M. D388-66, F = 0.01139 dscm/10^4 cal (101.4 dscf/10^4 BTU).

(ii) For subbituminous and bituminous coal according to A.S.T.M. D388-66, F = 0.01103 dscm/10^4 cal (98.2 dscf/10^4 BTU).

(iii) For liquid fossil fuels including crude, residual, and distillate oils, F = 0.01036 dscm/10^4 cal (92.2 dscf/10^4 BTU).

(iv) For gaseous fossil fuels including natural gas, propane, and butane, F = 0.00982 dscm/10^4 cal (87.4 dscf/10^4 BTU).

(ee) An onwer or operator may use the following equation to determine an F factor (dscf/10^4 BTU) in lieu of the

F factors specified by paragraph (6)(dd) of this section:

$$F = 10^6 \frac{3.64(\%H)+1.53(\%C)=.57(\%S)+.14(\%N)-.46(\%O)}{GHV}$$

where:

(i) H, C, S, N and O are content by weight of hydrogen, carbon, sulfur, nitrogen, and oxygen (expressed as percent), respectively, as determined by ultimate analysis of the fuel fired, dry basis, using A.S.T.M. methods D3178-74 or D3176 (solid fuels) or D240-64(73) (liquod fuels) or computed from results using A.S.T.M. method D1137-53(70), D1945-64(73) or D1946-67(72)(gaseous fuels) as applicable.

(ii) GHV is the gross heating value.

(ff) When combinations of fuels are fired, the F factors determined by paragraph (6)(dd) or (ee) of this section shall be prorated in accordance with the following formula:

$$F = \frac{xF_1 + yF_2 + zF_3}{100}$$

where:

x = the percentage of total heat input derived from gaseous fossil fuel.

y = the percentage of total heat input derived from liquid fossil fuel.

z = the percentage of total heat input derived from solid fossil fuel.

F_1 = the value of F for gaseous fossil fuels according to subsection (6)(dd) or (ee) of this regulation.

F_2 = the value of F for liquid fossil fuels according to subsection (6)(dd) or (ee) of this regulation.

F_3 = the value of F for solid fossil fuels according to subsection (6)(dd) or (ee) of this regulation.

(gg) When combinations of fossil fuels are fired, the actual heat input, expressed in cal/hr (BTU/hr), shall be determined during each testing period. The rate of fuels burned during each testing period shall be determined by suitable methods and shall be confirmed by a material balance over the indirect heating system.

(7) For each performance test, the emissions expressed in g/million cal (lb/million BTU) shall be determined by the following procedure if the rated heat input is used:

$$E = \frac{E_t}{Z}$$

where:

E = pollutant emissions, g/million cal (lb/million BTU).

E_t = pollutant emission rate, g/hr (lb/hr), determined by Method 5.

Z = applicable heat input, million cal/hr (million BTU/hr).

(8) The rated heat input shall be used only in determining the amount of particulate matter emitted from existing indirect heating equipment. The actual heat input shall be used in determining the amount of sulfur dioxide emitted from existing indirect heating equipment. The actual heat input shall be used in conducting performance tests for all pollutants for new indirect heating equipment.

TABLE I - EXISTING SOURCES

RATED HEAT INPUT OF THE INDIRECT HEATING EQUIPMENT Million BTU/Hr.	RATED HEAT INPUT OF ALL DIRECT AND INDIRECT HEATING EQUIPMENT AT THE PARTICULAR LOCATION Million BTU/Hr.	EMISSION LIMITATIONS LBS. PER MILLION BTU		
		Particulate Matter	SO_2	
		All Fuels	Solid Fuels	Liquid Fuels
A. Within Minneapolis-St. Paul Air Quality Control Region				
Greater than 250	Greater than 250	0.4	3.0	1.6
Less than or equal to 250	Greater than 250	0.4	3.0	1.6
Less than or equal to 250	Less than or equal to 250	0.4	4.0	2.0
B. Within the City of Duluth				
Greater than 250	Greater than 250	0.4	4.0	2.0
Less than or equal to 250	Greater than 250	0.4	4.0	2.0
Less than or equal to 250	Less than or equal to 250	0.4	N.A.*	N.A.
C. Outside Minneapolis-St. Paul Air Quality Control Region and Outside the City of Duluth				
Greater than 250	Greater than 250	0.6	4.0	2.0
Less than or equal to 250	Greater than 250	0.6	4.0	2.0
Less than or equal to 250	Less than or equal to 250	0.6	N.A.	N.A.

* N.A. - Not applicable

TABLE II - NEW SOURCES

RATED HEAT INPUT OF THE INDIRECT HEATING EQUIPMENT Million BTU/Hr.	RATED HEAT INPUT OF ALL DIRECT AND INDIRECT HEATING EQUIPMENT AT THE PARTICULAR LOCATION Million BTU/Hr.	EMISSION LIMITATIONS LBS. PER MILLION BTU					
		Particulate Matter	SO_2		NO_x *		
		All Fuels	Solid Fuels	Liquid Fuels	Solid Fuels	Gaseous Fuels	Liquid Fuels
A. Within Minneapolis-St. Paul Air Quality Control Region							
Greater than 250	Greater than 250	0.1	1.2	0.8	0.7	0.2	0.3
Greater than 100 but less than or equal to 250	Greater than 250	0.1	3.0	1.6	N.A.**	N.A.	N.A.
Less than or equal to 100	Greater than 250	0.4	3.0	1.6	N.A.	N.A.	N.A.
Less than or equal to 250	Less than or equal to 250	0.4	4.0	2.0	N.A.	N.A.	N.A.
B. Within the City of Duluth							
Greater than 250	Greater than 250	0.1	1.2	0.8	0.7	0.2	0.3
Greater than 100 but less than or equal to 250	Greater than 250	0.1	4.0	2.0	N.A.	N.A.	N.A.
Less than or equal to 100	Greater than 250	0.4	4.0	2.0	N.A.	N.A.	N.A.
Less than or equal to 250	Less than or equal to 250	0.4	N.A.	N.A.	N.A.	N.A.	N.A.
C. Outside Minneapolis-St. Paul Air Quality Control Region and Outside the City of Duluth							
Greater than 250	Greater than 250	0.1	1.2	0.8	0.7	0.2	0.3
Less than or equal to 250	Greater than 250	0.4	4.0	2.0	N.A.	N.A.	N.A.
Less than or equal to 250	Less than or equal to 250	0.4	N.A.	N.A.	N.A.	N.A.	N.A.

* NO_x expressed as NO_2

** N.A. - Not applicable

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STATE OF MINNESOTA
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FINAL

October 14, 1976

CHAPTER 32: APC 32

APC 32 STANDARDS OF PERFORMANCE FOR FOSSIL FUEL-BURNING DIRECT HEATING EQUIPMENT

(a) Definitions

As used in this regulation, the following words shall have the meanings defined herein:

(1) "Actual heat input" means the number of BTU per hour (cal/hr) determined by multiplying the gross heating value of the fuel by the rate of fuel burned.

(2) "Direct heating equipment" means a furnace, kiln, dryer, or other combustion equipment used in the burning of a fossil fuel for the purpose of processing a material where the products of combustion have direct contact with the heated material.

(3) "Fossil fuel" means natural gas, petroleum, coal, wood, peat, and any form of solid, liquid, or gaseous fuel derived from such materials for the purpose of creating useful heat.

(4) "Gross heating value" means the gross calorific value (cal/g or BTU/lb) of the fuel combusted as determined by A.S.T.M. test methods D 2015-66(72) for solid fuels; D 1826-64(70) for gaseous fuels, and D 240-64(73) for liquid fuels.

(5) "Indirect heating equipment" means a furnace, a boiler or other unit of combustion equipment used in the process of burning fossil fuel for the purpose of producing steam, hot water, hot air, or other hot liquid, gas, or solid, where the products of combustion do not have direct contact with the heated medium.

(6) "Rated heat input" means the number of BTU per hour (cal/hr) which the manufacturer has determined to be the continuous rated capability of the direct heating equipment.

(b) Determination of Applicable Standards of Performance

(1) This regulation shall apply to direct heating equipment for which a standard of performance has not been promulgated in a specific regulation.

(2) The applicable standard of performance for sulfur dioxide shall be determined by using the total rated heat input of all indirect heating equipment and all direct heating equipment of one owner or operator at that particular location.

(3) When different fossil fuels are burned simultaneously in any combination, the applicable sulfur dioxide (SO_2) standard shall be determined by proration using the following formula:

$$w = \frac{y(a) + z(b)}{x + y + z}$$

where:

w is the maximum allowable emissions of sulfur dioxide gases in lbs. per million BTU (g/million cal), and

x is the percentage of total heat input derived from gaseous fossil fuel, and

y is the percentage of total heat input derived from liquid fossil fuel, and

z is the percentage of total heat input derived from solid fossil fuel, and

a is the allowable SO_2 standard for liquid fossil fuels expressed in lbs per million BTU (g/million cal), and

b is the allowable SO_2 standard for solid fossil fuels expressed in lbs per million BTU (g/million cal).

(c) Standards of Performance for Fossil Fuel-Burning Direct Heating Equipment.

(1) Particulate Limitations.

(aa) No owner or operator of any direct heating equipment shall cause to be discharged into the atmosphere from the direct heating equipment any gases which:

(i) Contain particulate matter in excess of the limits allowed by Minnesota Regulation APC 5, or

(ii) Exhibit greater than 20% opacity, except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(bb) No owner or operator of an existing gray iron cupola with a melting capacity of less than one and one-half tons per hour shall allow emissions which exceed 0.3 grain per standard cubic foot, dry basis, and the owner or operator shall incinerate all gases, vapors, and gas entrained effluents from such cupolas at a temperature of not less than 1200 degrees Fahrenheit for a period of not less than 0.3 seconds. The owner or operator of any other gray iron cupola shall meet the requirements of subparagraph (aa).

(2) Sulfur Oxide Limitations.

(aa) Within Minneapolis-St. Paul Air Quality Control Region. No owner or operator of direct heating equipment located within the Minneapolis-St. Paul Air Quality Control Region shall cause to be discharged into the atmosphere from such equipment

any gases which contain sulfur dioxide:

(i) In excess of 3 pounds per million BTU heat input if a solid fossil fuel is burned or 1.6 pounds per million BTU heat input if a liquid fossil fuel is burned, if the total rated heat input of all indirect and direct heating equipment of the owner or operator at that particular location exceeds 250 million BTU per hour.

(ii) In excess of 4 pounds per million BTU heat input if a solid fossil fuel is burned or 2 pounds per million BTU heat input if a liquid fossil fuel is burned, if the total rated heat input of all indirect and direct heating equipment of the owner or operator at that particular location is equal to or less than 250 million BTU per hour.

(bb) Outside Minneapolis-St. Paul Air Quality Control Region. No owner or operator of direct heating equipment located outside the Minneapolis-St. Paul Air Quality Control Region shall cause to be discharged into the atmosphere from such equipment any gases which contain sulfur dioxide in excess of 4 pounds per million BTU heat input if a solid fossil fuel is burned or 2 pounds per million BTU heat input if a liquid fossil fuel is burned, if the total rated heat input of all indirect and direct heating equipment of the owner or operator at that particular location is greater than 250 million BTU per hour.

(d) Performance Test Methods

Unless another method is approved by the Agency, any person required to submit performance tests for direct heating equipment shall utilize the following test methods:

(1) Method 1 for selection of sampling site and sample traverses.

(2) Method 3 for gas analysis.

(3) Method 5 for concentration of particulate matter and the associated moisture content.

(4) Method 6 for concentration of SO_2.

(5) Method 9 for visual determination of opacity.

(e) Performance Test Procedures

(1) The sampling site, as selected by Method 1, shall be the same for each pollutant during a performance test.

