CR 83-65

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Carroll D. Besadny
Secretary

BOX 7921
MADISON, WISCONSIN 53707

Received October 3, 1983
9:05 am

STATE OF WISCONSIN)
) ss
DEPARTMENT OF NATURAL RESOURCES)

TO ALL TO WHOM THESE PRESENTS SHALL COME, GREETINGS:

I, Carroll D. Besadny, Secretary of the Department of Natural Resources and custodian of the official records of said Department, do hereby certify that the annexed copy of Natural Resources Board Order No. A-8-83 was duly approved and adopted by this Department on July 27, 1983. I further certify that said copy has been compared by me with the original on file in this Department and that the same is a true copy thereof, and of the whole of such original.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the official seal of the Department at General Executive Facility #2 in the City of Madison, this 27th day of September, 1983.

Carroll D. Besadny
Carroll D. Besadny, Secretary

(SEAL)

2689I

2-1-84

ORDER OF THE STATE OF WISCONSIN
NATURAL RESOURCES BOARD
RENUMBERING, REPEALING AND RECREATING AND CREATING RULES

IN THE MATTER OF renumbering section NR 154.19(3) (intro), (a) and (b), and (5)(c) and (d), repealing and recreating section NR 154.19(4), and creating sections NR 154.01(1g), (1r), (12m), (19m), (28e), (28j), (28o), (28t), (28y), (35m), (38s), (38w), (50m), (52m), (59g), (59r), (61m), (64m), (67g), (67r), (69m), (70g), (70r), (71m), (72m), (79m), (81m), (89m), (96m), (98m), (100m), (103m), (107m), (114m), (115m), (116e), (116j), (116o), (116t), (116y), (147m), (148m), (156g), (156r), (162s), (164m), (165q), (165w), (169m), (175e), (175m), (175s), (182e), (182m), (182s), (184e), (184m), (184s), (199m), (206e), (206j), (206o), (206t), (207m), and (209m), 154.19(3) (title), (a)3., (b) and (c), (5)(c), (f) and (g), (6), and (7) and chapter NR 440 of the Wisconsin Administrative Code pertaining to establishment of emission standards for certain hazardous air pollutants and standards of performance for new stationary sources of air pollution.

A-8-83

Analysis Prepared by Department of Natural Resources

Under sections 111 and 112 of the federal Clean Air Act, the Administrator of the United States Environmental Protection Agency (U.S. EPA) is required to adopt regulations establishing federal standards of performance for new sources (NSPS) and emission standards for hazardous air pollutants (NESHAPS). NSPS are to be adopted for categories of stationary air pollution sources which cause or contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. NESHAPS are to be set for air pollutants to which no ambient air quality standard is applicable and which cause or contribute to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness. NESHAPS must be set at a level which provides an ample margin of safety to protect the public health from the hazardous air pollutants.

At this time (June 30, 1983), NSPS have been adopted for 40 source categories and are set out in Title 40 of the Code of Federal Regulations, Part 60. NESHAPS so far have been set only for asbestos, beryllium, mercury and vinyl chloride. These regulations appear at Part 61 of Title 40 of the Code of Federal Regulations. Under sections 111(c)(1) and 112(d)(1) of the federal Clean Air Act, states may develop and submit to U.S. EPA procedures for implementing and enforcing the NSPS and NESHAPS. If that agency finds the state procedure to be adequate, it must delegate to the state any authority it has under the Clean Air Act to implement and enforce the Standards.

In 1975, the department incorporated major portions of the NSPS and NESHAPS then in effect into Ch. NR 154 of the Wisconsin Administrative Code and in September 1976 the state was delegated authority to implement and enforce the standards, subject to several conditions. Since then, additional NSPS and NESHAPS have been promulgated and some existing standards have been revised by U.S. EPA, but Wisconsin has not kept pace. In 1979 and 1980, state legislation was adopted which requires the department to keep pace with U.S. EPA.

Section 144.375(4)(a) and (5)(a), Wisconsin Statutes state that if an NSPS or NESHAPS is promulgated by U.S. EPA, the department shall promulgate by rule a similar standard, but these standards may not be more restrictive in terms of emission limitations than the federal standards. (Furthermore, if an NSPS or NESHAPS is relaxed, the corresponding state standard must also be relaxed unless the relaxation occured prior to April 30, 1980 or the department finds that the relaxed standard would not provide adequate protection for public health and welfare. (See section 144.375(6), Wisconsin Statutes.)

The rules contained in this order are intended to bring the department into compliance with section 144.375(4)(a) and (5)(a), Wisconsin Statutes, and to enable U.S. EPA to delegate to the state its authority to implement and enforce the present NSPS and NESHAPS. (U.S. EPA has threatened to withhold $120,000 in air program grant funds if the department has not requested delegation of the NSPS and NESHAPS by August 15, 1983.)

SECTION 1. of the order creates definitions needed to implement the current federal NESHAPS. They are to be added to existing definitions in s. NR 154.01, Wis. Adm. Code.

SECTIONS 2.,3., and 4. pertain to the adoption of current federal requirements for mercury emissions, while retaining the Department's original January, 1973 mercury emission limits now found in s. NR 154.19(3), Wis. Adm. Code.

SECTION 5. of the order incorporates the current federal asbestos NESHAPS into the state administrative code in place of the portions of the 1975 version now contained in s. NR 154.19(4), Wis. Adm. Code.

SECTIONS 6. and 7. bring the department's beryllium standards of s. NR 154.19(5), Wis. Adm. Code up to date with federal NESHAPS provisions.

SECTION 8. adds the vinyl chloride NESHAPS to the state's code by creating s. NR 154.19(6), Wis. Adm. Code. It also creates subsection (7), which is the incorporation by reference of Appendix B of 40 CFR 61 and certain other materials needed to implement the NESHAPS.

SECTION 9. creates a new chapter NR 440 of the Wisconsin Administrative Code to contain the NSPS. It is intended to be the state's equivalent of 40 C.F.R. Part 60. Its format generally parallels that of the federal regulations except that s. NR 440.09 sets out state statutory penalties and enforcement procedures, s. NR 440.10 addresses the interplay of requirements and exceptions of Ch. NR 440 with the other requirements and exceptions of the air pollution control program, and s. NR 440.18 provides for severability of the new chapter's provisions.

The drafting style and format of these new rules is clearly a compromise. It reflects an effort to conform to the drafting format and style recommended by the Wisconsin Revisor of Statutes and the Legislative Council Administrative Rules Clearinghouse, while attempting to carry forward the format and style of the federal regulations to minimize the chances of working a change in the substance of the standards in their translation from federal regulations to state rules.

Pursuant to the authority vested in the State of Wisconsin Natural Resources Board by ss.

144.31(1)(a), (e), (f), (h), and (i), 144.375(4)(a) and (5)(a), 144.38 and 227.014(2)(a), Stats., the State of Wisconsin Natural Resources Board hereby adopts rules implementing and interpreting ss. 144.31(1)(a), (e), (f)(h) and (i), 144.375(4)(a) and (5)(a), and 144.38, Stats. and revising the State Implementation Plan developed under s. 144.31(1)(f), Stats., as follows:

SECTION 1. NR 154.01 (1g), (1r), (12m), (19m), (28e), (28j), (28o), (28t), (28y), (35m), (38s), (38w), (50m), (52m), (59g), (59r), (61m), (64m), (67g), (67r), (69m), (70g), (70r), (71m), (72m), (79m), (81m), (89m), (96m), (98m), (100m), (103m), (107m), (114m), (115m), (116e), (116j), (116o), (116t), (116y), (147m), (148m), (156g), (156r), (162s), (164m), (165q), (165w), (169m), (175e), (175m), (175s), (182e), (182m), (182s), (184e), (184m), (184s), (199m), (206e), (206j), (206o), (206t), (207m), and (209m) are created to read:

(1g) "Active waste disposal site" means any disposal site other than an inactive site.

(1r) "Adequately wetted" means sufficiently mixed or coated with water or an aqueous solution to prevent dust emissions.

(12m) "Alternative method" means any method of sampling and analyzing for an air pollutant which is not a reference or equivalent method but which has been demonstrated to the department's satisfaction to produce, in specific cases, results adequate for the department's determination of compliance.

(19m) "Asbestos-containing waste material" means any waste which contains commercial asbestos and is generated by a source subject to the provisions of s. NR 154.19(4), including asbestos mill tailings, control device asbestos waste, friable asbestos waste material, and bags or containers that previously contained commercial asbestos.

(28e) "Beryllium" means the element beryllium. Where weights or concentrations are specified, such weights or concentrations apply to beryllium only, excluding the weight or concentration of any other elements.

(28j) "Beryllium alloy" means any metal to which beryllium has been added in order to increase its beryllium content and which contains more than 0.1 percent beryllium by weight.

(28o) "Beryllium-containing waste" means material contaminated with beryllium or beryllium compounds, or both, used or generated during any process or operation performed by a source subject to s. NR 154.19(5).

(28t) "Beryllium ore" means any naturally occurring material mined or gathered for its beryllium content.

(28y) "Beryllium propellant" means any propellant incorporating beryllium.

(35m) "Bulk resin" means a resin which is produced by a polymerization process in which no water is used.

(38s) "Cell room" means a structure housing one or more mercury chlor-alkali cells.

(38w) "Ceramic plant" means a manufacturing plant producing ceramic items.

(50m) "Condenser stack gases" mean the gaseous effluent evolved from the stack of processes utilizing heat to extract mercury ore.

(52m) "Control device asbestos waste" means any asbestos-containing waste material that is collected in a pollution control device.

(59g) "Demolition" means the wrecking or taking out of any load-supporting structural member and any related removing or stripping of friable asbestos materials.

(59r) "Denuder" means a horizontal or vertical container which is part of a mercury chlor-alkali cell and in which water and alkali metal amalgam are converted to alkali metal hydroxide, mercury, and hydrogen gas in a short-circuited, electrolytic reaction.

(61m) "Dispersion resin" means a resin manufactured in such a way as to form fluid dispersions when dispersed in a plasticizer or a plasticizer and diluent mixture.