(2) For Method 5, the sampling time for each run shall be at least 60 minutes and the minimum sampling volume shall be 0.85 dscm (30 dscf) except that smaller sampling times or volumes, when necessitated by process variables or other factors, may be approved by the Agency. The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature between 120°C and 160°C (250°F and 320°F).

(3) For Methods 6, the sampling point in the duct shall be at the center of the cross section or at a point no closer to the walls than 1 m (3.28 ft.). The sample shall be extracted at a rate proportional to the gas velocity at the sampling point.

(4) For Method 6, the minimum sampling time shall be 20 minutes and the minimum sampling volume 0.02 dscm (0.71 dscf) for each sample. The arithmetic mean of two samples shall

constitute one run. Samples shall be taken at approximately 30-minute intervals.

(5) For each performance test for sulfur dioxide emissions, the emissions expressed in g/million cal (lb/million BTU) shall be determined by the following procedure if the actual heat input is used:

$$E = CF \left(\frac{20.90}{20.9 - \%O_2} \right)$$

where:

(aa) E = pollutant emission, g/million cal (lb/million BTU.

(bb) C = pollutant concentration, g/dscm (lb/dscf),

(cc) $\%O_2$ = oxygen content by volume (expressed as percent), dry basis. Percent oxygen shall be determined by using the integrated sampling procedures of Method 3 or with the Orsat analyzer. The sample shall be obtained at approximately the same point in the duct as used to obtain the samples for Method 6.

(dd) F = factor representing a ratio of the volume of dry flue gases generated to the calorific value of the fuel combusted. Values of F are given as follows:

(i) For anthractic coal according to A.S.T.M. D388-66, F = 0.01139 dscm/10^4 cal (101.4 dscf/10^4 BTU).

(ii) For subbituminous and bituminous coal according to A.S.T.M. D388-66, F = 0.01103 dscm/10^4 cal (98.2 dscf/10^4 BTU).

(iii) For liquid fossil fuels including crude, residual, and distillate oils, F = 0.01036 dscm/10^4 cal (92.2 dscf/10^4 BTU).

(iv) For gaseous fossil fuels including natural gas, propane, and butane, F = 0.00982 dscm/10^4 cal (87.4 dscf/10^4 BTU).

(ee) An owner or operator may use the following equation to determine an F factor (dscf/10^4 BTU) in lieu of the F factors specified by paragraph (5)(dd) of this section:

$$F = 10^6 \frac{3.64(\%H)+1.53(\%C)+0.57(\%S)+0.14(\%N)-).46(\%)}{GHV}$$

where:

(i) H, C, S, N, and O are content by weight of hydrogen, carbon, sulfur, nitrogen, and oxygen (expressed as percent), respectively, as determined by ultimate analysis of the fuel fired, dry basis, using A.S.T.M. methods D3178-74 or D3176 (solid fuels) or D240-64(73) (liquid fuels) or computed from results using A.S.T.M. method D1137-53(70), D1945-64(73) or D1946-67(72) (gaseous fuels) as applicable.

(ii) GHV is the gross heating value.

(ff) When combinations of fuels are fired, the F factors determined by paragraph (5)(dd) or (ee) of this section shall be prorated in accordance with the following formula:

$$F = \frac{xF_1 + yF_2 + zF_3}{100}$$

where:

x = the percentage of total heat input derived from gaseous fossil fuel.

y = the percentage of total heat input derived from liquid fossil fuel.

z = the percentage of total heat input derived from solid fossil fuel.

F_1 = the value of F for gaseous fossil fuels according to subsection (5)(dd) or (ee) of this regulation.

F_2 = the value of F for liquid fossil fuels according to subsection (5)(dd) or (ee) of this regulation.

F_3 = the value of F for solid fossil fuels according to subsection (5)(dd) or (ee) of this regulation.

(gg) When combinations of fossil fuels are fired, the actual heat input, expressed in cal/hr (BTU/hr), shall be determined during each testing period. The rate of fuels burned during each testing period shall be determined by suitable methods and shall be confirmed by a material balance over the direct heating system.

APPROVED AS TO FORM AND LEGALITY
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STATE OF MINNESOTA
DEPARTMENT OF STATE
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Joan Anderson Growe
Secretary of State

Proposed

March 14, 1975

APC 32 STANDARDS OF PERFORMANCE FOR FOSSIL FUEL-BURNING EQUIPMENT USED FOR DIRECT HEATING.

(a) Definitions

as used in this regulation the following words shall have the meanings defined herein.

(1) "Fossil fuel-burning direct heating equipment" means a furnace, kiln, dryer or other combustion equipment used in the burning of a fossil fuel for the purpose of processing a material where the products of combustion have direct contact with the heated material, and which is not covered by a standard of performance in a specific source regulation.

(2) "Fossil fuel" means natural gas, petroleum, coal, wood, and any form of solid, liquid, or gaseous fuel derived from such materials.

(3) "Heat input" means the number of BTU per hour determined by multiplying the high heating value (BTU/lb.) of each fossil fuel fired in the indirect heating equipment at the time of determining the heat input times the rate of each fuel burned (lb/hr).

(4) "Distillate fuel oil" means grades of oils known as No. 1 and No. 2 as defined in the American Society for Testing and Materials D 396 (1959).

(5) "Residual fuel oil" means grades of oils known as No. 4, No. 5 (Light), No. 5 (Heavy), and No. 6 as defined in the American Society for Testing and Materials D 396 (1959).

(6) "Lot" means any quantity of material so designated by the material's supplier except that the quantity of material in any one lot shall not exceed the quantity of any shipment(s) physically delivered by each supplier to the owner or operator in any 24-hour period.

(b) Determination of Applicable Standards of Performance

(1) The provisions of this regulation shall be applicable only to those owners or operators of Fossil fuel-burning direct fired equipment not covered by a specific source regulation.

(2) In determining which provisions of paragraph (c) are applicable to specific fossil fuel-burning equipment, the heat input of all fossil fuel-burning equipment of one owner or operator at one particular location shall be added together to determine the total heat input.

(3) If the total heat input of all fossil fuel-burning equipment of one owner or operator at one particular location exceeds 250 million BTU per hour, the provisions in paragraph (c) which apply to equipment of greater than 250 million BTU per hour heat input shall apply.

(c) Standards of Performance for Fossil Fuel-Burning Direct Heating Equipment.

(1) The following standards apply to fossil fuel-burning direct heating equipment of 250 million BTU per hour or less heat input and located outside the Minneapolis-St. Paul Air Quality Control Region:

(aa) There is no restriction on the amount of sulfur dioxide emissions which can be discharged from the direct heating equipment except to the extent that ambient air standards must be complied with. Refer to APC 1.

(bb) No owner or operator of such direct heating equipment shall cause to be discharged into the atmosphere from the direct heating equipment any gases:

(i) Which contain particulate matter in excess of the limitations of Table 1. The particulate matter concentration limitations shall be determined by the quantity of source gas volume.

(ii) Which exhibit greater than 20% opacity, except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) There is no restriction on the amount of nitrogen oxides emissions which can be discharged from the direct heating equipment except to the extent that the ambient air quality standards must be complied with. Refer to APC 1.

(2) The following standards apply to fossil fuel-burning equipment of more than 250 million BTU per hour input and located outside the Minneapolis-St. Paul Air Quality Control Region.

(aa) No owner or operator of such direct heating equipment shall cause to be discharged into the atmosphere any gases which contain sulfur dioxide in excess of 1.75 pounds per million BTU heat input; except that any owner or operator who burns a fossil fuel or combination of fuels with a sulfur content not exceeding 2.0 pounds per million BTU heat input if a solid fossil fuel is burned and 1.0 pounds per million BTU heat input if a liquid fossil fuel is burned shall be deemed to be in compliance with the requirements of this provision.

(bb) No owner or operator of such direct heating equipment shall cause to be discharged into the atmosphere from the direct heating equipment any gases:

(i) Which contain particulate matter in excess of the limitations of Table 1. The particulate matter concentration limitations shall be determined by the quantity of source gas volume.

(ii) Which exhibit greater than 20% opacity, except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) There is no restriction on the amount of nitrogen oxides emissions which can be discharged from the direct heating equipment except to the extent that the ambient air standards must be complied with. Refer to APC 1.

(3) The following standards apply to fossil fuel-burning direct heating equipment of 250 million BTU per hour or less heat input and located within the Minneapolis-St. Paul Air Quality Control Region:

(aa) No owner or operator of such direct heating equipment shall cause to be discharged into the atmosphere from the direct heating equipment any gases which contain sulfur dioxide in excess of 1.75 pounds per million BTU heat input; except that any owner or operator who burns a fossil fuel or combination of fuels with a sulfur content not exceeding 2.0 pounds per million BTU heat input if a solid fossil fuel is burned and 1.0 pounds per million BTU heat input if a liquid fossil fuel is burned shall be deemed to be in compliance with the requirements of this provision.

(bb) No owner or operator of such direct heating equipment unit shall cause to be discharged into the atmosphere from the direct heating equipment any gases:

(i) Which contain particulate matter in excess of the limitations of Table 1. The particulate matter concentration limitations shall be determined by the quantity of source gas volume.

(ii) Which exhibit greater than 20% opacity,

except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) There is no restriction on the amount of nitrogen oxides emissions which can be discharged from the direct heating equipment except to the extent that the ambient air standards must be complied with. Refer to APC 1.

(4) The following standards apply to fossil fuel-burning direct heating equipment of more than 250 million BTU per hour heat input and located within the Minneapolis-St. Paul Air Quality Control Region:

(aa) No owner or operator of such direct heating equipment shall cause to be discharged into the atmosphere from the direct heating equipment any gases which contain sulfur dioxide in excess of 1.75 pounds per million BTU input; except that any owner or operator who burns a fossil fuel with a sulfur content not exceeding 1.5 pounds per million BTU heat input if a solid fossil fuel is burned and 0.8 pounds per million BTU heat input if a liquid fossil fuel is burned shall be deemed to be in compliance with the requirements of this provision.

(bb) No owner or operator of such direct heating

equipment shall cause to be discharged into the atmosphere from the direct heating equipment any gases:

(i) Which contain particulate matter in excess of the limitations of Table 1. The particulate matter concentration limitations shall be determined by the quantity of source gas volume.

(ii) Which exhibit greater than 20% opacity, except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) There is no restriction on the amount of nitrogen oxides emissions which can be discharged from the indirect heating equipment except to the extent that the ambient air quality standards must be complied with. Refer to APC 1.

(5) An owner or operator of fossil fuel-burning direct heating equipment located within the Minneapolis-St. Paul Air Quality Control Region shall be deemed to be in compliance with the requirements of this regulation if:

(aa) The equipment is existing equipment equipped with particulate collection equipment which has a collection efficiency of 99% or greater by weight; or

(bb) The equipment is new equipment equipped with particulate collection equipment which has a collection efficiency of 99.7% or greater by weight

(6) An owner or operator of fossil fuel-burning direct heating equipment located outside the Minneapolis-St. Paul Air Quality Control Region shall be deemed to be in compliance with the requirements of this regulation if:

(aa) The equipment is equipped with particulate collection equipment which has a collection efficiency of 99% or greater by weight; or

(bb) The equipment is equipped with particulate collection equipment which has a collection efficiency of 90% or greater by weight and the direct heating equipment is located more than one-fourth mile from any residence or public roadway.

(7) Exceptions

No owner or operator of existing gray iron cupolas with a melting capacity of up to 1½ tons per hour shall allow emissions which exceed 0.3 grains per standard cubic foot, dry basis.