(64m) "Emergency renovation" means a renovation operation that results from a sudden, unexpected event, and is not a planned renovation. Operations necessitated by non-routine failures of equipment are included.

(67g) "End box" means one or more containers located on one or both ends of a mercury chlor-alkali electrolyzer which serves as a connection between the electrolyzer and denuder for rich and stripped amalgam.

(67r) "End box ventilation system" means a ventilation system which collects mercury emissions from the end boxes, the mercury pump sumps, and their water collection systems.

(69m) "Equivalent method" means any method of sampling and analyzing for an air pollutant which has been demonstrated to the department's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specified conditions.

(70g) "Ethylene dichloride plant" includes any plant which produces ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene.

(70r) "Ethylene dichloride purification" includes any part of the process of ethylene dichloride production which follows ethylene dichloride formation and in which finished ethylene dichloride is produced.

(71m) "Extraction plant" means a facility chemically processing beryllium ore to beryllium metal, alloy, or oxide, or performing any of the intermediate steps in these processes.

(72m) "Fabricating" means any processing of a manufactured product containing commercial asbestos, with the exception of processing at temporary sites for the construction or restoration of buildings, structures, facilities or installations.

(79m) "Foundry" means a facility engaged in the melting or casting of metal or metal alloys.

(81m) "Friable asbestos material" means any material that contains more than one percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure.

(89m) "Grade of resin" means the subdivision of resin classification which describes it as a unique resin, i.e., the most exact description of a resin with no further subdivision.

(96m) "Hydrogen gas stream" means a hydrogen stream formed in the chlor-alkali cell denuder.

(98m) "Inactive waste disposal site" means any disposal site or portion thereof where additional asbestos-containing waste material will not be deposited and where the surface is not disturbed by vehicular traffic.

(100m) "Inprocess wastewater" means any water which, during manufacturing or processing, comes into direct contact with vinyl chloride or polyvinyl chloride or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product containing vinyl chloride or polyvinyl chloride but which has not been discharged to a wastewater treatment process or discharged untreated as wastewater.

(103m) "In vinyl chloride service" means a piece of equipment that contains or contacts either a liquid that is at least 10% by weight vinyl chloride or a gas that is at least 10% by volume vinyl chloride.

(107m) "Latex resin" means a resin which is produced by a polymerization process which initiates from free radical catalyst sites and is sold undried.

(114m) "Machine shop" means a facility performing cutting, grinding, turning, honing, milling, deburring, lapping, electrochemical machining, etching or other similar operations.

(115m) "Manufacturing of asbestos products" means the combining of commercial asbestos, or in the case of woven friction products the combining of textiles containing commercial asbestos, with any other material, including commercial asbestos, and the processing of this combination into a product as specified in s. NR 154.19(4)(c).

(116e) "Mercury" means the element mercury, excluding any other elements, and includes mercury in particulates, vapors, aerosols and compounds.

(116j) "Mercury chlor-alkali cell" means a device which is basically composed of an electrolyzer section and a denuder or decomposer section and utilizes mercury to produce chlorine gas, hydrogen gas, and alkali metal hydroxide.

(116o) "Mercury chlor-alkali electrolyzer" means an electrolytic device which is part of a mercury chlor-alkali cell and utilizes a flowing mercury cathode to produce chlorine gas and alkali metal amalgam.

(116t) "Mercury ore" means a mineral mined specifically for its mercury content.

(116y) "Mercury ore processing facility" means a facility processing mercury ore to obtain mercury.

(147m) "Planned renovation" means a renovation operation, or a number of such operations, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Operations that are individually nonscheduled are included, provided a number of such operations can be predicted to occur during a given period of time based on operating experience.

(148m) "Polyvinyl chloride plant" includes any plant where vinyl chloride alone or in combination with other materials is polymerized.

(156g) "Propellant" means a fuel and oxidizer physically or chemically combined which undergoes combustion to provide rocket propulsion.

(156r) "Propellant plant" means any facility engaged in the mixing, casting or machining of propellant.

(162s) "Reference method" means any method of sampling and analyzing for an air pollutant, as described in 40 C.F.R. pt. 61, Appendix B.

(164m) "Renovation" means the removing or stripping of friable asbestos material used on any pipe, duct, boiler, tank, reactor, turbine, furnace or structural member. Operations in which load-supporting structural members are wrecked or taken out are excluded.

(165q) "Roadway areas" means any surface on which motor vehicles travel including, but not limited to, highways, roads, streets, parking areas and driveways.

(165w) "Rocket motor test site" means any building, structure, facility or installation where the static test firing of a beryllium rocket motor or the disposal of beryllium propellant, or both, is conducted.

(169m) "Run" means the net period of time during which an emission sample is collected.

(175e) "Slip gauge" means a gauge which has a probe that moves through the gas to liquid interface in a storage or transfer vessel and indicates the level of vinyl chloride in the vessel by the physical state of the material the gauge discharges.

(175m) "Sludge" means sludge produced by a treatment plant that processes municipal or industrial wastewater.

(175s) "Sludge dryer" means a device used to reduce the moisture content of sludge by heating to temperatures above 65°C (ca. 150°F) directly with combustion gases.

(182e) "Standard operating procedure" means a formal written procedure officially adopted by the plant owner or operator and available on a routine basis to those persons responsible for carrying out the procedure.

(182m) "Standard pressure" means a pressure of 760 millimeters of mercury (29.92 inches of mercury).

(182s) "Standard temperature" means a temperature of 20°C (69°F).

(184e) "Stripper" includes any vessel in which residual vinyl chloride is removed from polyvinyl chloride resin, except bulk resin, in the slurry form by the use of heat or vacuum, or both. In the case of bulk resin, stripper includes any vessel which is used to remove residual vinyl chloride from polyvinyl chloride resin immediately following the polymerization step in the plant process flow.

(184m) "Stripping" means taking off friable asbestos materials from any pipe, duct, boiler, tank, reactor, turbine, furnace or structural member.

(184s) "Structural member" means any load-supportng member, such as beams and load-supporting walls; or any nonload-supporting member, such as ceilings and nonload-supporting walls.

(199m) "Type of resin" means the broad classification of resin referring to the basic manufacturing process for producing that resin, including, but not limited to, the suspension, dispersion, latex, bulk and solution processes.

(206e) "Vinyl chloride purification" includes any part of the process of vinyl chloride production which follows vinyl chloride formation and in which finished vinyl chloride is produced.

(206j) "Vinyl chloride plant" includes any plant which produces vinyl chloride by any process.

(206o) "Vinyl chloride reactor" includes any vessel in which vinyl chloride is partially or totally polymerized into polyvinyl chloride.

(206t) "Vinyl chloride reactor opening loss" means the emission of vinyl chloride occurring when a reactor is vented to the atmosphere for any purpose other than an emergency relief discharge as defined in s. NR 154.19(6)(f)1.c. and (g)1.

(207m) "Visible asbestos emissions" means any emissions which are visually detectable without the aid of instruments and which contain particulate asbestos material.

(209m) "Wastewater treatment process" includes any process which modifies characteristics such as biological or chemical oxygen demand, total suspended solids, or pH, usually for the purpose of meeting effluent guidelines and standards but does not include any process the purpose of which is to remove vinyl chloride from water to meet requirements of s. NR 154.19(6).

SECTION 2. NR 154.19(3) (title) is created to read:

(3) CONTROL OF MERCURY EMISSIONS.

SECTION 3. NR 154.19(3) (intro), (a) and (b) are renumbered to be NR 154.19(3)(a) (intro), 1. and 2.

SECTION 4. NR 154.19(3)(a)3., (b) and (c) are created to read:

3. In quantities greater than 3,200 grams of mercury per 24-hour period from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges.

(b) Stack sampling. 1. 'Mercury ore processing facility'. a. Unless a waiver of emission testing is requested and obtained from the department, each owner or operator of a facility processing mercury ore on which construction or modification commenced after January 1, 1984 shall test emissions from the source within 90 days after startup.

b. The department shall be notified at least 30 days prior to a stack or performance test to afford it the opportunity to have a representative present to witness the testing procedures. The notice shall include a test plan in accordance with s. NR 154.06(5).

c. Samples shall be taken over such a period as is necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation may be made which would potentially increase emissions above that determined by the most recent source test until the new emission level has been estimated by calculation and the results reported to the department.

d. All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the source test. Each determination shall be reported to the department by registered letter dispatched before the close of the next business day following the determination.

e. Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available for inspection by a department representative for a minimum of 2 years.

2. 'Mercury chlor-alkali plant-hydrogen and end box ventilation gas streams'. a. Unless a waiver of emission test is requested and obtained from the department, each owner or operator of a mercury chlor-alkali cell on which construction or modification commenced after January 1, 1984 shall test emissions from the source within 90 days after startup.

b. The department shall be notified at least 30 days in advance of stack or performance tests to afford it the opportunity to have a representative present to witness the testing procedures. The notice shall include a test plan in accordance with s. NR 154.06(5).

c. Samples shall be taken over such a period as is necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation may be made which would potentially increase emissions above that determined by the most recent source test until the new emission level has been estimated by calculation and the results reported to the department.

d. All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the source test. All determinations shall be reported to the department by registered letter dispatched before the close of the next business day following the determination.

e. Records of emissions test results and other data needed to determine total emissions shall be retained at the source and made available for inspection by a department representative for a minimum of 2 years.

3. 'Mercury chlor-alkali plants -- cell room ventilation system'. a. Stationary sources using mercury chlor-alkali cells may test cell room emissions in accordance with subpar. b., or demonstrate compliance with subpar. d. and assume ventilation emissions of 1,300 grams per day of mercury.

b. Unless a waiver of emission test is requested and obtained from the department, each owner or operator of a new or modified chlor-alkali plant shall pass all cell room air in forced gas streams through stacks suitable for testing and shall test emissions from the cell room within 90 days after startup.

c. The department shall be notified at least 30 days in advance of stack or performance tests to afford it the opportunity to have a representative present to witness the testing procedures. The notice shall provide a test plan in accordance with s. NR 154.06(5).

d. An owner or operator may carry out design, maintenance and housekeeping practices approved by the department.