(8) TABLE 1

Source Gas Volume, SCFM[a]	Concentration GR/SCF[b]	Source Gas Volume, SCFM[a]	Concentration GR/SCF[b]
7,000 or less	0.100	140,000	0.038
8,000	0.096	160,000	0.036
9,000	0.092	180,000	0.035
10,000	0.089	200,000	0.034
20,000	0.071	300,000	0.030
30,000	0.062	400,000	0.027
40,000	0.057	500,000	0.025
50,000	0.053	600,000	0.024
60,000	0.050	800,000	0.021
80,000	0.045	1,000,000 or more	0.020
100,000	0.042		
120,000	0.040		

[a]Standard cubic feet per minute (See APC 2)
[b]Grains per standard cubic foot.

(d) Fuel Monitoring

(1) The sulfur content (%S) and high heating value (HHV) of solid fuels shall be determined by using A.S.T.M. test methods D2234-68(72) for mechanical sampling, D2013-68(72) for sample preparation, and D271-70 (%S and HHV). Alternate method D2015-66(72) may be used only for the high heating value analysis (HHV). For A.S.T.M. test method D2234-68(72) the methods of increment collection shall be Type I (see 4.2.1), Conditions A, B, or D (see 4.3.4), and systematic spacing (see 4.4.1) for each lot. The number and weight of increments selected shall be the same as listed within Table 2 of the method.

(2) The sulfur content (%S) and high heating value (HHV) of liquid fuels shall be determined by using A.S.T.M. test method D240-64(73) for the complete sample analysis (HHV and %S). Alternate methods D1551-68 or D1552-64 may be used only for the sulfur analysis (%S).

(3) The high heating value (HHV) of gaseous fuels shall be determined by A.S.T.M. test method D1826-64(70).

(e) Emission Monitoring

(1) Opacity

(aa) The owner or operator of any fossil fuel-burning direct heating equipment unit of more than 250 million BTU per hour heat input shall install, calibrate, maintain and operate a continuous monitoring system for the measurement of the opacity of emissions, except where:

(i) Gaseous fuel is the only fuel burned, or

(ii) Oil is the only fuel burned and the source is able to comply with the applicable particulate matter regulation without utilization of emission control equipment and no violation of the visible emission limitation has been noted.

(bb) Continuous monitoring systems for measuring opacity shall comply with Performance Specification 1. (Refer to APC 2).

(2) SO_2 Emissions

(aa) The owner or operator of any fossil fuel-fired direct heating equipment unit of more than 250 million BTU per hour heat input shall install, calibrate, maintain and operate a continuous monitoring system for the measurement of sulfur dioxide emissions, except where:

(i) Gaseous fuel is the only fuel burned, or

(ii) Fuel analyses demonstrate that any lot of fuel procured by an owner or operator for combustion within an affected facility can, without the benefit of blending, achieve compliance with this Regulation.

(bb) Where the owner or operator elects to submit fuel analyses to determine sulfur dioxide emissions, emissions shall be calculated by use of the equation:

$$Eavg = K \frac{(20,000) \quad (\%S)}{(HHV)}$$

where:

(i) Eavg = average sulfur dioxide emission, g/million cal (lb/million BTU).

(ii) %S = sulfur content by weight of the fuel, dry basis (expressed as percent).

(iii) HHV = high heating value of fuel, cal/g (BTU/lb), dry basis.

(iv) K = fraction of the total sulfur input exhausted with the flue gas. For solid fuels (except lignite) K = 0.970, and for liquid fuels K = 0.985. Sources which elect to analyze the sulfur content of bottom and precipitated ash using A.S.T.M. test method D1757-62(69) and perform a material balance around the affected facility monthly may establish other values for K.

(cc) Continuous monitoring systems for measuring sulfur dioxide shall comply with Performance Specification 2.

(f) Performance Test Methods

Unless another method is approved by the Director of the Division of Air Quality, any person required to submit performance tests for a fossil fuel-fired direct heating equipment unit shall utilize the following test methods. Refer to APC 2.

(1) Method 1 for selection of sampling site and sample traverses.

(2) Method 3 for gas analysis.

(3) Method 5, modified for the State of Minnesota, for concentration of particulate matter and the associated moisture content.

(4) Method 6 for concentration of SO_2.

(5) Method 7 for concentration of NO_x.

(6) Method 9 for visual determination of opacity.

(g) Performance Test Procedures

(1) The sampling site, as selected by Method 1, shall be the same for each pollutant during a performance test.

(2) For Method 5, the sampling time for each run shall be at least 60 minutes and the minimum sampling volume shall be 0.85 dscm (30 dscf) except that smaller sampling times or volumes, when necessitated by process variables or other factors, may be approved by the Agency. The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature between 120°C and 150°C (250°F and 300°F).

(3) For methods 6 and 7, the sampling point in the duct shall be at the centroid of the cross section or at a point no closer to the walls than 1 m (3.28 ft). For Method 6 the sample shall be extracted at a rate proportional to the gas velocity at the sampling point.

(4) For Method 6, the minimum sampling time shall be 20 minutes and the minimum sampling volume 0.02 dscm (0.71 dscf) for each sample. The arithmetic mean of two samples shall constitute one run. Samples shall be taken at approximately 30-minute intervals.

(5) For Method 7, each run shall consist of at least four grab samples taken at approximately 15-minute intervals. The arithmetic mean of the samples shall constitute the run value.

(6) For each performance test, the emissions expressed in g/million cal (lb/million BTU) shall be determined by the following procedure:

$$E=CF\left(\frac{2090}{20.9-\%O_2}\right)$$

where:

(aa) E=pollutant emission, g/million cal (lb/million BTU).

(bb) C=pollutant concentration, g/dscm (lb/dscf), determined by Methods 5, 6 or 7.

(cc) $\%O_2$=oxygen content by volume (expressed as percent), dry basis. Percent oxygen shall be determined by using the integrated sampling procedures of Method 3 and by analyzing the sample with the continuous monitoring system required under subsection (e)(4), or by using the Orsat analyzer. The sample shall be obtained as follows:

(i) For determination of sulfur dioxide and nitrogen oxides emissions, the oxygen sample shall be obtained at approximately the same point in the duct as used to obtain the samples for Methods 6 and 7 determinations, respectively.

(ii) For determination of particulate emissions, the oxygen sample shall be obtained by traversing the duct in accordance with Method 1 except that 12 sample points shall be used in all cases.

(dd) F=factor representing a ratio of the volume of flue gases generated to the calorific value of the fuel combusted. Values of F are given as follows:

(i) For anthracitic coal according to A.S.T.M. D388-66, F=0.01139 dscm/10^4 cal (101.4 dscf/10^4 BTU).

(ii) For subbituminous and bituminous coal

according to A.S.T.M. D388-66, F=0.01103 dscm/10^4 cal (98.2 dscf/10^4 BTU).

(iii) For liquid fossil fuels including crude, residual, and distillate oils, F=0.01036 dscm/10^4 cal (92.2 dscf/10^4 BTU).

(iv) For gaseous fossil fuels including natural gas, propane, and butane, F=0.00982 dscm/10^4 cal (87.4 dscf/10^4 BTU).

(ee) An owner or operator may use the following equation to determine an F factor (dscf/10^4 BTU) in lieu of the F factors specified by paragraph (6)(dd) of this section:

$$F=10^6 \frac{3.64(\%H)+1.53(\%C)+.57(\%S)+.14(\%N)-.46(\%O)}{HHV}$$

where:

(i) H, C, S, N, and O are content by weight of hydrogen, carbon, sulfur, nitrogen, and oxygen (percent expressed as a decimal), respectively, as determined by ultimate analysis of the fuel fired, dry basis, using A.S.T.M. methods D271-70 (solid fuels) or D240-64(73) (liquid fuels) or computed from results using A.S.T.M. Method D1137-53(70) (gaseous fuels) as applicable.

(ii) HHV is the high heating value (BTU/lb), dry basis, of the fuel combusted, as determined under subsection (d).

(ff) When combinations of fuels are fired, the F factors determined by paragraph (6)(dd) or (ee) of this

section shall be prorated in accordance with the following formula:

$$F=\frac{xF_1+yF_2+zF_3}{x+y+z}$$

where:

x=the percentage of total heat input derived from gaseous fossil fuel.

y=the percentage of total heat input derived from liquid fossil fuel.

z=the percentage of total heat input derived from solid fossil fuel.

F_1=the value of F for gaseous fossil fuels according to subsection (6)(dd) or (ee) of this regulation.

F_2=the value of F for liquid fossil fuels according to subsection (6)(dd) or (ee) of this regulation.

F_3=the value of F for solid fossil fuels according to subsection (6)(dd) or (ee) of this regulation.

(gg) When combinations of fossil fuels are fired, the heat input, expressed in cal/hr (BTU/hr), shall be determined during each testing period by multiplying the high heating value of each fuel fired by the rate of each fuel burned. The rate of fuels burned during each testing period shall be determined by suitable methods and shall be confirmed by a material balance over the direct heating system.

Proposed

March 14, 1975

20.

APC 11 RESTRICTION OF EMISSION OF VISIBLE AIR CONTAMINANTS

(a) Visible emission restrictions applicable to existing installations which are not covered by specific source regulations. No person shall cause or permit the emission of smoke or any other air contaminant which is:

(1) Darker than 20 percent opacity,

(2) Except that emissions greater than 20 percent opacity but less than or equal to 40 percent opacity shall be permissible for not longer than four (4) minutes in the aggregate in any 60 minute period.

(b) Smoke restrictions applicable to new installations which are not covered by specific regulations. No person shall cause or permit the emission of smoke or any other contaminant which is:

(1) Darker than 20 percent opacity.

(c) Exceptions

(1) Where the presence of condensed water vapor is the only reason for failure of an emission to meet the requirements of Section (a) or (b) of this regulation, such sections shall not apply.

(2) A temporary operational breakdown of any equipment, installation or facility may be permitted by the Agency to be an exception to the provisions of Regulation APC-11.

(d) Performance Test Method

The evaluation of opacities shall be determined in accordance with Method 9, as referenced in APC-21.

Proposed
March 14, 1975

APC 4 STANDARDS OF PERFORMANCE FOR FOSSIL FUEL-BURNING EQUIPMENT USED FOR INDIRECT HEATING.

(a) Definitions

As used in this regulation the following words shall have the meanings defined herein:

(1) "Fossil fuel-burning equipment" and "indirect heating equipment" means a furnace, a boiler or other unit of combustion equipment used in the process of burning fossil fuel for the purpose of producing steam, hot water, hot air, or other hot liquid, gas, or solid, where the products of combustion do not have direct contact with the heated medium.

(2) "Fossil fuel" means natural gas, petroleum, coal, wood, and any form of solid, liquid, or gaseous fuel derived from such materials.

(3) "Heat input" means the number of BTU per hour determined by multiplying the high heating value (BTU/lb.) of each fossil fuel fired in the indirect heating equipment at the time of determining the heat input times the rate of each fuel burned (lb/hr).

(4) "Distillate fuel oil" means grades of oils known as No. 1 & No. 2 as defined in the American Society for Testing and Materials D 396 (1973).

(5) "Residual fuel oil" means grades of oils known as No. 4, No. 5 (Light), No. 5 (Heavy), and No. 6, as defined in the American Society for Testing and Materials D 396 (1973).

(6) "Lot" means any quantity of material so designated by the material's supplier except that the quantity of material in any one lot shall not exceed the quantity of any shipment(s) physically delivered by each supplier to the owner or operator in any 24-hour period.

(b) Determination of Applicable Standards of Performance

(1) In determining which provisions of paragraph (c) or (d) are applicable to specific fossil fuel-burning equipment, the heat input of all fossil fuel-burning equipment of one owner or operator at one particular location shall be added together to determine the total heat input.

(2) If the total heat input of all fossil fuel-burning equipment of one owner or operator at one particular location exceeds 250 million BTU, the provisions in paragraph (c) or (d) which apply to equipment of greater than 250 million BTU per hour heat input shall apply, except that new fossil fuel-burning equipment of less than 250 million BTU per hour heat input for which construction was commenced prior to the effective date of this regulation shall not be required to comply with the new source performance standard for new equipment of greater than 250 million BTU per hour heat input.

(c) Standards of Performance for Existing Fossil Fuel-Burning Equipment.

(1) The following standards apply to existing indirect heating equipment of 250 million BTU per hour or less heat input and located outside the Minneapolis-St. Paul Air Quality Control Region:

(aa) There is no restriction on the amount of sulfur dioxide emissions which can be discharged from

the indirect heating equipment except to the extent that the ambient air quality standards must be complied with. Refer to APC 1.

(bb) No owner or operator of such equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases:

(i) Which contain particulate matter in excess of 0.6 pounds per million BTU per hour input; except that the owner or operator of such indirect heating equipment located within the city limits of the City of Duluth shall not cause to be discharged into the atmosphere any gases which contain particulate matter in excess of 0.4 pounds per million BTU input; or

(ii) Which exhibit greater than 20% opacity; except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) There is no restriction on the amount of nitrogen oxides emissions which can be discharged from the indirect heating equipment except to the extent that the ambient air quality standards must be complied with. Refer to APC 1.

(2) The following standards apply to existing indirect heating equipment of more than 250 million BTU per hour input

and located outside the Minneapolis-St. Paul Air Quality Control Region:

(aa) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere any gases which contain sulfur dioxide in excess of 1.75 pounds per million BTU heat input; except that any owner or operator who burns a fossil fuel or combination of fuels with a sulfur content not exceeding 2.0 pounds per million BTU heat input if a solid fossil fuel is burned and 1.0 pound per million BTU if a liquid fossil fuel is burned, shall be deemed to be in compliance with the requirements of this provision.

(bb) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases:

(i) Which contain particulate matter in excess of 0.6 pounds per million BTU input; except that the owner or operator of such indirect heating equipment located within the city limits of the City of Duluth shall not cause to be discharged into the atmosphere from the indirect heating equipment any gases which contain particulate matter in excess of 0.4 pounds per million BTU input; or:

(ii) Which exhibit greater than 20% opacity; except that a maximum of 60% opacity shall be

permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) There is no restriction on the amount of nitrogen oxides emissions which can be discharged from the indirect heating equipment except to the extent that the ambient air standards must be complied with. Refer to APC 1.

(3) The following standards apply to existing indirect heating equipment of 250 million BTU per hour or less heat input and located within the Minneapolis-St. Paul Air Quality Control Region:

(aa) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases which contain sulfur dioxide in excess of 1.75 pounds per million BTU input; except that any owner or operator who burns a fossil fuel or combination of fuels with a sulfur content not exceeding 2.0 pounds per million BTU heat input if a solid fossil fuel is burned and 1.0 pound per million BTU if a liquid fossil fuel is burned shall be deemed to be in compliance with the requirements of this provision.

(bb) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases:

(i) Which contain particulate matter in excess of 0.4 pounds per million BTU input; or

(ii) Which exhibit greater than 20% opacity; except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) There is no restriction on the amount of nitrogen oxides emissions which can be discharged from the indirect heating equipment except to the extent that the ambient air quality standards must be complied with. Refer to APC 1.

(4) The following standards apply to existing indirect heating equipment of more than 250 million BTU per hour heat input and located within the Minneapolis-St. Paul Air Quality Control Region:

(aa) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases which contain sulfur dioxide in excess of 1.75 pounds per million BTU input; except that any owner or operator who burns a fossil fuel with a sulfur content not exceeding 1.50 pounds per million BTU heat input if a solid fossil fuel is burned and 0.8 pounds per million BTU heat input if a liquid fossil fuel is burned shall be deemed to be in compliance with the requirements of this provision.

(bb) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases:

(i) Which contain particulate matter in excess of 0.4 pounds per million BTU input; or

(ii) Which exhibit greater than 20% opacity; except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases which contain nitrogen oxides, expressed as nitrogen dioxide, in excess of 0.3 pounds per million BTU input if the fossil fuel burned is natural gas and in excess of 0.4 pounds per million BTU input if the fossil fuel burned is petroleum.

(d) Standards of Performance for New Fossil Fuel-Burning Equipment.

(1) The following standards apply to new indirect heating equipment of less than 250 million BTU per hour heat input and located within the Minneapolis-St. Paul Air Quality Control Region:

(aa) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases

which contain sulfur dioxide in excess of 1.75 pounds per million BTU input; except that any owner or operator who burns a fossil fuel with a sulfur content not exceeding 1.50 pounds per million BTU heat input if a solid fossil fuel is burned and 0.8 pounds per million BTU heat input if a liquid fossil fuel is burned, shall be deemed to be in compliance with the requirements of this provision.

(bb) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases:

(i) Which contain particulate matter in excess of 0.4 pounds per million BTU input; or

(ii) Which exhibit greater than 20% opacity; except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) There is no restriction on the amount of nitrogen oxides emissions which can be discharged from the indirect heating equipment except to the extent that the ambient air standards must be complied with. Refer to APC 1.

(2) The following standards apply to new indirect heating equipment of less than 250 million BTU per hour heat input and located outside the Minneapolis-St. Paul Air Quality Control Region:

(aa) There is no restriction on the amount of sulfur dioxide emissions which can be discharged from the indirect heating equipment except to the extent that the ambient air quality standards must be complied with. Refer to APC 1.

(bb) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases:

(i) Which contain particulate matter in excess of 0.4 pounds per million BTU input; or

(ii) Which exhibit greater than 20% opacity; except that a maximum of 60% opacity shall be permissible for four minutes in any 60 minute period and that a maximum of 40% opacity shall be permissible for four additional minutes in any 60 minute period.

(cc) There is no restriction on the amount of nitrogen oxides emissions which can be discharged from the indirect heating equipment except to the extent that the ambient air quality standards must be complied with. Refer to APC 1.

(3) The following standards apply to new indirect heating equipment of more than 250 million BTU per hour heat input, regardless of location:

(aa) No owner or operator of the steam generating unit shall cause to be discharged into the atmosphere from the steam generating unit any gases which contain

sulfur dioxide in excess of 0.80 pounds per million BTU input if a liquid fossil fuel is burned and 1.2 pounds per million BTU input if a solid fossil fuel is burned. When different fossil fuels are burned simultaneously in any combination, the applicable standard shall be determined by proration using the following formula:

$$x = \frac{y(0.8) + z(1.2)}{y + z}$$

where:

x is the maximum allowable emissions of sulfur dioxide gases in lbs. per million BTU, and

y is the percentage of total heat input derived from liquid fossil fuel, and

z is the percentage of total heat input derived from solid fossil fuel, and

compliance shall be based on the total heat input from all fossil fuels burned including gaseous fuels.

(bb) No owner or operator of such indirect heating equipment shall cause to be discharged into the atmosphere from the indirect heating equipment any gases which:

(i) Contain particulate matter in excess of 0.10 pounds per million BTU input; or

(ii) Exhibit greater than 20 percent opacity except that a maximum of 40 percent opacity shall be permissible for not more than 2 minutes in any 60 minute period.

(cc) No owner or operator of such indirect heating equipment unit shall cause to be discharged into the atmosphere from the indirect heating equipment any gases which contain nitrogen oxides, expressed as nitrogen dioxide, in excess of 0.20 pounds per million BTU input if a gaseous fossil fuel is burned; 0.30 pounds per million BTU input if a liquid fossil fuel is burned, and 0.70 pounds per million BTU input if a solid fossil fuel (except lignite) is burned.

(e) Allowance for Stack Height

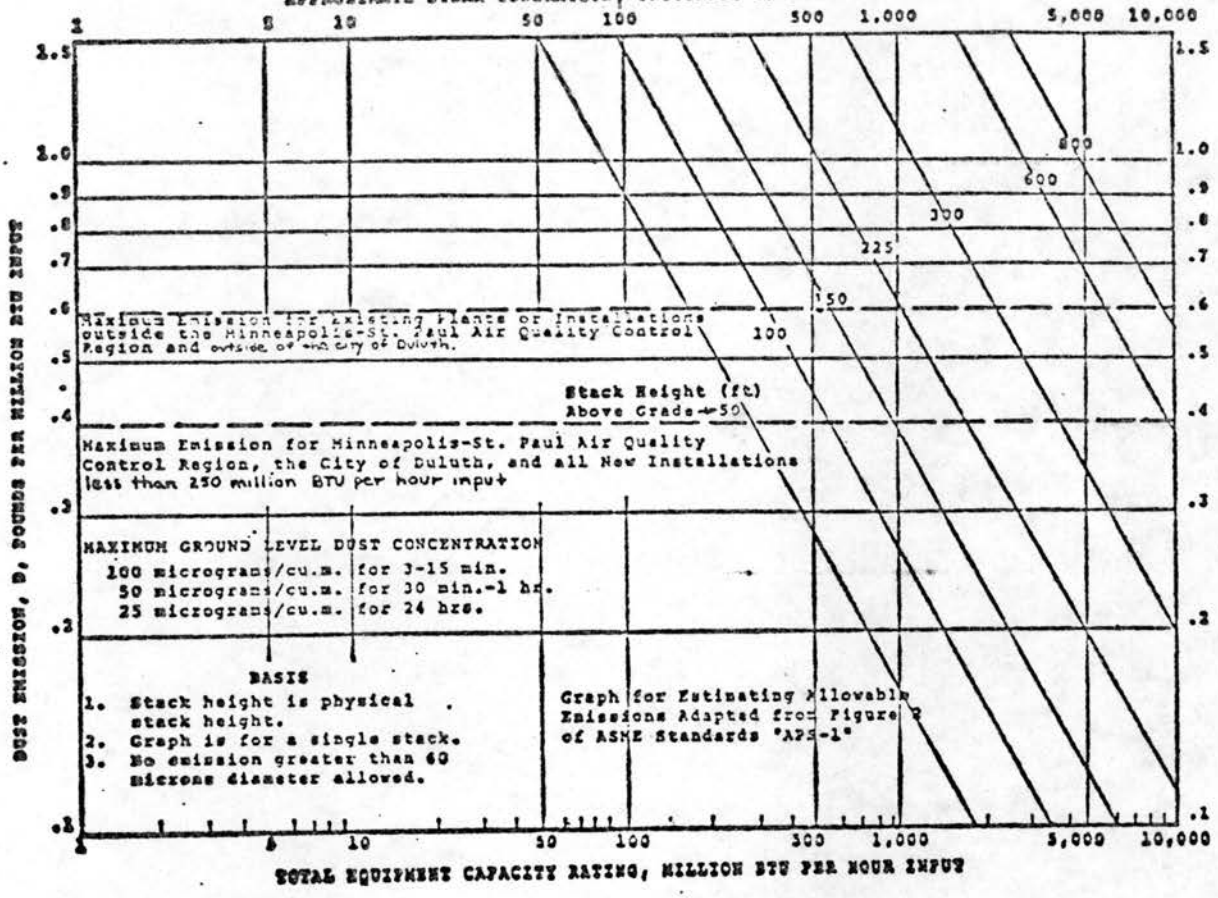
(1) Each owner or operator of indirect heating equipment shall determine an allowable emission of particulate matter from each stack which emits particulate matter from indirect heating equipment, using Figure I. The heat input shall be the total heat input of all indirect heating equipment which emits particulate matter out the stack.

(2) If the allowable emission from Fig. I is more stringent than that provided by the applicable provision of paragraph (c) or (d), the owner or operator of the indirect heating equipment shall comply with the more stringent restriction of Fig. I.

(3)

FIGURE # 1

COMBUSTION FOR INDIRECT HEAT EXCHANGERS



(f) Fuel Monitoring

(1) The sulfur content (%S) and high heating value (HHV) of solid fuels shall be determined by using A.S.T.M. test methods D2234-68(72) for mechanical sampling, D2013-68(72) for sample preparation, and D271-70 (%S and HHV). Alternate method D2015-66(72) may be used only for the high heating value analysis (HHV). For A.S.T.M. test method D2234-68(72) the methods of increment collection shall be Type I (see 4.2.1), Conditions A, B, or D (see 4.3.4), and systematic spacing (see 4.4.1) for each lot. The number and weight of increments selected shall be the same as listed within Table 2 of the method.