4. 'Sludge incineration and drying plants'. a. Unless a waiver of emission testing is requested and obtained from the department, each owner or operator of sludge incineration plants and drying plants on which construction or modification commenced after January 1, 1984 shall test emissions

from the source within 90 days of startup. The tests shall be conducted in accordance with Method 101A or Method 105 in 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), using the procedures in subpar. f.

b. The department shall be notified at least 30 days in advance of stack or performance tests to afford it the opportunity to have a representative present to witness the testing procedures. The notice shall include a test plan in accordance with s. NR 154.06(5).

c. Samples shall be taken over such a period as is necessary to determine accurately the maximum emissions which will occur in a 24-hour period. No changes may be made in the operation which would potentially increase emissions above the level determined by the most recent stack tests until the new emission level has been estimated by calculation and the results reported to the department.

d. All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the stack test. All determinations shall be reported to the department by registered letter dispatched before the close of the next business day following the determination.

e. Records of emission test results and other data needed to determine total emissions shall be retained at the source and shall be made available for inspection by a department representative for a minimum of 2 years.

f. If an owner or operator uses Method 105 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), the following procedures shall be adhered to, in addition to Method 105:

1) The sludge shall be sampled after dewatering and before incineration or drying, at a location that provides a representative sample of the sludge that is charged to the incinerator or dryer. Eight consecutive grab samples shall be obtained at intervals of between 45 and 60 minutes and thoroughly mixed into one sample. Each of the 8 grab samples shall have a volume of at least 200 milliliters but not more than 400 milliliters. A total of 3 composite samples shall be obtained within an operating period of 24 hours. When the 24-hour operating period is not continuous, the total sampling period may not exceed 72 hours after the first grab sample is obtained. Samples may not be exposed to any condition that may result in mercury contamination or loss.

2) The maximum 24-hour period sludge incineration or drying rate shall be determined by use of a flow rate measurement device that can measure the mass rate of sludge charged to the incinerator or dryer with an accuracy of plus or minus 5% over its operating range. Other methods of measuring sludge mass charging rates may be used if they have received prior approval by the department.

3) The handling, preparation and analysis of sludge samples shall be accomplished according to Method 105.

4) The mercury emissions shall be determined by use of the following equation:

$$E_{Hg} = 1 \times 10^{-3} cQ$$

where:

E_{Hg} is the mercury emissions, grams/day

c is the mercury concentration of sludge on a dry solids basis, microgram/gram (parts per million)

Q is the sludge charging rate, kilogram/day

5) No changes in the operation of a plant may be made after a sludge test has been conducted which would potentially increase emissions above the level determined by the most recent sludge test, until the new emisions level has been estimated by calculation and the results reported to the department.

6) All sludge samples shall be analyzed for mercury content within 30 days after the sludge sample is collected. Each determination shall be reported to the department by registered letter dispatched before the close of the next business day following the determination.

7) Records of sludge sampling, charging rate determination and other data needed to determine mercury content of wastewater treatment plant sludges shall be retained at the source and made available for inspection by a department representative for a minimum of 2 years.

(c) Emission monitoring. All wastewater treatment plant sludge incineration and drying plants for which mercury emissions exceed 1600 grams/day, demonstrated either by stack sampling or sludge sampling according to par. (b)4., shall monitor mercury emissions at intervals of at least once per year by use of Method 105 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), or the procedures specified in par. (b)4.f. The results of monitoring shall be reported to the department by registered letter dispatched before the close of the next business day following the monitoring. The results shall be retained at the source and shall be made available for inspection by a department representative for a minimum of 2 years.

SECTION 5. NR 154.19(4) is repealed and recreated to read:

(4) CONTROL OF ASBESTOS EMISSIONS. (a) Asbestos mills. There may be no visible asbestos emissions to the outside air from any asbestos mill except as provided in par. (f) .

(b) Roadway areas. The surfacing of roadway areas with asbestos tailings or with asbestos-containing waste that is generated by any source subject to par. (c), (d), (e) or (h) is prohibited, except for temporary roadway areas on asbestos ore deposits. The deposition of asbestos tailings or asbestos-containing waste on roadway areas covered with snow or ice is considered "surfacing".

(c) Manufacturing of asbestos products. There may be no visible asbestos emissions to the outside air, except as provided in par. (f), from any of the operations listed in this paragraph if they use commercial asbestos or from any building or structure in which manufacturing of asbestos products is conducted.

1. The manufacture of cloth, cord, wicks, tubing, tape, twine, rope, thread, yarn, roving, lap or other textile materials.

2. The manufacture of cement products.

3. The manufacture of fireproofing and insulating materials.

4. The manufacture of friction products.

5. The manufacture of paper, millboard and felt.

6. The manufacture of floor tile.

7. The manufacture of paints, coatings, caulks, adhesives and sealants.

8. The manufacture of plastics and rubber materials.

9. The manufacture of chlorine.

10. The manufacture of shotgun shells.

11. The manufacture of asphalt concrete.

(d) Demolition and renovation. Any owner or operator of a demolition or renovation operation who intends to demolish any institutional, commercial or industrial building (including apartment buildings having more than 4 dwelling units), structure, facility, installation, or portion thereof which contains any boiler, pipe, duct, tank, reactor, turbine, furnace or load-supporting structural member that is insulated or fireproofed with friable asbestos material, except as provided in subd. 1.; or who intends to renovate any institutional, commercial or industrial building, structure, facility, installation or portion thereof where more than 80 meters (ca. 260 feet) of pipe covered or coated with friable asbestos material are stripped or removed, or more than 15 square meters (ca. 160 square feet) of friable asbestos material used to cover or coat any duct, boiler, tank, reactor, turbine, furnace or structural member are stripped or removed shall comply with the requirements set forth under subds. 2. and 5.

1. The owner or operator of a demolition operation is exempted from the requirements of this paragraph provided:

a. The amount of friable asbestos material in the building or portion thereof to be demolished is less than 80 meters (ca. 260 feet) used to insulate pipes, and less than 15 square meters (ca. 160 square feet) used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace or structural member; and

b. The notification requirements of subd. 2. are met. This written notification shall be postmarked or delivered to the department at least 20 days prior to commencement of demolition, shall include the information listed under subd. 2.a., b., d., and e., and shall state the measured or estimated amount of friable asbestos material which is present. Techniques of estimation shall be explained in the notification.

2. Notice of intention to demolish or renovate shall be provided to the department by the owner or operator of the demolition or renovation operation. The notice shall be postmarked or delivered to the department at least 10 days prior to commencement of such demolition, or as early as possible prior to commencement of emergency demolition, subject to subd. 6., and as early as possible prior to commencement of renovation. The notice shall include the following information:

a. Name of owner or operator.

b. Address of owner or operator.

c. Description of the building, structure, facility or installation to be demolished or renovated, including the size, age, and prior use of the structure, and the approximate amount of friable asbestos materials present.

d. Address or location of the building, stucture, facility or installation.

e. Scheduled starting and completion dates of demolition or renovation.

f. Nature of planned demolition or renovation and methods to be employed.

g. Procedures to be employed to meet the requirements of this paragraph and par. (j).

h. Name and address or location of the waste disposal site where the friable asbestos waste will be deposited.

i. Name, title, and authority of the state or local government representative who has ordered a demolition which is subject to subd. 6.

3. For purposes of determining whether a planned renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be:

a. For planned renovating operations involving individually nonscheduled operations, the total amount of friable asbestos material that can be predicted will be removed or stripped, at a source over the maximum period of time for which a prediction can be made. The period shall be not less than 30 days and not longer than one year.

b. For each planned renovating operation not covered by subpar. a., the total amount of friable asbestos material that can be predicted will be removed or stripped at a source.

4. For purposes of determining whether an emergency renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be the total amount of friable asbestos material that will be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

5. The procedures of this subdivision shall be used to prevent emissions of particulate asbestos material to outside air.

a. Friable asbestos materials used to insulate or fireproof any pipe, duct boiler, tank, reactor, turbine, furnace, or load-supporting structural member shall be wetted and removed from any building, structure, facility or installation subject to this paragraph. Such removal shall occur before wrecking or dismantling of any portion of such building, structure, facility or installation that would break up the friable asbestos materials and before wrecking or dismantling of any other portion of such building, structure, facility or installation that would preclude access to such materials for subsequent removal. Removal of friable asbestos materials used on any pipe, duct or structural member which are encased in concrete or other similar structural material is not required prior to demolition, but such material shall be adequately wetted whenever exposed during demolition.

b. Friable asbestos materials used on pipes, ducts, boilers, tanks, reactors, turbine, furnaces, or structural members shall be adequately wetted during stripping, except as provided in subpars. d., f. and g.

c. Pipes, ducts, boilers, tanks, reactors, turbines, furnaces or structural members that are covered or coated with friable asbestos materials may be taken out of any building, structure, facility or installation subject to this paragraph as units or in sections, provided the friable asbestos materials exposed during cutting or disjointing are adequately wetted during the cutting or disjointing operation. The units may not be dropped or thrown to the ground but shall be carefully lowered to ground level.

d. The stripping of friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace or structural member that has been removed as a unit or in sections as provided in subpar. c. shall be performed in accordance with subpar. b. Rather than comply with the wetting requirement of subpar. b., a local exhaust ventilation and collection system may be used to prevent emissions to the outside air. The local exhaust ventilations systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping of friable asbestos material. There may be no visible asbestos emissions to the outside air from such local exhaust ventilation and collection systems except as provided in par. (f).

e. All friable asbestos materials that have been removed or stripped shall be adequately wetted to ensure that the materials remain wet during all remaining stages of demolition or renovation and related handling operations. The materials may not be dropped or thrown to the ground or a lower floor. Such materials that have been removed or stripped more than 50 feet above ground level, except those materials removed as units or in sections, shall be transported to the ground via dust-tight chutes or containers.

f. Except as specified in this subparagraph, the wetting requirements of this paragraph are suspended when the temperature at the point of wetting is below 0°C (32°F). When friable asbestos materials are not wetted due to freezing temperatures, the materials on pipes, ducts, boilers, tanks, reactors, turbines, furnaces or structural members shall, to the maximum extent possible, be removed as units or in sections prior to wrecking. In no case may the requirements of subpar. d. or e. be suspended due to freezing temperatures.

g. For renovation operations, local exhaust ventilation and collection systems may be used, instead of wetting as specified in subpar. b., to prevent emissions of particulate asbestos material to outside air when damage to equipment resulting from the wetting would be unavoidable. Upon request and supply of adequate information, the department shall determine whether damage to equipment resulting from wetting to comply with the provisions of this paragraph would be unavoidable. Local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping and removal of friable asbestos material. There may be no visible emissions to the outside air from the local exhaust ventilation and collection systems, except as provided in par. (f).