(2) The sulfur content (%S) and high heating value (HHV) of liquid fuels shall be determined by using A.S.T.M. test method D240-64(73) for the complete sample analysis (HHV and (%S). Alternate methods D1551-68 or D1552-64 may be used only for the sulfur analysis (%S).

(4) The high heating value (HHV) of gaseous fuels shall be determined by A.S.T.M. test method D1826-64(70).

(g) Emission Monitoring

(1) Opacity

(aa) The owner or operator of any fossil fuel-fired indirect heating equipment unit of more than 250 million BTU per hour heat input shall install, calibrate, maintain, and operate a continuous monitoring system for the measurement of the opacity of emissions, except where:

(i) Gaseous fuel is the only fuel burned, or

(ii) Oil is the only fuel burned and the source is able to comply with the applicable particulate matter regulation without utilization of emission control equipment and no violation of the visible emission limitation has been noted.

(bb) Continuous monitoring systems for measuring opacity shall comply with Performance Specification 1. (Refer to APC 2).

(2) SO_2 Emissions

(aa) The owner or operator of any fossil fuel-fired indirect heating equipment unit of more than 250 million BTU per hour heat input shall install, calibrate, maintain, and operate a continuous monitoring system for the measurement of sulfur dioxide emissions, except where:

(i) Gaseous fuel is the only fuel burned, or

(ii) Fuel analyses demonstrate that any lot of fuel procured by an owner or operator for

combustion within an affected facility can, without the benefit of blending, achieve compliance with this Regulation.

(bb) Where the owner or operator elects to submit fuel analyses to determine sulfur dioxide emissions, emissions shall be calculated by use of the equation:

$$Eavg = K \frac{(20,000) \quad (\%S)}{(HHV)}$$

where:

(i) Eavg = average sulfur dioxide emission, g/million cal (lb/million BTU).

(ii) %S = sulfur content by weight of the fuel, dry basis (expressed as percent).

(iii) HHV = high heating value of fuel, cal/g (BTU/lb) on dry basis.

(iv) K = fraction of the total sulfur input exhausted with the flue gas. For solid fuels (except lignite) K = 0.970, and for liquid fuels K = 0.985. Sources which elect to analyze the sulfur content of bottom and precipitated ash using A.S.T.M. test method D1757-62(69) and perform a material balance around the affected facility monthly may establish other values for K.

(cc) Continuous monitoring systems for measuring sulfur dioxide shall comply with Performance Specification 2. Refer to APC 2.

(3) Nitrogen Oxides Emissions

(aa) The owner or operator of any fossil fuel-fired indirect heating equipment unit of more than 250 million BTU per hour heat input shall install, calibrate, maintain, and operate a continuous monitoring system for the measurement of nitrogen oxides emissions.

(bb) The pollutant gas used to prepare calibration gas mixtures for the continuous monitoring system shall be nitric oxide (NO).

(cc) Continuous monitoring systems for measuring nitrogen oxides emissions shall comply with Performance Specification 2. Refer to APC 2.

(4) Oxygen in Flue Gases

(aa) The owner or operator of any fossil fuel-fired indirect heating equipment unit of more than 250 million BTU per hour heat input shall install, calibrate, maintain, and operate a continuous monitoring system for the measurement of the percent oxygen in the flue gases.

(bb) Continuous monitoring systems for measuring oxygen shall comply with Performance Specification 3. Refer to APC 2.

(h) Performance Test Methods

Unless another method is approved by the Director of the Division of Air Quality, any person required to submit performance tests for a fossil fuel-fired indirect heating equipment unit shall utilize the following test methods (Refer to APC 2):

(1) Method 1 for selection of sampling site and sample traverses.

(2) Method 3 for gas analysis.

(3) Method 5, modified for the State of Minnesota, for concentration of particulate matter and the associated moisture content.

(4) Method 6 for concentration of SO_2.

(5) Method 7 for concentration of NO_x.

(6) Method 9 for visual determination of opacity.

(i) Performance Test Procedures

(1) The sampling site, as selected by Method 1, shall be the same for each pollutant during a performance test.

(2) For Method 5, the sampling time for each run shall be at least 60 minutes and the minimum sampling volume shall be 0.85 dscm (30 dscf) except that smaller sampling times or volumes, when necessitated by process variables or other factors, may be approved by the Agency. The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature between 120°C and 150° C (250°F and 300°F).

(3) For Methods 6 and 7, the sampling point in the duct shall be at the center of the cross section or at a point no closer to the walls than 1 m (3.28 ft). For Method 6 the sample shall be extracted at a rate proportional to the gas velocity at the sampling point.

(4) For Method 6, the minimum sampling time shall be 20 minutes and the minimum sampling volume 0.02 dscm (0.71 dscf)

for each sample. The arithmetic mean of two samples shall constitute one run. Samples shall be taken at approximately 30-minute inter-vals.

(5) For Method 7, each run shall consist of at least four grab samples taken at approximately 15-minute intervals. The arithmetic mean of the samples shall constitute the run value.

(6) For each performance test, the emissions expressed in g/million cal (lb/million BTU) shall be determined by the following procedure:

$$E=CF\ \left(\frac{2090}{20.9-\%O_2}\right)$$

where:

(aa) E-pollutant emission, g/million cal (lb/million BTU).

(bb) C=pollutant concentration, g/dscm (lb/dscf), determined by Methods 5, 6 or 7.

(cc) $\%O_2$=oxygen content by volume (expressed as percent), dry basis. Percent oxygen shall be determined by using the integrated sampling procedures of Method 3 and by analyzing the sample with the continuous monitoring system required under subsection (e)(4), or by using the Orsat analyzer. The sample shall be obtained as follows:

(i) For determination of sulfur dioxide and nitrogen oxides emissions, the oxygen sample shall be obtained at approximately the same point in the duct as used to obtain the samples for Methods 6 and 7 determinations, respectively.

(ii) For determination of particulate emissions, the oxygen sample shall be obtained by traversing the

duct in accordance with Method 1 except that 12 sample points shall be used in all cases.

(dd) F-factor representing a ratio of the volume of flue gases generated to the calorific value of the fuel combusted. Values of F are given as follows:

(i) For anthracitic coal according to A.S.T.M. D388-66, F=0.01139 dscm/10^4 cal (101.4 dscf/10^4 BTU).

(ii) For subbituminous and bituminous coal according to A.S.T.M. D388-66, F=0.01103 dscm/10^4 cal (98.2 dscf/10^4 BTU).

(iii) For liquid fossil fuels including crude, residual, and distillate oils, F=0.01036 dscm/10^4 cal (92.2 dscf/10^4 BTU).

(iv) For gaseous fossil fuels including natural gas, propane, and butane, F=0.00982 dscm/10^4 cal (87.4 dscf/10^4 BTU).

(ee) An owner or operator may use the following equation to determine an F factor (dscf/10^4 BTU) in lieu of the F factors specified by paragraph (6)(dd) of this section:

$$F=10^6 \frac{3.64(\%H)+1.53(\%C)+.57(\%S)+.14(\%N)-.46(\%O)}{HHV}$$

where:

(i) H, C, S, N, and O are content by weight of hydrogen, carbon, sulfur, nitrogen, and oxygen (expressed as percent), respectively, as determined by

ultimate analysis of the fuel fired, dry basis, using A.S.T.M. methods D271-70 (solid fuels) or D240-64(73) (liquid fuels) or computed from results using A.S.T.M. method D1137-53(70) (gaseous fuels) as applicable.

(ii) HHV is the high heating value (BTU/lb) dry basis, of the fuel combusted, as determined under subsection (f)(1) and (f)(2).

(ff) When combinations of fuels are fired, the F factors determined by paragraph (6)(dd) or (ee) of this section shall be prorated in accordance with the following formula:

$$F = \frac{xF_1 + yF_2 + zF_3}{x+y+z}$$

where:

x=the percentage of total heat input derived from gaseous fossil fuel.

y=the percentage of total heat input derived from liquid fossil fuel.

z=the percentage of total heat input derived from solid fossil fuel.

F_1=the value of F for gaseous fossil fuels according to subsection (6)(dd) or (ee) of this regulation.

F_2=the value of F for liquid fossil fuels according to subsection (6)(dd) or (ee) of this regulation.

F_3=the value of F for solid fossil fuels according to subsection (6)(dd) or (ee) of this regulation.

(gg) When combinations of fossil fuels are fired, the heat input, expressed in cal/hr (BTU/hr), shall be determined during each testing period by multiplying the high heating value of each fuel fired by the rate of each fuel burned. The rate of fuels burned during each testing period shall be determined by suitable methods and shall be confirmed by a material balance over the indirect heating system.

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Adoption of Amendments to Air Pollution Control Regulations APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

FINDINGS OF FACT
APC 4

The above-entitled matter came on for hearing before the Minnesota Pollution Control Agency (hereinafter Agency) on the 17th day of April, 1975, at 9:00 a.m. and again at 7:00 p.m. and again on the 18th day of April, 1975, at 9:00 a.m., and again on the 10th day of June, 1975, at 9:00 a.m. in the Board Room of the Agency offices, 1935 West County Road B2, Roseville, Minnesota, and again on April 23 at 9:00 a.m. in the Duluth, Minnesota, City Council Chambers in City Hall, and again on April 20, 1975, at 9:00 a.m. in the Moorhead, Minnesota, City Council Chambers in the City Hall, and again on May 1, 1975, at 9:00 a.m. at Mankato, Minnesota, at the Law Enforcement Center, 710 South Front Street, after proper notice required by Minnesota Statutes §15.0412 (1974) was served upon all persons, associations and other interested groups registered with the Secretary of State for that purpose.

After affording all interested persons an opportunity to present written and oral data, statements and arguments, having considered all of the testimony, having considered all evidence adduced and upon the records, files and proceedings herein, the Agency finds the following:

1. The Agency first promulgated emission standards for fuel-burning equipment used for indirect heating in 1969. Minn. Reg. APC 4. This regulation established emission limitations on the discharge of sulfur dioxide, particulate matter, and nitrogen oxides from such equipment.

2. The emission limitations established in Minn. Reg. APC 4 are dependent on the heat input of the indirect heating equipment. While the limitation on the discharge of sulfur dioxide emissions in APC 4 was clearly based on the actual heat input to the equipment, some confusion and ambiguity existed regarding the determination of heat input for determining the emission rate of particulate matter. Many of the owners or operators of indirect heating equipment used the rated heat input of their equipment to determine compliance with the particulate limitations and claimed that a change to the actual heat input would require significant expenditures for control equipment or a derate of equipment in order to achieve compliance. (June 10, 1975, Transcript at pp. 24, 58, and 157-159; Public Exhibit 21 at pp. 29-33; Public Exhibit 17 at p. 3; Public Exhibit 18 at p. 3; Statement of Otter Tail Power Company at p. 2; and Statement of 3M Company dated June 30, 1975, at p. 1.) It is reasonable, therefore, to continue using the rated heat input when determining compliance with the particulate standard and the actual heat input when determining compliance with the sulfur dioxide standard.

3. The United States Environmental Protection Agency (hereinafter EPA) requires performance tests for new indirect heating equipment for which it has promulgated emission standards to be

conducted using the actual heat input. 40 C.F.R. §60.46(f). Owners or operators of new indirect heating equipment have adequate notice that actual heat input is the basis for determining compliance with emission limitations and can plan and design the facility with this knowledge. It is reasonable to require owners or operators of new indirect heating equipment to base compliance on the actual heat input.