6. The demolition of a building, structure, facility or installation, pursuant to an order of an authorized representative of a state or local governmental agency, issued because that building is structurally unsound and in danger of imminent collapse is exempt from all but the following requirements of this paragraph.

a. The notification requirements specified by subd. 2.;

b. The requirements of stripping of friable asbestos materials from previously removed units or sections as specified in subd. 5.d.;

c. The wetting, as specified by subd. 5.e. of friable asbestos materials that have been removed or stripped;

d. The portion of the structure being demolished that contains friable asbestos materials shall be adequately wetted during the wrecking operation.

(e) Spraying. There may be no visible asbestos emissions to the outside air from the spray-on application of materials containing more than one percent asbestos, on a dry weight basis, used on equipment and machinery except as provided in par. (f). Materials sprayed on buildings, structures, pipes and conduits shall contain less than one percent asbestos on a dry weight basis.

1. Any owner or operator who intends to spray asbestos materials which contain more than one percent asbestos on a dry weight basis to insulate or fireproof equipment and machinery shall report this intention to the department at least 20 days prior to the commencement of the spraying operation. The report shall include the following information:

a. Name of owner or operator.

b. Address of owner or operator.

c. Location of spraying operation.

d. Procedures to be followed to meet the requirements of this paragraph.

2. The spray-on application of materials in which the asbestos fibers are encapsulated with a bituminous or resinous binder during spraying and which are not friable after drying is exempted from the requirements of this paragraph.

(f) Alternatives. Rather than meet the no-visible-asbestos-emission requirements of pars. (a), (c), (d), (e), (h), (j) and (k), an owner or operator may elect to use the methods specified in subds. 1. to 4. to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

1. Fabric filter collection devices shall be used, except as noted in subds. 2. and 3. The devices shall be operated at a pressure drop of no more than 4 inches water gauge as measured across the filter fabric. The airflow permeability, as determined by ASTM method D737-75, incorporated by reference in sub. (7), may not exceed 30 $ft^3/min/ft^2$ for woven fabrics or 35 $ft^3/min/ft^2$ for felted fabrics, except that 40 $ft^3/min/ft^2$ for woven and 45 $ft^3/min/ft^2$ for felted fabrics is allowed for filtering air from asbestos ore dryers. Each square yard of felted fabric shall weigh at least 14 ounces and be at least one-sixteenth inch thick throughout. Synthetic fabrics may not contain fill yarn other than that which is spun.

2. If the use of fabric filters creates a fire or explosion hazard, the department may authorize the use of wet collectors designed to operate with a unit contacting energy of at least 40 inches water gauge pressure.

3. The department may authorize the use of filtering equipment other than that described in subds. 1. and 2. if the owner or operator demonstrates to the satisfaction of the department that the filtering of particulate asbestos material is equivalent to that of the described equipment.

4. All air-cleaning equipment authorized by this paragraph shall be properly installed, used, operated and maintained. Bypass devices may be used only during upset or emergency conditions and then only for so long as it takes to shut down the operation generating the particulate asbestos material.

(g) Presence of uncombined water. Where the presence of uncombined water is the sole reason for failure to meet the no-visible-asbestos-emission requirements of pars. (a), (c), (d), (e), (h), (j) and (k), the failure is not a violation of the emission requirements.

(h) Fabricating. There may be no visible asbestos emissions to the outside air, except as provided in par. (f), from any of the operations listed in this paragraph, if they use commercial asbestos, or from any building or structure in which the operations are conducted.

1. The fabrication of cement building products.

2. The fabrication of friction products, except those operations that primarily install asbestos friction materials on motor vehicles.

3. The fabrication of cement or silicate board for ventilation hoods, ovens, electrical panels, laboratory furniture, bulkheads, partitions and ceilings for marine construction, and flow control devices for the molten metal industry.

(i) Insulating. Molded insulating materials which are friable and wet-applied insulating materials which are friable after drying, installed after January 1, 1984 may not contain commercial asbestos. The provisions of this paragraph do not apply to insulating materials which are spray applied.

Note: Such materials are regulated under par. (e).

(j) Waste disposal for manufacturing of asbestos products, fabricating, demolition, renovation and spraying operations. The owner or operator of any source covered under the provisions of par. (c), (d), (e) or (h) shall meet the standards of this paragraph.

1. There may be no visible asbestos emissions to the outside air, except as provided in subd. 3., during the collection, processing including incineration, packaging, transporting, or deposition of any asbestos-containing waste material which is generated.

2. All asbestos-containing waste material shall be deposited at waste disposal sites which shall be operated in accordance with the following requirements:

a. There may be no visible asbestos emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited, except as provided in subpar. e.

b. Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited, at intervals of 100 meters (ca. 330 ft.) or less except as specified in subpar. e. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs shall conform to the requirements of 20" x 14" upright format signs specified in 29 C.F.R. s. 1910.145(d)(4), incorporated by reference in sub. (7), and this paragraph. The signs shall display the following legend in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND

ASBESTOS WASTE DISPOSAL SITE

DO NOT CREATE DUST

Breathing Asbestos is Hazardous to Your Health

NOTATION

1" Sans Serif, Gothic or Block
3/4" Sans Serif, Gothic or Block
14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the 2 lines.

c. The perimeter of the disposal site shall be fenced in order to adequately deter access to the general public except as specified in subpar. d.

d. Warning signs and fencing are not required where the requirements of subpar. e.1) are met, or where a natural barrier adequately deters access to the general public. Upon request and supply of appropriate information, the department will determine whether a fence or a natural barrier adequately deters access to the general public.

e. Rather than meet the requirement of subpar. a., an owner or operator may elect to meet either of the requirements of subpar. e.1) or 2), or may use an alternative control method for emissions from active waste disposal sites which has received prior approval by the department.

1) At the end of each operating day or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material.

2) At the end of each operating day, or at least once every 24-hour period while the disposal site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion. The agent shall be used as recommended for the particular dust by the dust suppression agent

manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the department. For purposes of this subparagraph, waste crankcase oil is not considered a dust suppression agent.

3. Rather than meet the requirement of subd. 1, an owner or operator may elect to use either of the disposal methods specified under subpars. a. and b., or an alternative disposal method which has received prior approval by the department.

a. Treatment of asbestos-containing waste material with water.

1) Control device asbestos waste shall be thoroughly mixed with water into a slurry and other asbestos-containing waste material shall be adequately wetted. There may be no visible asbestos emissions to the outside air from the collection, mixing, and wetting operations, except as provided in par. (f).

2) After wetting, all asbestos-containing waste material shall be sealed into leak-tight containers while wet and such containers shall be deposited at waste disposal sites which are operated according to subd. 2.

3) The containers specified under subpar. a.2) shall be labeled with a warning label that states:

CAUTION

Contains Asbestos
Avoid Opening or
Breaking Container

Breathing Asbestos is Hazardous
to Your Health

Alternatively, warning labels specified by occupational safety and health standards of the department of labor, occupational safety and health administration (OSHA) under 29 C.F.R. s. 1910.93a(g)(2)(ii), incorporated by reference in sub. (7), may be used.

b. Processing of asbestos-containing waste material into non-friable forms:

1) All asbestos-containing waste material shall be formed into non-friable pellets or other shapes and deposited at waste disposal sites which are operated according to subd. 2.

2) There may be no visible asbestos emissions to the outside air from the collection and processing of asbestos-containing waste material except as specified in par. (f).

4. For the purposes of this paragraph, the term all asbestos-containing waste material as applied to demolition and renovation operations covered by par. (d) includes only friable asbestos waste and control device asbestos waste.

(k) Waste disposal for asbestos mills. The owner or operator of any source covered under par. (a) shall meet the following standard:

1. There may be no visible asbestos emissions to the outside air except as provided in subd. 3., during the collection, processing, packaging, transporting or deposition of any asbestos-containing waste material which is generated by any source covered under par. (a).

2. All asbestos-containing waste material shall be deposited at waste disposal sites which are operated according to par. (j)2.

3. Rather than meet the requirement of subd. 1., an owner or operator may elect to meet the requirements in subpars. a. and b., or use an alternative disposal method which has received prior approval by the department.

a. There may be no visible asbestos emissions to the outside air from the transfer of control device asbestos waste to the tailings conveyor, except as provided in par. (f). The waste shall be subsequently processed either as specified in subpar. b. or as specified in par. (j)3.

b. All asbestos-containing waste material shall be adequately mixed, with a wetting agent recommended by the manufacturer of the agent to effectively wet dust and tailings, prior to deposition at a waste disposal site. The agent shall be used as recommended for the particular dust by the manufacturer of the agent. There may be no discharge of visible asbestos emissions to the outside air from the wetting operation except as specified in par. (f). Wetting may be suspended when the ambient temperature at the waste disposal site is less than -9.5°C (ca. 15°F). The ambient air temperature shall be determined by a measurement method with an accuracy of plus or minus 1°C (ca. plus or minus 2°F) and recorded at least at hourly intervals during the period that the operation of the wetting system is suspended. Records of the temperature measurements shall be retained at the source for a minimum of 2 years and made available for inspection by a department representative.

(l) Inactive asbestos waste disposal sites. The owner of any inactive waste disposal site, which was operated by sources covered under par. (a), (c) or (h) and where asbestos-containing waste material produced by these sources was deposited, shall meet the standards of this paragraph.

1. There may be no visible asbestos emissions to the outside air from an inactive waste disposal site subject to this paragraph, except as provided in subd. 5.

2. Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited, at intervals of 100 meters (ca. 330 ft.) or less, except as specified in subd. 4. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this subdivision shall conform to the requirements of 20" x 14" upright format signs specified in 29 C.F.R. s. 1910.145(d)(4), incorporated by reference in sub. (7), and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this subdivision.

LEGEND

ASBESTOS WASTE DISPOSAL SITE

DO NOT CREATE DUST

Breathing Asbestos Is Hazardous
to Your Health

NOTATION

1" Sans Serif, Gothic or Block
3/4" Sans Serif, Gothic or Block

14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the 2 lines.

3. The perimeter of the site shall be fenced in a manner adequate to deter access by the general public except as specified in subd. 4.

4. Warning signs and fencing are not required where the requirements of subd. 5.a. or b. are met, or where a natural barrier adequately deters access by the general public. Upon request and

supply of appropriate information, the department will determine whether a fence or a natural barrier adequately deters access to the general public.

5. Rather than meet the requirement of subd. 1., an owner may elect to meet the requirements of this subdivision or may use an alternative control method for emissions from inactive waste disposal sites which has received prior approval by the department.

a. The asbestos-containing waste material shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material, and a cover of vegetation shall be grown and maintained on the area adequate to prevent exposure of the asbestos-containing waste material; or

b. The asbestos-containing waste material shall be covered with at least 60 centimeters (ca. 2 feet) of compacted non-asbestos-containing material and maintained to prevent exposure of asbestos containing waste; or

c. For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion shall be applied. The agent shall be used as recommended for the particular asbestos tailings by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the department. For purposes of this subparagraph, waste crankcase oil is not considered a dust suppression agent.

SECTION 6. NR 154.19(5)(c) and (d) are renumbered to be (d) and (e).

SECTION 7. NR 154.19(5)(c), (f) and (g) are created to read:

(c) Stack sampling. 1. Unless a waiver of emission testing is obtained from the department, each owner or operator of a source covered under par. (a) on which construction or modification commenced after January 1, 1984 shall test emissions from the source within 90 days of startup.

2. The department shall be notified at least 30 days prior to an emission test to afford it the opportunity to have a representative present to witness the testing procedures.

3. Samples shall be taken over such a period as is necessary to accurately determine the maximum emissions which will occur in any 24-hour period. Where emissions depend upon the relative frequency of operation of different types of processes, operating hours, operating capacities or other factors, the calculation of maximum 24-hour-period emissions will be based on that combination of factors which is likely to occur during the subject period and which result in the maximum emissions. No changes in the operation may be made which would potentially increase emissions above that determined by the most recent source test until a new emission level has been estimated by calculation and the results reported to the department.

4. All samples shall be analyzed and beryllium emissions shall be determined within 30 days after the source test. All determinations shall be reported to the department by registered letter dispatched before the close of the next business day following the determinations.

5. Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available for insection by a department representative for a minimum of 2 years.

(f) Emission testing -- rocket firing or propellant disposal. 1. Ambient air concentrations shall be measured during and after firing of a rocket motor or propellant disposal and in such a manner that the effect of these emissions can be compared with the standard set in par. (d). The sampling techniques shall be approved by the department.

2. All samples shall be analyzed and results shall be calculated within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the same site. All results shall be reported to the department by registered letter dispatched before the close of the next business day following determination of the results.

3. Records of air sampling test results and other data needed to determine integrated intermittent concentrations shall be retained at the source and made available for inspection by a department representative for a minimum of 2 years.

4. The department shall be notified at least 30 days in advance of an air sampling test to have a representative present to witness the testing procedures.

(g) Stack sampling -- rocket motor firing. 1. Sources subject to par. (e) shall be continuously sampled during the release of combustion products from the tank so that compliance with the standards can be determined. The tests shall be conducted in accordance with:

a. Method 104 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), or

b. Method 103 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7).

2. All samples shall be analyzed and beryllium emissions shall be determined within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the same site. All determinations shall be reported to the department by registered letter dispatched before the close of the next business day following the determination.

3. Records of emission test results and other data needed to determine total emissions shall be retained at the source and shall be made available for inspection by a department representative for a minimum of 2 years.

4. The department shall be notified at least 30 days prior to an emission test to afford it the opportunity to have a representative present to witness the testing procedures.

SECTION 8. NR 154.19(6) and (7) are created to read:

(6) CONTROL OF VINYL CHLORIDE EMISSIONS. (a) Applicability. This subsection applies to plants which produce:

1. Ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene,

2. Vinyl chloride by any process,

3. One or more polymers containing any fraction of polymerized vinyl chloride and

4. Any combination of the products listed in subds. 1. through 3.

(b) Exemption. This subsection does not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of no more than 0.19 cubic meters (50 gallons).

(c) Partial exemption. Paragraphs of this subsection other than pars. (f)1.a., 2., 3., and 4., (i), (j), (k), (l), and (m) do not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of greater than 0.19 cubic meters (50 gallons) and no more than 4.07 cubic meters (1100 gallons).

(d) Emission standards for ethylene dichloride plants. 1. 'Ethylene dichloride purification'. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in ethylene dichloride purification may not exceed 10 parts per million, except as provided in par. (g)1. This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in par. (g)2.f.1) before being opened.

2. 'Oxychlorination reactor'. Except as provided in par. (g)1., emissions of vinyl chloride to the atmosphere from each oxychlorination reactor may not exceed 0.2 gram/kilogram (0.0002 pound/pound) of the 100% ethylene dichloride product from the oxychlorination process.

(e) Emission standard for vinyl chloride plants. An owner or operator of a vinyl chloride plant shall comply with the requirements of this paragraph and par. (g).

1. 'Vinyl chloride formation and purification'. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in vinyl chloride formation or purification, or both, may not exceed 10 parts per million, except as provided in par. (g)1. This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in par. (g)2.f.1) before being opened.

2. [Reserved]

(f) Emission standards for polyvinyl chloride plants. An owner or operator of a polyvinyl chloride plant shall comply with the requirements of this paragraph and par. (g).

1. 'Requirements for vinyl chloride reactors'. a. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each vinyl chloride reactor may not exceed 10 parts per million, except as provided in pars. (f)1.b. and (g)1.

b. The vinyl chloride reactor opening loss from each vinyl chloride reactor may not exceed 0.02 gram vinyl chloride/kilogram (0.00002 pound vinyl chloride/pound) of polyvinyl chloride product, with the product determined on a dry solids basis. This requirement applies to any vessel which is used as a vinyl chloride reactor or as both a vinyl chloride reactor and a stripper. In the bulk process, the product means the gross product of prepolymerization and postpolymerization.

c. Except for an emergency manual vent valve discharge, there may be no discharge to the atmosphere from any manual vent valve on a polyvinyl chloride reactor in vinyl chloride service. An emergency manual vent valve discharge means a discharge to the atmosphere which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any discharge to the atmosphere from any manual vent valve, the owner or operator of the source from which the discharge occurs shall submit to the department a report in writing containing information on the source, nature and cause of the discharge, the method used for determining the vinyl chloride loss, the action that was taken to abate the discharge, and measures adopted to prevent future discharges.

2. 'Requirement for strippers.' The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each stripper may not exceed 10 parts per million, except as provided in par. (g)1. This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in par. (g)2.f.1) before being opened.

3. 'Requirement for mixing, weighing, and holding containers.' The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each mixing, weighing, or holding container in vinyl chloride service which precedes the stripper, or the reactor if the plant has no stripper, in the plant process flow may not exceed 10 parts per million, except as provided in par. (g)1. This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in par. (g)2.f.1) before being opened.

4. 'Requirement for monomer recovery systems.' The concentration of vinyl chloride in any exhaust gases discharged to the atmosphere from each monomer recovery system may not exceed 10 parts per million, except as provided in par. (g)1. This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in par. (g)2.f.1) before being opened.

5. 'Requirements for sources following strippers.' The following requirements apply to emissions of vinyl chloride to the atmosphere from the combination of all sources following strippers, or vinyl chloride reactors if the plant has no strippers, in the plant process flow including but not limited to, centrifuges, concentrators, blend tanks, filters, dryers, conveyor air discharges, baggers, storage containers, and inprocess wastewater.

a. In polyvinyl chloride plants using stripping technology to control vinyl chloride emissions, the weighted average residual vinyl chloride concentration in all grades of polyvinyl chloride resin processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, may not exceed:

1) 2000 parts per million for polyvinyl chloride dispersion resins, excluding latex resins;

2) 400 ppm for all other polyvinyl chloride resins, including latex resins, averaged separately for each type of resin; or

b. In polyvinyl chloride plants controlling vinyl chloride emissions with technology other than stripping or in addition to stripping, emissions of vinyl chloride to the atmosphere may not exceed:

1) 2 grams/kilogram (0.002 pound/pound) product from the strippers (or vinyl chloride reactors if the plant has no strippers) for dispersion polyvinyl chloride resins, excluding latex resins, with the product determined on a dry solids basis;

2) 0.4 gram/kilogram (0.0004 pound/pound) product from the strippers (or vinyl chloride reactors if the plant has no strippers) for all other polyvinyl chloride resins, including latex resins, with the product determined on a dry solids basis.

(g) Emission standards for ethylene dichloride, vinyl chloride and polyvinyl chloride plants. An owner or operator of an ethylene dichloride, vinyl chloride, or polyvinyl chloride plant shall comply with the requirements of this paragraph.