4. While actual heat input is the more logical basis for determining emission rates during performance tests, rated heat input is the only feasible basis for determining the capability of certain indirect heating equipment, which is indicative of the potential emissions which may occur. Rated heat input will remain constant and will generally represent the maximum heat output of the equipment. Rated heat input is a reasonable basis for establishing emission limitations.

5. A rated heat input of 250 million BTU per hour has been considered the dividing point between major and minor equipment in both Minn. Reg. APC 4 and the federal new source performance standard, 40 C.F.R. §60.40. However, a number of small units of fossil fuel-burning equipment at one facility can have a significant impact on ground level pollutant concentrations particularly since most small sources do not have tall stacks. (April 23, 1975, Transcript at p. 48; Public Exhibit 21 at p. 28.) It is reasonable to consider the total rated heat input of all units of fossil fuel-burning equipment at one facility, whether used for direct or indirect heating, in determining an applicable emission standard for each unit of equipment.

6. A more stringent emission standard can be imposed on smaller units of indirect heating equipment which are part of a large facility without necessarily requiring the installation of continuous monitoring equipment on these smaller units. (Statement of Minnesota Power and Light Company dated June 27, 1975, at p. 9; Statement of United States Steel Corporation dated June 24, 1975, at p. 4; Statement of Lake Superior Industrial Bureau dated June 27, 1975.)

7. The Minneapolis-St. Paul Air Quality Control Region and the City of Duluth have been designated Air Quality Maintenance Areas for particulates by EPA. 40 Fed. Reg. 23754 (June 2, 1975); 40 C.F.R. §52.1229. An Air Quality Maintenance Area is an area within a state that because of existing air quality and projected growth rate has the potential for exceeding ambient air quality standards in the future. 40 C.F.R. §51.12(e). Numerous violations of the primary and secondary ambient air quality standards for particulate matter have been reported in these areas. (PCA Exhibit 25 at pp. 34, 37-41 and PCA Exhibit 26.) It is reasonable to adopt more stringent standards for particulates for indirect heating equipment located in the Minneapolis-St. Paul Air Quality Control Region and in the City of Duluth than for equipment located in other areas.

8. The Minneapolis-St. Paul Air Quality Control Region is also in Air Quality Maintenance Area for sulfur dioxide. 40 C.F.R. §52.1229. It is reasonable to adopt more stringent standards for sulfur dioxide for indirect heating equipment located in this Region.

9. Most owners or operators of indirect heating equipment have elected to comply with Minn. Reg. APC 4 by complying with the sulfur content alternative rather than the sulfur dioxide emission limitation. It is advisable, however, to adopt one standard in terms of the amount of sulfur dioxide emitted into the atmosphere per heat input. Such a standard (SO_2/BTU) is in equivalent units to the federal new source performance standard for steam generators (40 C.F.R. §60.43) and is most indicative of the amount of the controlled pollutant, sulfur dioxide, which may be emitted. (Public Exhibit 21 at pp. 36-37.)

10. Conversion from the percentage of sulfur in the fuel to the amount of sulfur dioxide generated per unit of heat input depends upon the heating value of the coal. (April 17, 1975, Transcript at p. 21; June 10, 1975, Transcript at pp. 84-85, Public Exhibit 21 at pp. 33-34; Statement of Minnesota Power and Light Company dated June 27, 1975, at pp. 9-11; Statement of Otter Tail Power Company received July 1, 1975, at p. 2; and Statement of Otter Tail Power Company dated June 27, 1975.) A change in the standard from percent sulfur to pounds of sulfur dioxide per heat input will allow a wider range of coal to be burned. For example, an Ohio Bituminous coal with 2.28% sulfur and a heating value of 13,035 BTU per pound will emit 1.75 pounds of sulfur dioxide per million BTU. (June 10, 1975, Transcript at pp. 87-88.) While this coal could not be burned under the existing sulsfur content limitations in APC 4, it can meet a comparable standard expressed in terms of the amount of sulfur dioxide emitted.

11. Several public utility companies testified that a change from the sulfur content restriction would cause some of the coal they presently burn to violate the standard. (Public Exhibit 21 at pp. 33-34; Statement of Minnesota Power and Light Company dated June 27, 1975, at pp. 9-11; Statement of Otter Tail Power Company received July 1, 1975, at p. 2; and Statement of Otter Tail Power Company dated June 27, 1975.) However, a sulfur dioxide standard, as opposed to a pounds of sulfur limitation, will still allow some low heating value coal to be burned since not all of the sulfur in the coal will be emitted into the air as sulfur dioxide. Some of the sulfur will be retained in the ash and some will be emitted as a gas other than sulfur dioxide. In addition, pollution abatement equipment such as a wet scrubbing system can be installed to remove some of the sulfur dioxide. (PCA Exhibit 15 at pp. 10-12 and PCA Exhibit 4A.)

12. Several of the public utility companies testified that an extended averaging period of 30 days was necessary in order to meet the sulfur dioxide standard because of excursions in the sulfur content and the heating value of the coal. (June 10, 1975, Transcript at pp. 80-81 and 160-161; April 29, 1975 Transcript at p. 16; Public Exhibit 21 at pp. 34-36; Statement of Minnesota Power and Light Company dated June 27, 1975, at pp. 11-13; Statement of Otter Tail Power Company received July 1, 1975, at pp. 2-3.) It is not evident that a 30 day averaging period is warranted, particularly since ambient air quality standards for sulfur dioxide for a 24 hour period and a three hour period, in addition to an annual average, have been promulgated by the

Agency. Furthermore, EPA is uncertain what to do about averaging emissions of sulfur dioxide. 40 Fed. Reg. 46242, 46244, and 46251 (Oct. 6, 1975). It is reasonable at this time to continue the requirement of Minn. Reg. APC 4 and not allow any averaging period and schedule additional hearings at an appropriate time in the future.

13. On May 8, 1974, EPA reclassified the Minneapolis-St. Paul Air Quality Control Region as a Priority III region for nitrogen oxides. 39 Fed. Reg. 16346 (May 8, 1974). All air quality control regions in Minnesota are now Priority III regions for nitrogen oxides. 40 C.F.R. §52.1226. A Priority III region for nitrogen oxide is one in which the annual arithmetic mean for NO_x below 110 micrograms per cubic meter (0.06 ppm). 40 C.F.R. §51.3. Minn. Reg. APC 4 required control of nitrogen oxides from large facilities located only in Priority I regions.

14. Control of nitrogen oxides is generally achieved by modifications to the combustion process. (PCA Exhibit 33 at ch. 4 and 5 and PCA Exhibit 15 at p. 13.) These combustion modifications are often impractical and unreliable for existing facilities, particularly small ones. (PCA Exhibit 4-D at pp. 1-5.)

15. There is some indirect heating equipment that is included within another regulation. For example, petroleum refineries contain many indirect heaters for which standards of performance are promulgated in Minn. Reg. APC 24. The best manner in which to eliminate any possible confusion as to which regulation applies is

to provide that the specific regulation shall take precedence over Minn. Reg. APC 4. (April 17, 1975, Transcript at pp. 86-87; April 18, 1975, Transcript at pp. 6-9; April 23, 1975, Transcript at p. 42; Public Exhibit 4; Public Exhibit 7; Public Exhibit 8; and Statement of Minnesota Petroleum Council dated June 27, 1975.)

16. The term "high heating value" is used in Minn. Reg. APC 24(a)(13) with a reference to Minn. Reg. APC 4(f).

17. It is possible that emissions from indirect heating equipment could comply with the applicable emission limitations and still cause a violation of ambient air quality or other standards. This could happen if a large facility had a short stack. Therefore, it is necessary to provide that stack height shall be a factor in determining compliance with applicable standards. (PCA Exhibit 20.)

18. EPA has promulgated regulations which require the installation of certain continuous monitoring equipment on indirect heating equipment of greater than 250 million BTU per hour heat input. 40 Fed. Reg. 46247, 46256-46257 (Oct. 6, 1975), 40 C.F.R. Part 51 Appendix P and §60.45. The provisions for those persons who conduct fuel analyses to monitor sulfur dioxide emissions have been reserved. 40 Fed. Reg. 36242, 46244, and 46251 (Oct. 6, 1975), 40 C.F.R. §60.45(b)(2). It is appropriate to withhold these monitoring requirements for indirect heating equipment as a matter of state law until the fuel analyses questions are resolved. However, these requirements will continue to be effective to the extent that the federal law must be complied with.

19. Pursuant to Section 111 of the Clear Air Act, EPA has promulgated standards of performance for certain new affected facilities, including new steam generators. 40 C.F.R. Part 60 Subpart D. These new source performance standards are based on results of source tests conducted by the Environmental Protection Agency and local agencies, on data derived from available technical literature, on information gathered during visits by the Environmental Protection Agency to pollution control agencies and plants in the United States and abroad, and comments and suggestions solicited from experts. (PCA Exhibit 15 at p. 3 and various issues of the Federal Register promulgating the standards.)

20. Adoption of the federal new source performance standards as state regulations and administration and enforcement of these standards by the state is justified. (April 18, 1975, Transcript at p. 41, June 10, 1975, Transcript at pp. 23, 58, and 148, Public Exhibit 17 at p. 2, Public Exhibit 18 at pp. 2-3, and Public Exhibit 21 at p. 6.)

21. The federal new source performance standards apply only to new steam generators but it is reasonable to require other new indirect heating equipment to comply with the same standards. The environmental impact from indirect heating equipment is essentially the same whether the equipment is producing steam or hot water or hot air.

22. While the federal new source performance standards for steam generators apply only to new facilities in excess of 250 million BTU per hour, those new facilities in excess of 100 million BTU per hour which are located in Air Quality Maintenance

Area for particulate matter and which are located within a facility that exceeds 250 million BTU per hour can reasonably be expected to comply with the new source performance standard for particulate matter.

23. It is necessary to distinguish steam generating units from other kinds of indirect heating equipment because the effective date of the new source performance standards for steam generating units is August 17, 1971 (Minn. Reg. APC 2) while the effective date of the new source performance standards for other indirect heating equipment is the effective date of Minn. Reg. APC 4.

Dated this 27 day of October, 1976.

MINNESOTA POLLUTION CONTROL AGENCY

By _____
Peter L. Gove
Executive Director

and _____
Marion E. Watson
Chairwoman

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Adoption of Amendments to Air Pollution Control Regulations APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

ORDER ADOPTING REGULATION APC 4

The above-entitled matter came on for hearing before the Minnesota Pollution Control Agency (hereinafter Agency) on the 17th day of April, 1975, at 9:00 a.m. and again at 7:00 p.m. and again on the 18th day of April, 1975, at 9:00 a.m., and again on the 10th day of June, 1975, at 9:00 a.m. in the Board Room of the Agency offices, 1935 West County Road B2, Roseville, Minnesota, and again on April 23 at 9:00 a.m. in the Duluth, Minnesota, City Council Chambers in City Hall, and again on April 20, 1975, at 9:00 a.m. in the Moorhead, Minnesota, City Council Chambers in the City Hall, and again on May 1, 1975, at 9:00 a.m. at Mankato, Minnesota, at the Law Enforcement Center, 710 South Front Street, after proper notice required by Minnesota Statutes §15.0412 (1974) was served upon all persons, associations and other interested groups registered with the Secretary of State for that purpose.

After affording all interested persons an opportunity to present written and oral data, statements and arguments, having considered all of the testimony, having considered all evidence adduced and upon the records, files and proceedings herein, and having confirmed the need for the above-captioned regulation:

NOW, THERFORE, IT IS ORDERED that this amendment dated October 4, 1976, to this regulation identified as APC 4, entitled "Standards of Performance for Fossil Fuel-Burning Indirect Heating Equipment," is adopted this 26th day of October, 1976, pursuant to authority vested in the Minnesota Pollution Control Agency by Minnesota Statutes §116.07 subd. 4a (1974).