1. 'Relief valve discharge'. Except for an emergency relief discharge, there may be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service. An emergency relief discharge means a discharge which could not have been avoided by taking measures to

prevent the discharge. Within 10 days of any relief valve discharge, the owner or operator of the source from which the relief valve discharge occurs shall submit to the department a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

2. 'Fugitive emission sources'. a. Vinyl chloride emissions from loading and unloading lines in vinyl chloride service which are opened to the atmosphere after each loading and unloading operation shall be minimized as follows:

1) After each loading and unloading operation and before opening a loading or unloading line to the atmosphere, the quantity of vinyl chloride in all parts of each loading or unloading line that are to be opened to the atmosphere shall be reduced so that the parts combined contain no greater than 0.0038 cubic meter (0.13 cubic feet) of vinyl chloride, at standard temperature and pressure; and

2) Any vinyl chloride removed from a loading or unloading line in accordance with subpar. a.1) shall be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

b. During loading or unloading operations, the vinyl chloride emissions from each slip gauge in vinyl chloride service shall be minimized by ducting any vinyl chloride discharged from the slip gauge through a control system from which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

c. 1) Rotating pumps. Vinyl chloride emissions from seals on all rotating pumps in vinyl chloride service shall be minimized by installing sealless pumps, pumps with double mechanical seals, or equivalent as provided in par. (h). If double mechanical seals are used, vinyl chloride emissions from the seals shall be minimized by maintaining the pressure between the 2 seals so that any leak that occurs is into the pump, by ducting any vinyl chloride between the 2 seals through a control system from which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

2) Reciprocating pumps. Vinyl chloride emissions from seals on all reciprocating pumps in vinyl chloride service shall be minimized by installing double outboard seals, or equivalent as provided in par. (h). If double outboard seals are used, vinyl chloride emissions from the seals shall be minimized by maintaining the pressure between the 2 seals so that any leak that occurs is into the pump, by ducting any vinyl chloride between the 2 seals through a control system from which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

3) Rotating compressors. Vinyl chloride emissions from seals on all rotating compressors in vinyl chloride service shall be minimized by installing compressors with double mechanical seals, or equivalent as provided in par. (h). If double mechanical seals are used, vinyl chloride emissions from the seals shall be minimized by maintaining the pressure between the 2 seals so that any leak that occurs is into the compressor, by ducting any vinyl chloride between the 2 seals through a control system from which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

4) Reciprocating compressors. Vinyl chloride emissions from seals on all reciprocating compressors in vinyl chloride service shall be minimized by installing double outboard seals, or equivalent as provided in par. (h). If double outboard seals are used, vinyl chloride emissions from the seals shall be minimized by maintaining the pressure between the 2 seals so that any leak that occurs is into the compressor, by ducting any vinyl chloride between the 2 seals through a control system from which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

5) Agitators. Vinyl chloride emissions from seals on all agitators in vinyl chloride service shall be minimized by installing agitators with double mechanical seals, or equivalent as provided in par. (h). If double mechanical seals are used, vinyl chloride emissions from the seals shall be minimized by maintaining the pressure between the 2 seals so that any leak that occurs is into the agitated vessels, by ducting any vinyl chloride between the 2 seals through a control system from

which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

d. Vinyl chloride emissions due to leakage from each relief valve on equipment in vinyl chloride service shall be minimized by installating a rupture disk between the equipment and the relief valve, by connecting the relief valve discharge to a process line or recovery system, or equivalent as provided in par. (h).

e. Except as provided in par. (f)1.c., all gases which are manually vented from equipment in vinyl chloride service shall be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

f. Vinyl chloride emissions from opening of equipment (including loading or unloading lines that are not opened to the atmosphere after each loading or unloading operation) shall be minimized as follows:

1) Before opening any equipment for any reason, the quantity of vinyl chloride shall be reduced so that the equipment contains no more than 2% by volume vinyl chloride or 0.0950 cubic meter (25 gallons) of vinyl chloride, whichever is larger, at standard temperature and pressure, and

2) Any vinyl chloride removed from the equipment in accordance with subpar. f.1) shall be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

g. Unused portions of samples containing at least 10% by weight vinyl chloride shall be returned to the process, and sampling techniques shall be such that sample containers in vinyl chloride service are purged into a closed process system.

h. Vinyl chloride emissions due to leaks from equipment in vinyl chloride service shall be minimized by instituting and implementing a formal leak detection and elimination program. The owner or operator of a source on which construction or modification commenced after January 1, 1984 shall submit a description of the program to the department for approval. The program shall be submitted within 45 days after startup unless a waiver is granted by the department. If a waiver of compliance is granted, the program is to be submitted on a date scheduled by the department. Approval of a program shall be granted by the department provided it finds:

1) It includes a reliable and accurate vinyl chloride monitoring system for detection of major leaks and identification of the general area of the plant where a leak is located. A vinyl chloride monitoring system means a device which obtains air samples from one or more points on a continuous sequential basis and analyzes the samples with gas chromatography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry flame ion detection, or an equivalent or alternative method.

2) It includes a reliable and accurate portable hydrocarbon detector to be used routinely to find small leaks and to pinpoint the major leaks indicated by the vinyl chloride monitoring system. A portable hydrocarbon detector means a device which measures hydrocarbons with a sensitivity of at least 10 parts per million and is of such design and size that it can be used to measure emissions from localized points.

3) It provides for an acceptable calibration and maintenance schedule for the vinyl chloride monitoring system and portable hydrocarbon detector. For the vinyl chloride monitoring system, a daily span check shall be conducted with a concentration of vinyl chloride equal to the concentration defined as a leak according to subpar. h.6). The calibration shall be done with either:

a) A calibration gas mixture prepared from the gases specified in section 5.2.1 and 5.2.2 and in accordance with section 7.1 of Test Method 106 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), or

b) A calibration gas cylinder standard containing the appropriate concentration of vinyl chloride. The gas composition of the calibration gas cylinder standard shall have been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than plus or minus 5% from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer. If a gas chromatograph is used as the vinyl chloride monitoring system, these gas mixtures may be directly used to prepare a chromatograph calibration curve as described in section 7.3 of Test Method 106 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7). The requirements in sections 5.2.3.1 and 5.2.3.2 of Test Method 106 for certification of cylinder standards and for establishment and verification of calibration standards shall be followed.

4) The location and number of points to be monitored and the frequency of monitoring provided for in the program are acceptable when they are compared with the number of pieces of equipment in vinyl chloride service and the size and physical layout of the plant.

5) It contains an acceptable plan of action to be taken when a leak is detected.

6) It contains a definition of leak which is acceptable when compared with the background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system. Measurement of background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system shall be included with the description of the program. The definition of leak for a given plant may vary among the different areas within the plant and is also to change over time as background concentrations in the plant are reduced.

i. Vinyl chloride emissions to the atmosphere from inprocess wastewater shall be reduced as specified in this subparagraph.

1) The concentration of vinyl chloride in each inprocess wastewater stream containing greater than 10 parts per million vinyl chloride measured immediately as it leaves a piece of equipment and before being mixed with any other inprocess wastewater stream shall be reduced to no more than 10 parts per million by weight before being mixed with any other inprocess wastewater stream which contains less than 10 parts per million vinyl chloride, before being exposed to the atmosphere, before being discharged to a wastewater treatment process, or before being discharged untreated as a wastewater. This subparagraph does apply to water which is used to displace vinyl chloride from

equipment before it is opened to the atmosphere in accordance with par. (f)1.b. or subpar. f., but does not apply to water which is used to wash out equipment after the equipment has already been opened to the atmosphere in accordance with par. (f)1.b. or subpar. f.

2) Any vinyl chloride removed from the inprocess wastewater in accordance with subpar. i.1) shall be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases may not exceed 10 parts per million, or equivalent as provided in par. (h).

3. 'Standard operating procedure'. The requirements in subpars. a., b., e., f., g., and h., shall be incorporated into a standard operating procedure and made available upon request for inspection by a department representative. The standard operating procedure shall include provisions for measuring the vinyl chloride in equipment 4.75 cubic meters (1,250 gallons) in volume for which an emission limit is prescribed in subpar. f.1) prior to opening the equipment and using Test Method 106 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), a portable hydrocarbon detector, or an equivalent or alternative method. The method of measurement shall meet the requirements in par. (i)7.e.1)a) or b).

(h) Equivalent equipment and procedures. Upon written application from an owner or operator, the department may approve use of equipment or procedures which have been demonstrated to the department's satisfaction to be equivalent in terms of reducing vinyl chloride emissions to the atmosphere to those prescribed for compliance with a specific paragraph of this subsection. Any request for using an equivalent method shall be submitted to the department with the application for a permit to construct or modify and operate the vinyl chloride source.

(i) Emission tests. 1. Unless a waiver of emission testing is obtained from the department, each owner or operator of a source to which this subsection applies on which construction or modification commenced after January 1, 1984 shall test emissions from the source within 90 days of startup.

2. The department shall be notified at least 30 days prior to a stack or performance test to afford the department the opportunity to have a representative present to witness the testing procedures.

3. Any emission test shall be conducted while the equipment being tested is operating at the maximum production rate at which the equipment will be operated and under other relevant conditions as may be specified by the department based on the representative performance of the source.

4. [Reserved]

5. When at all possible, each sample shall be analyzed within 24 hours, but in no case in excess of 72 hours of sample collection. Vinyl chloride emissions shall be determined within 30 days after the emission test. The owner or operator shall report the determinations to the department by registered letter dispatched before the close of the next business day following the determination.

6. The owner or operator shall retain at the plant and make available, upon request, for inspection by a department representative, for a minimum of 2 years, records of emission test results and other data needed to determine emissions.

7. Unless otherwise specified, the owner or operator shall use Test Methods of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), for each test as required by subpars. a., b., c., d. and e. unless an equivalent method or an alternative method has been approved by the department. If the department finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, the department may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the department may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

a. Test Method 106 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), shall be used to determine the vinyl chloride emissions from any source for which an emission limit is prescribed in par. (d)1. or 2., (e)1., (f)1.a., 2., 3., or 4., or from any control system to which reactor emissions are required to be ducted in par. (f)1.b. or to which fugitive emissions are required to be ducted in par. (g)2.a.2), b., e., f.2), or i.2).

1) For each run, one sample shall be collected. The sampling site shall be at least 2 stack or duct diameters downstream and one-half diameter upstream from any flow disturbance such as a bend,

expansion, contraction or visible flame. For a rectangular cross section an equivalent diameter shall be determined from the following equation:

$$\text{equivalent diameter} = 2\,(\text{length})(\text{width})/\text{length} + \text{width}$$

The sampling point in the duct shall be at the centroid of the cross section. The sample shall be extracted at a rate proportional to the gas velocity at the sampling point. The sample shall be taken over a minimum of one hour, and shall contain a minimum volume of 50 liters corrected to standard conditions.