DATED: October 27, 1976

MINNESOTA POLLUTION CONTROL AGENCY

Marion E. Watson
Chairwoman

Peter L. Gove
Executive Director

CERTIFICATE OF AGENCY'S

ADOPTION OF RULES RESOLUTION

I, Peter L. Gove, do hereby certify that I am the Executive Director of the Minnesota Pollution Control Agency, an agency duly authorized under the laws of the State of Minnesota, and that the following is a true, complete, and correct copy of a resolution adopted at a meeting of the Agency duly and properly called and held on the 26th day of October, 1976; that a quorum was present at said meeting; and that said resolution is set forth in the minutes of said meeting and has not been rescinded or modified.

> RESOLVED, that the amendments to Minnesota Regulation APC 4, entitled "Standards of Performance for Fossil Fuel-Burning Indirect Heating Equipment," dated October 4, 1976, be and they hereby are approved and adopted pursuant to authority vested in the Minnesota Pollution Control Agency by Minn. Stat. §116.07 subd. 4 (1974) and the Findings of Fact submitted by the staff are hereby adopted as the Findings of Fact of the Agency.

IN WITNESS WHEREOF, I have hereunto subscribed my name this 27 day of October, 1976.

Peter L. Gove
Executive Director

Subscribed and sworn to before me
this 27th day of October, 1976:

Lila Holmdahl
Notary Public

LILA HOLMDAHL
Notary Public, Hennepin County, Minn.
My Commission Expires Oct. 31, 1976

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Adoption of Amendments to Air Pollution Control Regulations APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

STATEMENT OF COMPLIANCE WITH RULEMAKING PROCEDURES
APC 4

I, Special Assistant Attorney General Alan R. Mitchell, do hereby declare that I have examined the proposed rules entitled "Standards of Performance for Fossil Fuel-Burning Indirect Heating Equipment," and all related documents and that, based on them and my personal familiarity with the applicable procedures, the Manual of Rulemaking Procedures has been followed.

Alan R. Mitchell

Alan R. Mitchell
Special Assistant
Attorney General

Dated: October 28, 1976

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Adoption of Amendments to Air Pollution Control Regulations APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

FINDINGS OF FACT
APC 32

The above-entitled matter came on for hearing before the Minnesota Pollution Control Agency (hereinafter Agency) on the 17th day of April, 1975, at 9:00 a.m. and again at 7:00 p.m. and again on the 18th day of April, 1975, at 9:00 a.m., and again on the 10th day of June, 1975, at 9:00 a.m. in the Board Room of the Agency offices, 1935 West County Road B2, Roseville, Minnesota, and again on April 23 at 9:00 a.m. in the Duluth, Minnesota, City Council Chambers in City Hall, and again on April 20, 1975, at 9:00 a.m. in the Moorhead, Minnesota, City Council Chambers in the City Hall, and again on May 1, 1975, at 9:00 a.m. at Mankato, Minnesota, at the Law Enforcement Center, 710 South Front Street, after proper notice required by Minnesota Statutes §15.0412 (1974) was served upon all persons, associations and other interested groups registered with the Secretary of State for that purpose.

After affording all interested persons an opportunity to present written and oral data, statements and arguments, having considered all of the testimony, having considered all evidence adduced and upon the records, files and proceedings herein, the Agency finds the following:

1. The Agency first promulgated emission standards for fuel burning equipment used for direct heating in 1969. Minn. Reg. APC 5. This regulation established emission limitations on the discharge of particulate matter only.

2. It is not feasible to promulgate a standard of performance for particulate matter for direct heating equipment which is a function of the heat input of the fossil fuel, as it is for indirect heating equipment, because of the particulate matter which is emitted from the process material. Minn. Reg. APC 5 imposes a standard of performance for particulate matter which is a function of the process weight or the source gas volume. Minn. Reg. APC 5 was amended by the Agency on June 4, 1976. Hearings on those amendments were held in conjunction with the proposed adoption of this regulation. It is reasonable to continue to require owners or operators of direct heating equipment to comply with the standards of performance for particulate matter in APC 5.

3. The restrictions of the process weight and source gas tables in APC 5 may be more stringent than the particulate restrictions for indirect heating equipment in APC 4, particularly for those facilities with a small process weight or source gas volume. (Statement of The Hanna Mining Company dated June 23, 1975, at pp. 3-4.) However, for large facilities, such as taconite pelletizing machines, with large process weights and source gas volumes, the difference is not major. In addition, owners or operators of direct heating equipment which is located in a remote

area are given the option of complying with an efficiency standard of only 85%. Finally, owners or operators of direct heating equipment have been required to comply with APC 5 since 1969 and no significant problems with compliance have arisen.

4. Minn. Reg. APC 5 has always imposed a more stringent collection efficiency requirement on new direct heating equipment than on old equipment. It is reasonable to maintain this more stringent collection efficiency requirement for new direct heating equipment. New direct heating equipment is that equipment which was not in operation when APC 5 first took effect on July 9, 1969.

5. The opacity restriction on particulate emissions has been contained in APC 11 in the past. In order to be consistent with the format in other regulations, the opacity restriction is now found in APC 32.

6. Minn. Reg. APC 5 has in the past provided a special standard of performance for small gray iron cupolas. A small gray iron cupola is one which has a melting capacity of less than a ton and a half per hour. It is reasonable to continue to impose a more lenient standard on these cupolas than on other direct heating equipment.

7. During the operation of direct heating equipment, sulfur dioxide is emitted from the combustion of the fossil fuel. In the past a standard of performance for sulfur dioxide was not imposed on owners or operators of direct heating equipment.

However, it is reasonable to require persons who burn fossil fuel to limit the emissions of sulfur dioxide regardless of whether the fuel is burned for direct heating or indirect heating purposes. (April 17, 1975, Transcript at p. 62.) This is especially true when many owners or operators of direct heating equipment will be switching from natural gas to oil and coal. (Statement of The Hanna Mining Company dated June 23, 1975, at p. 2; Statement of Lake Superior Industrial Bureau dated June 27, 1975, at p. 7; and Statement of United States Steel Corporation dated June 24, 1975, at p. 9.)

8. Since the sulfur dioxide comes from the combustion of the fossil fuel and not from the process material, it is reasonable to impose a standard that is a function of the heat input, as is done in Minn. Reg. APC 4 for indirect heating equipment. Rated heat input is the only feasible basis for determining the capability of direct heating equipment, which is indicative of the potential emissions which may occur. Rated heat input will remain constant and will generally represent the maximum heat output of the equipment. Rated heat input is a reasonable basis for establishing emission limitations. Actual heat input, however, is the only logical basis for determining the emission rate during performance tests.

9. A standard of performance for sulfur dioxide expressed in terms of pounds of sulfur dioxide per million BTU input is preferable to a standard dependent on the sulfur content of the

fuel or expressed in terms of pounds of sulfur emitted per unit of heat input. A standard expressed in terms of the amount of sulfur dioxide emitted per unit of heat input (SO_2/BTU) is in equivalent units to the federal new source performance standard for steam generators (40 C.F.R. §60.43), is consistent with the changes being made for indirect heating equipment in APC 4, and is most indicative of the amount of controlled pollutant, sulfur dioxide, which may be emitted.

10. Fossil fuels of various sulfur contents will be able to be burned with the adoption of a standard in units of pounds of sulfur dioxide per heat input because the higher the heating value, the higher the sulfur content can be. (April 17, 1975, Transcript at p. 21; June 10, 1975, Transcript at pp. 84-85; Public Exhibit 21 at pp. 33-34; Statement of Minnesota Power and Light Company dated June 27, 1975, at pp. 9-11; Statement of Otter Tail Power Company received July 1, 1975, at p. 2; and Statement of Otter Tail Power Company dated June 27, 1975.) For example, an Ohio Bituminous coal with 2.28% sulfur and a heating value of 13,035 BTU per pound will emit 1.75 pounds of sulfur dioxide per million BTU, well within the standard (June 10, 1975, Transcript at pp. 87-88.) Oil with a heating value of 18,000 BTU per pound and a sulfur content of 2% will also be within the standard. (Statement of The Hanna Mining Company dated June 23, 1975, at p. 2.)

11. A standard in terms of the amount of sulfur dioxide emitted will also allow a wider range of fuel to be burned than a standard expressed in terms of the pounds of sulfur emitted.

A sulfur dioxide limitation gives credit for the sulfur that is retained in the ash or emitted as a gas other than sulfur dioxide or removed by the process material and recognizes that pollution abatement equipment such as wet scrubbers can be installed to remove some of the sulfur dioxide. (PCA Exhibit 15 at pp. 10-12 and PCA Exhibit 4A.)

12. Owners or operators of direct heating equipment could have the same excursions in sulfur content and heating value of the fuel as experienced and predicted by owners or operators of indirect heating equipment. (June 10, 1975, Transcript at pp. 80-81 and 160-161; April 29, 1975 Transcript at p. 16; Public Exhibit 21 at pp. 34-36; Statement of Minnesota Power and Light Company dated June 27, 1975, at pp. 11-13; Statement of Otter Tail Power Company received July 1, 1975, at pp. 2-3.) However, it is not evident that an averaging period of any extended duration is warranted, particularly since ambient air quality standards for 24 hour and 3 hour periods have been promulgated by the Agency. Minn. Reg. APC 1. It is reasonable to require owners or operators of direct heating equipment to comply with the same requirements as owners or operators of indirect heating equipment, which requirements allow no averaging, and schedule additional hearings at an appropriate time in the future.

13. A rated heat input of 250 million BTU per hour has been considered the dividing point between major and minor fossil fuel-burning equipment in both Minn. Reg. APC 4 and in the federal new source performance standard for steam generators, 40 C.F.R.

§60.40. Since the same fossil fuel is burned in direct heating equipment as in indirect heating equipment, it is reasonable to consider the same dividing point of 250 million BTU per hour.

14. A number of small units of fossil fuel-burning equipment at one facility can have a significant impact on ground level pollutant concentrations particularly since most small sources do not have tall stacks. (April 23, 1975, Transcript at p. 48 and Public Exhibit 21 at p. 8.) It is reasonable to consider the total rated heat input of all units of fossil fuel-burning equipment at one facility, whether used for direct or indirect heating, in determining an applicable emission standard for each unit of equipment.

15. The Minneapolis-St. Paul Air Quality Control Region has been designated an Air Quality Maintenance Area for sulfur dioxide by the United States Environmental Protection Agency. 40 Fed. Reg. 23754 (June 2, 1975); 40 C.F.R. §52.1229. An Air Quality Maintenance Area is an area within a state that because of existing air quality and projected growth rate has the potential for exceeding ambient air quality standards in the future. 40 C.F.R. §51.12(e). Numerous violations of the primary and secondary ambient air quality standards for sulfur dioxide have been reported in the Minneapolis-St. Paul Air Qaulity Control Region. (PCA Exhibit 25 at pp. 67-69 and PCA Exhibit 26.) It is reasonable to adopt a more stringent standard of performance for sulfur dioxide for direct heating equipment located in the Minneapolis-St. Paul Air Quality Control Region than for equipment located in other areas of the State.

16. There is some indirect heating equipment that is included within another regulation. Asphalt concrete plants, for example, are covered by Minn. Reg. APC 23. The best manner in which to eliminate any possible confusion as to which regulation applies is to provide that the specific regulation shall take precedence over Minn. Reg. APC 32. (April 17, 1975, Transcript at pp. 86-87; April 18, 1975, Transcript at pp. 6-9; April 23, 1975, Transcript at p. 42; Public Exhibit 4; Public Exhibit 7; Public Exhibit 8; and Statement of Minnesota Petroleum Council dated June 27, 1975.)