2) Each emission test shall consist of 3 runs. For the purpose of determining emissions, the average of results of all runs shall apply. The average shall be computed on a time weighted basis.

3) For gas streams containing more than 10% oxygen the concentration of vinyl chloride as determined by Test Method 106 shall be corrected to 10% oxygen (dry basis) for determination of emissions by using the following equation:

$$C_b(\text{corrected}) = C_b\ 10.9/20.9\text{-percent } O_2$$

where:

C_b(corrected) is the concentration of vinyl chloride in the exhaust gases, corrected to 10% oxygen, C_b is the concentration of vinyl chloride as measured by Test Method 106

20.9 equals the percent oxygen in the ambient air at standard conditions

10.9 is the percent oxygen in the ambient air at standard conditions minus the 10% oxygen to which the correction is being made

percent O_2 is the percent oxygen in the exhaust gas as measured by Reference Method 3 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in sub. (7)

4) For those emission sources where the emission limit is prescribed in terms of mass rather than concentration, mass emissions in kilograms/100 kilograms product shall be determined by using the following equation:

$$C_{BX} = [C_b(2.60)\ Q\ 10^{-6}][100]/Z$$

where:

C_{BX} equals the kilograms vinyl chloride/100 kilograms product

C_b is the concentration of vinyl chloride as measured by Test Method 106

2.60 equals the density of vinyl chloride at one atmosphere and 20°C in kilograms/cubic meter

Q is the volumetric flow rate in cubic meters/hour as determined by Reference Method 2 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in sub. (7)

10^{-6} is the conversion factor for parts per million

Z is the production rate (kilograms/hour)

b. Test Method 107 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), shall be used to determine the concentration of vinyl chloride in each inprocess wastewater stream for which an emission limit is prescribed in par. (g)2.1.1).

c. Where a stripping operation is used to attain the emission limit in par. (f)5., emissions shall be determined using Test Method 107 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), as follows:

1) The number of strippers and samples and the types and grades of resin to be sampled shall be determined by the department for each individual plant at the time of the test based on the plant's operation.

2) Each sample shall be taken immediately following the stripping operation.

3) The corresponding quantity of material processed by each stripper shall be determined on a dry solids basis and by a method submitted to and approved by the department.

4) At the prior request of the department, the owner or operator shall provide duplicates of the samples required in subpar. c.1).

d. Where control technology other than or in addition to a stripping operation is used to attain the emission limit in par. (f)5., emissions shall be determined as follows:

1) Test Method 106 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), shall be used to determine atmospheric emissions from all of the process equipment simultaneously. The requirements of subpar. a. shall be met.

2) Test Method 107 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), shall

be used to determine the concentration of vinyl chloride in each inprocess wastewater stream subject to the emission limit prescribed in par. (f)5. The mass of vinyl chloride in kilograms/100 kilograms product in each inprocess wastewater stream shall be determined by using the following equation:

$$C_{BX} = [C_d R 10^{-6}][100]/Z$$

where:

C_{BX} equals to kilogram vinyl chloride/100 Kg product

C_d is the concentration of vinyl chloride as measured by Test Method 107 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7)

R is the water flow rate in liters/hour determined in accordance with a method which has been submitted to and approved by the department

10^{-6} is the conversion factor for parts per million

Z is the production rate (kilograms/hour), determined in accordance with a method which has been submitted and approved by the department

e. The vinyl chloride reactor opening loss for which an emission limit is prescribed in par. (f)1.b. shall be determined. The number of reactors for which the determination shall be made shall be specified by the department for each individual plant at the time of the determination based on the plant's operation. For a vinyl chloride reactor that is also used as a stripper, the detemination may be made immediately following the stripping operation.

1) Except as provided in subpar. e.2), the vinyl chloride reactor opening loss shall be determined using the following equation:

$$C = W(2.60)(10^{-6})(C_b)/YZ$$

where:

C equals the kilogram vinyl chloride emissions/kilogram product

W is the capacity of the vinyl chloride reactor in cubic meters

2.60 is the density of vinyl chloride at one atmosphere and 20°C in kilogram/cubic meters

10^{-6} is the conversion factor for parts per million

C_b equals parts per million by volume vinyl chloride as determined by Test Method 106 of 40

C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), or by a portable hydrocarbon detector which measures hydrocarbons with a sensitivity of at least 10 parts per million

Y is the number of batches since the vinyl chloride reactor was last opened to the atmosphere

Z is the average kilogram of polyvinyl chloride produced per batch in the number of batches since the vinyl chloride reactor was last opened to the atmosphere

a) If Method 106 is used to determine the concentration of vinyl chloride (C_b), the sample shall be withdrawn at a constant rate with a probe of sufficient length to reach the vessel bottom from the manhole. Samples shall be taken for 5 minutes within 6 inches of the vessel bottom, 5 minutes near the vessel center, and 5 minutes near the vessel top.

b) If a portable hydrocarbon detector is used to determine the concentration of vinyl chloride (C_b), a probe of sufficient length to reach the vessel bottom from the manhole shall be used to make the measurements. One measurement shall be made within 6 inches of the vessel bottom, one near the vessel center and one near the vessel top. Measurements shall be made at each location until the reading is stabilized. All hydrocarbons measured shall be assumed to be vinyl chloride.

c) The production rate of polyvinyl chloride (Z) shall be determined by a method submitted to and approved by the department.

2) A calculation based on the number of evacuations, the vacuum involved, and the volume of gas in the reactor is hereby approved by the department as an alternative method for determining reactor opening loss for past polymerization reactors in the manufacture of bulk resins.

(j) Emission monitoring. 1. A vinyl chloride monitoring system shall be used to monitor on a continuous basis the emissions from the sources for which emission limits are prescribed in pars. (d)1. and 2., (e)1., and (f)1.a., 2., 3., and 4., and for any control system to which vinyl chloride reactor emissions are required to be ducted in par. (f)1.b. or to which fugitive emissions are required to be ducted in par. (g)2.a.2), b., e., f.2) and i.2).

2. The vinyl chloride monitoring system used to meet the requirement in subd. 1. shall be a device which obtains air samples from one or more points on a continuous sequential basis and analyzes the samples with gas chromatography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry, flame ion detection, or

an equivalent or alternative method. The vinyl chloride monitoring system used to meet the requirements in par. (g)2.h.2) may be used to meet the requirements of this paragraph.

3. A daily span check shall be conducted for each vinyl chloride monitoring system used. For all of the emission sources listed in subd. 1., except the one for which an emission limit is prescribed in par. (d)2., the daily span check shall be conducted with a concentration of vinyl chloride equal to 10 parts per million. For the emissions source for which an emission limit is prescribed in par. (d)2., the daily span check shall be conducted with a concentration of vinyl chloride which is determined to be equivalent to the emission limit for that source based on the emission test required by par. (i). The calibration shall be done with:

a. A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.2 and in accordance with section 7.1 of Test Method 106 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), or

b. A calibration gas cylinder standard containing the appropriate concentration of vinyl chloride. The gas composition of the calibration gas cylinder standard shall have been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than plus or minus 5% from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer. If a gas chromatograph is used as the vinyl chloride monitoring system, these gas mixtures may be directly used to prepare a chromatograph calibration curve as described in section 7.3 of Test Method 106 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7). The requirements in sections 5.2.3.1 and 5.2.3.2 of Test Method 106 for certification of cylinder standards and for establishment and verification of calibration standards shall be followed.

(k) Initial report. 1. The owner or operator of any source to which this subsection applies and on which construction or modification is commenced after January 1, 1984 shall notify the department in writing that the equipment and procedural specifications in par. (g)2.a. through h. are being implemented.

2. The statement shall be submitted to the department within 90 days of the initial startup date. The statement shall contain the information specified in this subdivision.

a. A list of the equipment installed for compliance,

b. A description of the physical and functional characteristics of each piece of equipment,

c. A description of the methods which have been incorporated into the standard operating procedures for measuring or calculating the emissions for which emission limits are prescribed in par. (g)2.a.1) and f.1), and

d. A statement that each piece of equipment is installed and that each piece of equipment and each procedure is being used.

(l) Semiannual report. 1. The owner or operator of any source subject to this subsection shall submit to the department on September 15 and March 15 of each year a report in writing containing the information required by this paragraph.

2. The first semiannual report shall be submitted within 180 days of the initial startup date of a source on which construction or modification commenced after January 1, 1984.

3. Unless otherwise specified, the owner or operator shall use the Test Methods of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), to conduct emission tests as required by subpars. b. and c., unless an equivalent or an alternative method has been approved by the department. If the department finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, the department may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the department may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

a. The owner or operator shall include in the report a record of any emissions which averaged over any hour period (commencing on the hour) are in excess of the emission limits prescribed in par. (d)1. or 2., (e)1., or (f)1.a., 2., 3., or 4., or for any control system to which reactor emissions are required to be ducted in par. (g)2.a.2), b., e., f.2), or i.2). The emissions shall be measured in accordance with par. (j).

b. In polyvinyl chloride plants for which a stripping operation is used to attain the emission level prescribed in par. (f)5., the owner or operator shall include in the report a record of the vinyl chloride content in the polyvinyl chloride resin. Test Method 107 of 40 C.F.R. pt. 61, Appendix B, incorporated by reference in sub. (7), shall be used to determine vinyl chloride content in accordance with this subparagraph.

1) If batch stripping is used, one representative sample of polyvinyl chloride resin shall be taken from each batch of each grade of resin immediately following the completion of the stripping operation and identified by resin type and grade and the date and time the batch is completed. The corresponding quantity of material processed in each stripper batch shall be be recorded and identified by resin type and grade and the date and time the batch is completed.

2) If continuous stripping is used, one representative sample of polyvinyl chloride resin shall be taken for each grade of resin processed, whichever is more frequent. The sample shall be taken as the resin flows out of the stripper and identified by resin type and grade and the date and time the sample was taken. The corresponding quantity of material processed by each stripper over the time period represented by the sample during the 8-hour period shall be recorded and identified by resin type and grade and the date and time it represents.