17. The United States Environmental Protection Agency has promulgated regulations which require the installation of certain continuous monitoring equipment on indirect heating equipment of greater than 250 million BTU per hour heat input. 40 Fed. Reg. 46247, 46256-46257 (Oct. 6, 1975), 40 C.F.R. Part 51 Appendix P and §60.45. The provisions for those persons who conduct fuel analyses to monitor sulfur dioxide emissions have been reserved. 40 Fed. Reg. 36242, 46244, and 46251 (Oct 6, 1975), 40 C.F.R. §60.45(b)(2). It may be appropriate to require owners or operators of major direct heating equipment to install continuous monitoring equipment also, but this decision will be reserved until the questions regarding the monitoring requirements for indirect heating equipment are resolved. (Statement of United States Steel Corporation dated June 24, 1975, at p. 10; Statement of The Hanna Mining Company dated June 23, 1975, at p. 3; Statement of Pickards Mather and Co. dated June 27, 1975, at p. 2; and

Statement of Lake Superior Industrial Bureau dated June 27, 1975, at p. 7.)

18. Although direct heating equipment may use excess air in combustion of the fuel, the formula for calculating sulfur dioxide emissions, $E = CF\left(\frac{20.90}{20.9-\%O_2}\right)$, will not result in higher calculated emissions because an increase in the oxygen content will result in a corresponding decrease in the concentration of sulfur dioxide in the exit gas. (Statement of Lake Superior Industrial Bureau dated June 27, 1975, at p. 7 and Statement of The Hanna Mining Company dated June 23, 1975, at p. 4.)

Dated this 29 day of October, 1976.

MINNESOTA POLLUTION CONTROL AGENCY

By _____
Peter L. Gove
Executive Director

and _____
Marion E. Watson
Chairwoman

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Adoption of Amendments to Air Pollution Control Regulations APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

ORDER ADOPTING REGULATION APC 32

The above-entitled matter came on for hearing before the Minnesota Pollution Control Agency (hereinafter Agency) on the 17th day of April, 1975, at 9:00 a.m. and again at 7:00 p.m. and again on the 18th day of April, 1975, at 9:00 a.m., and again on the 10th day of June, 1975, at 9:00 a.m. in the Board Room of the Agency offices, 1935 West County Road B2, Roseville, Minnesota, and again on April 23 at 9:00 a.m. in the Duluth, Minnesota, City Council Chambers in City Hall, and again on April 20, 1975, at 9:00 a.m. in the Moorhead, Minnesota, City Council Chambers in the City Hall, and again on May 1, 1975, at 9:00 a.m. at Mankato, Minnesota, at the Law Enforcement Center, 710 South Front Street, after proper notice required by Minnesota Statutes §15.0412 (1974) was served upon all persons, associations and other interested groups registered with the Secretary of State for that purpose.

After affording all interested persons an opportunity to present written and oral data, statements and arguments, having considered all of the testimony, having considered all evidence adduced and upon the records, files and proceedings herein, and having confirmed the need for the above-captioned regulation:

NOW, THEREFORE, IT IS ORDERED that this regulation dated October 14, 1976, identified as APC 32, entitled "Standards of Performance for Fossil Fuel-Burning Direct Heating Equipment," is adopted this 26th day of October, 1976, pursuant to authority vested in the Minnesota Pollution Control Agency by Minnesota Statutes §116.07 subd. 4a (1974).

DATED: October 27, 1976

MINNESOTA POLLUTION CONTROL AGENCY

Marion E. Watson
Chairwoman

Peter L. Gove
Executive Director

CERTIFICATE OF AGENCY'S

ADOPTION OF RULES RESOLUTION

I, Peter L. Gove, do hereby certify that I am the Executive Director of the Minnesota Pollution Control Agency, an agency duly authorized under the laws of the State of Minnesota, and that the following is a true, complete, and correct copy of a resolution adopted at a meeting of the Agency duly and properly called and held on the 26th day of October, 1976; that a quorum was present at said meeting; and that said resolution is set forth in the minutes of said meeting and has not been rescinded or modified.

> RESOLVED, that Minnesota Regulation APC 32, entitled "Standards of Performance for Fossil Fuel-Burning Direct Heating Equipment," dated October 14, 1976, be and they hereby are approved and adopted pursuant to authority vested in the Minnesota Pollution Control Agency by Minn. Stat. §116.07 subd. 4 (1974) and the Findings of Fact submitted by the staff are hereby adopted as the Findings of Fact of the Agency.

IN WITNESS WHEREOF, I have hereunto subscribed my name this 27 day of October, 1976.

Peter L. Gove
Executive Director

Subscribed and sworn to before me
this 27th day of October, 1976:

Lila Holmdahl
Notary Public

LILA HOLMDAHL
Notary Public, Hennepin County, Minn.
My Commission Expires Oct. 31, 1976

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Adoption of Amendments to Air Pollution Control Regulations APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

STATEMENT OF COMPLIANCE WITH RULEMAKING PROCEDURES
APC 32

I, Special Assistant Attorney General Alan R. Mitchell, do hereby declare that I have examined the proposed rules entitled "Standards of Performance for Fossil Fuel-Burning Direct Heating Equipment," and all related documents and that, based on them and my personal familiarity with the applicable procedures, the Manual of Rulemaking Procedures has been followed.

Alan R. Mitchell
Special Assistant
Attorney General

Dated: October 28, 1976

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Adoption of Amendments to Air Pollution Control Regulations APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

FINDINGS OF FACT
APC 11

The above-entitled matter came on for hearing before the Minnesota Pollution Control Agency (hereinafter Agency) on the 17th day of April, 1975, at 9:00 a.m. and again at 7:00 p.m. and again on the 18th day of April, 1975, at 9:00 a.m., and again on the 10th day of June, 1975, at 9:00 a.m. in the Board Room of the Agency offices, 1935 West County Road B2, Roseville, Minnesota, and again on April 23 at 9:00 a.m. in the Duluth, Minnesota, City Council Chambers in City Hall, and again on April 20, 1975, at 9:00 a.m. in the Moorhead, Minnesota, City Council Chambers in the City Hall, and again on May 1, 1975, at 9:00 a.m. at Mankato, Minnesota, at the Law Enforcement Center, 710 South Front Street, after proper notice required by Minnesota Statutes §15.0412 (1974) was served upon all persons, associations and other interested groups registered with the Secretary of State for that purpose.

After affording all interested persons an opportunity to present written and oral data, statements and arguments, having considered all of the testimony, having considered all evidence adduced and upon the records, files and proceedings herein, the Agency finds the following:

1. The Agency first promulgated a regulation restricting the amount of visible air contaminants which could be emitted from an installation in July, 1969, Minn. Reg. APC 11. This regulation applied to all kinds of installations and facilities which emitted visible air contaminants.

2. The Agency has now promulgated opacity standards in individual regulations which apply to specific kinds of facilities. For example, opacity standards for power plants are included in Minn. Reg. APC 4 and opacity standards for incinerators are included in Minn. Reg. APC 7.

3. Generally fossil fuel burning equipment emits pollutants with the highest opacity readings. Since the opacity standards for this kind of equipment is now found in such regulations as Minn. Reg. APC 4 and APC 32, opacity standards which reflect the degree of control which is reasonable for other kinds of facilities can now be required in APC 11. (April 17, 1975, Transcript at p. 34; Statement of St. Paul Ammonia Products, Inc., dated June 26, 1975, at pp. 3-4 and Statement of 3M Company, dated June 30, 1975, at p. 3).

4. The exemptions which were contained in Minn. Reg. APC 11 are no longer necessary. Many of the exemptions, such as those for cupolas and coke ovens, are now covered in specific regulations which adequately reflect the present state of control technology. Other exemptions, such as that for blast furnaces, are not required since there are no existing blast furnaces in Minnesota and new facilities will be able to comply with the opacity standard. (April 17, 1975, Transcript at p. 34).

5. An opacity standard is required for facilities which emit air pollutants. An opacity standard will prevent the emission of submicron particles such as liquid aerosols which are not captured in the test procedure for particulate matter measurement. Opacity standards also help to prevent the degradation of ambient visiblity and preserve the aesthetics of our environment. (April 17, 1975 Transcript at pp. 35-36).

Dated this 29 day of October, 1976.

MINNESOTA POLLUTION CONTROL AGENCY

Peter L. Gove
Executive Director

Marion E. Watson
Marion Watson
Chairwoman

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Adoption of Amendments to Air Pollution Control Regulations APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

ORDER ADOPTING REGULATION APC 11

The above-entitled matter came on for hearing before the Minnesota Pollution Control Agency (hereinafter Agency) on the 17th day of April, 1975, at 9:00 a.m. and again at 7:00 p.m. and again on the 18th day of April, 1975, at 9:00 a.m., and again on the 10th day of June, 1975, at 9:00 a.m. in the Board Room of the Agency offices, 1935 West County Road B2, Roseville, Minnesota, and again on April 23 at 9:00 a.m. in the Duluth, Minnesota, City Council Chambers in City Hall, and again on April 20, 1975, at 9:00 a.m. in the Moorhead, Minnesota, City Council Chambers in the City Hall, and again on May 1, 1975, at 9:00 a.m. at Mankato, Minnesota, at the Law Enforcement Center, 710 South Front Street, after proper notice required by Minnesota Statutes §15.0412 (1974) was served upon all persons, associations and other interested groups registered with the Secretary of State for that purpose.

After affording all interested persons an opportunity to present written and oral data, statements and arguments, having considered all of the testimony, having considered all evidence adduced and upon the records, files and proceedings herein, and having confirmed the need for the above-captioned regulation:

NOW, THEREFORE, IT IS ORDERED that this amendment dated September 28, 1976, to this regulation identified as APC 11, entitled "Restriction of Emission of Visible Air Contaminants," is adopted this 26th day of October, 1976, pursuant to authority vested in the Minnesota Pollution Control Agency by Minnesota Statutes §116.07 subd. 4a (1974).

DATED: October 27, 1976

MINNESOTA POLLUTION CONTROL AGENCY

Marion E. Watson
Chairwoman

Peter L. Gove
Executive Director

CERTIFICATE OF AGENCY'S

ADOPTION OF RULES RESOLUTION

I, Peter L. Gove, do hereby certify that I am the Executive Director of the Minnesota Pollution Control Agency, an agency duly authorized under the laws of the State of Minnesota, and that the following is a true, complete, and correct copy of a resolution adopted at a meeting of the Agency duly and properly called and held on the 26th day of October, 1976; that a quorum was present at said meeting; and that said resolution is set forth in the minutes of said meeting and has not been rescinded or modified.

> RESOLVED, that the amendments to Minnesota Regulation APC 11, entitled "Restriction of Emission of Visible Air Contaminants," dated September 28, 1976, be and they hereby are approved and adopted pursuant to authority vested in the Minnesota Pollution Control Agency by Minn. Stat. §116.07 subd. 4 (1974) and the Findings of Fact submitted by the staff are hereby adopted as the Findings of Fact of the Agency.

IN WITNESS WHEREOF, I have hereunto subscribed my name this 27 day of October, 1976.

Peter L. Gove
Executive Director

Subscribed and sworn to before me
this 27th day of October, 1976:

Lila Holmdahl
Notary Public

LILA HOLMDAHL
Notary Public, Hennepin County, Minn.
My Commission Expires Oct. 31, 1976

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Adoption of Amendments to Air Pollution Control Regulations APC 2, 3, 4, 5, 7, 8, 11, 12, 13, 15, and 16 and New Regulations APC 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 32

STATEMENT OF COMPLIANCE WITH RULEMAKING PROCEDURES
APC 11

I, Special Assistant Attorney General Alan R. Mitchell, do hereby declare that I have examined the proposed rules entitled "Restriction of Emission of Visible Air Contaminants," and all related documents and that, based on them and my personal familiarity with the applicable procedures, the Manual of Rulemaking Procedures has been followed.

Alan R. Mitchell

Alan R. Mitchell
Special Assistant
Attorney General

Dated: October 28, 1976