3) The quantity of material processed by the stripper shall be determined on a dry solids basis and by a method submitted to and approved by the department.

4) At the prior request of the department, the owner or operator shall provide duplicates of the samples required in subpar. b.1) and 2).

5) The report to the department by the owner or operator shall include the vinyl chloride content found in each sample required by subpar. b.1) and 2), averaged separately for each type of resin, over each calendar day and weighted according to the quantity of each grade of resin processed by the stripper or strippers that calendar day, according to the following equation:

$$A_{T_i} = \frac{\sum_{i=1}^{n} P_{G_i} M_{G_i}}{Q_{T_i}} = \frac{P_{G_1} M_{G_1} + P_{G_2} M_{G_2} + \ldots P_{G_n} M_{G_n}}{Q_{T_i}}$$

where:

A is the 24-hour average concentration of type T_i resin in ppm (dry weight basis)

Q is the total production of type T_i resin over the 24-hour period in kilograms

T_i is the type of resin

i=1, 2...m where m is total number of resin types produced during the 24-hour period

M is the concentration of vinyl chloride in one sample of grade G_i resin in parts per million

P is the production of grade G_i resin represented by the sample in kilograms

G_i is the grade of resin (e.g., G_1, G_2 and G_3)

n is the total number of grades of resin produced during the 24-hour period

6) Records of all data needed to furnish the information required by subpar. b.5) shall be retained at the source and made available for inspection by a department representative for a minimum of 2 years. The records shall contain:

a) The vinyl chloride content found in all the samples required in subpar. b.1) and 2), identified by the resin type and grade and the time and date of the sample, and

b) The corresponding quantity of polyvinyl chloride resin processed by the stripper or strippers identified by the resin type and grade and the time and date it represents.

c. The owner or operator shall include in the report a record of the emissions from each reactor opening for which an emission limit is prescribed in par. (f)1.b. Emissions shall be determined in accordance with par. (i)7.e., except that emissions for each reactor are to be determined. For a reactor that is also used as a stripper, the determination may be made immediately following the stripping operation.

(m) Recordkeeping. The owner or operator of any source subject to this subsection shall retain the information specified in this paragraph at the source and make it available for inspection by a department representative for a minimum of 2 years.

1. A record of the leaks detected by the vinyl chloride monitoring system, as required by par. (g)2.h., including the concentrations of vinyl chloride measured, analyzed, and recorded by the vinyl chloride detector, the location of each measurement and the date and approximate time of each measurement.

2. A record of the leaks detected during routine monitoring with the portable hydrocarbon detector and the action taken to repair the leaks, as required by par. (g)2.h.

3. A record of emissions measured in accordance with par. (j).

4. A daily operating record for each polyvinyl chloride reactor, including pressure and temperatures.

(7) INCORPORATION BY REFERENCE. (a) Code of federal regulations. The federal regulations or appendix materials in effect on June 30, 1983 listed in this paragraph are incorporated by reference in the corresponding subsections of this section. Copies of these materials are available for inspection in the offices of the department of natural resources, secretary of state and revisor of statutes, Madison, Wisconsin or may be purchased for personal use from the superintendent of documents, U.S. government printing office, Washington D.C. 20402.

1. Appendix B of 40 C.F.R. pt. 61 for subs. (3), (4), (5) and (6).

2. Test Method 3, Appendix A of 40 C.F.R. pt. 60 for sub. (6)(i)7.a.3).

3. Test Method 5, Appendix A of 40 C.F.R. pt. 60 for Test Method 101, Appendix B, 40 C.F.R. pt. 61.

4. 29 C.F.R. s. 1910.145(d)(4) for sub. (4)(j)2.b. and (i)2.

5. 29 C.F.R. s. 1910.93a(g)(2)(ii) for sub. (4)(j)3.a.3).

(b) Other materials. The materials listed in this paragraph are incorporated by reference in the corresponding subsections noted. Some of the materials are also incorporated in Appendix B of 40 C.F.R. pt. 61 as in effect on June 30, 1983. Since Appendix B is incorporated by reference in this subsection by par. (a), materials incorporated by reference in that Appendix are hereby also incorporated by reference and made a part of this subsection. The materials are available for inspection in the offices of the department of natural resources, secretary of state and revisor of statutes, Madison, Wisconsin or may be purchased for personal use at the corresponding address noted.

1. The following materials are available for purchase from at least one of the following addresses: American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103, or the University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106.

a. ASTM D737-75, Standard Test Method for Air Permeability of Textile Fabrics, for sub. (4)(f)1.

b. ASTM D1193-74, Standard Specifications for Type I Reagent Water, for 40 C.F.R. pt. 61, Appendix B, Method 101, par. 6.1.1.

c. ASTM D2986-71 (Reapproved 1978), Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test, for 40 C.F.R. pt. 60, Appendix A, Method 5, par. 3.1.1.

2. [Reserved]

SECTION 9. Ch. NR 440 is created to read:

CHAPTER NR 440

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

NR 440.01 APPLICABILITY; PURPOSE. (1) APPLICABILITY, on and after January 1, 1984 the provisions of this chapter apply to the owner or operator of any stationary source which contains an affected facility.

(2) PURPOSE. This chapter is adopted to enable the department to implement and enforce standards of performance for new stationary sources promulgated by the United States environmental protection agency under section 7411 of the federal clean air act, as required by s. 144.375(4), Stats.

NR 440.02 DEFINITIONS. In this chapter:

(1) "Act or 'Federal clean air act'" has the meaning given it in s. 144.30(14), Stats.

(2) "Administrator" means the administrator of the United States environmental protection agency or the administrator's authorized representative.

(3) "Affected facility" means, with reference to a stationary source, any apparatus to which a standard set out in this chapter is applicable.

(4) "Air pollutant" means an air contaminant as defined in s. 144.30(1), Stats.

(5) "Alternative method" means any method of sampling and analyzing for an air pollutant which is not a reference or equivalent method but which has been demonstrated to the department's satisfaction to produce, in specific cases, results adequate for its determination of compliance.

(6) "Capital expenditure" means an expenditure for a physical or operational change to an existing facility which exceeds the product of the applicable "annual asset guideline repair allowance percentage" specified in the latest edition of internal revenue service (IRS) publication 534 and the existing facility's basis, as defined by 26 U.S.C. s. 1012. However, the total expenditure for a physical or operational change to an existing facility may not be reduced by any "excluded additions" as defined in IRS publication 534, as would be done for tax purposes.

(7) "Commenced" means, with respect to the definition of "new source" in sub. (18), that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

(8) "Construction" means fabrication, erection or installation of an affected facility.

(9) "Continuous monitoring system" means the total equipment, required under the emission monitoring subsections in applicable sections of this chapter, used to sample and condition (if applicable), to analyze, and to provide a permanent record of emissions or process parameters.

(10) "Emission limitation" or "emission standard" has the meaning given it in s. 144.30(11), Stats.

(11) "Equivalent method" means any method of sampling and analyzing for an air pollutant which has been demonstrated to the department's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specified conditions.

(12) "Existing facility" means, with reference to a stationary source, any apparatus of the type for which a standard is promulgated in this chapter, and the construction or modification of which was commenced before the applicability date of that standard; or any apparatus which could be altered in such a way as to be of that type.

(13) [Reserved]

(14) "Isokinetic sampling" means sampling in which the linear velocity of the gas entering the sampling nozzle is equal to that of the undisturbed gas stream at the sample point.

(15) "Malfunction" means any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation, or any other preventable upset condition or preventable equipment breakdown may not be considered malfunctions.

(16) "Modification" means any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted.

(17) "Monitoring device" means the total equipment, required under the monitoring of operations subsections in applicable sections of this chapter, used to measure and, if applicable, record process parameters.

(18) "New source" means any stationary source, the construction or modification of which is commenced after the the applicability date of a standard of performance in this chapter which will be applicable to the source.

(19) "Nitrogen oxides" means all oxides of nitrogen except nitrous oxide, as measured by test methods set forth in this chapter or incorporated by reference in this chapter by s. NR 440.17.

(20) "One-hour period" means any 60-minute period commencing on the hour.

(21) "Opacity" means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background.

(22) "Owner or operator" means any person who owns, leases, operates, controls or supervises an affected facility or a stationary source of which an affected facility is a part.

(23) "Particulate matter" means any finely divided solid or liquid material, other than uncombined water, as measured by the reference methods specified under each applicable section of this chapter, or an equivalent or alternative method.

(24) "Person" has the meaning given it in s. 144.01(9m), Stats.

(25) "Proportional sampling" means sampling at a rate that produces a constant ratio of sampling rate to stack gas flow rate.

(26) "Reference method" means any method of sampling and analyzing for an air pollutant as described in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

(27) "Run" means the net period of time during which an emission sample is collected. Unless otherwise specified, a run may be either intermittent or continuous within the limits of good engineering practice.

(28) "Shutdown" means the cessation of operation of an affected facility for any purpose.

(29) "Six-minute period" means any one of the 10 equal parts of a one-hour period.

(30) "Standard" means a standard of performance set out in ss. NR 440.19 through 440.59.

(31) "Standard conditions" means a temperature of 293 K (68°F) and a pressure of 101.3 kilopascals (29.92 in Hg).

(32) [Reserved]

(33) "Startup" means the setting in operation of an affected facility for any purpose.

(34) "Stationary source" means any building, structure, facility or installation which emits or may emit any air pollutant.

(35) "'Volatile organic compound' or 'VOC'" means any organic compound which participates in atmospheric photochemical reactions, or which is measured by a reference method, an equivalent method, an alternative method, or which is determined by procedures specified under any section of this chapter.

NR 440.03 UNITS AND ABBREVIATIONS. Used in this chapter are abbreviations and symbols of units of measure. These are defined as follows:

(1) System International (SI) units of measure:

A - ampere

g - gram

Hz - hertz

J - joule

K - degree Kelvin

kg - kilogram

m - meter

m^3 - cubic meter

mg - milligram--10^{-3} gram

mm - millimeter--10^{-3} meter

Mg - megagram--10^{6} gram

mol - mole

N - newton

ng - nanogram--10^{-9} gram

nm - nanometer--10^{-9} meter

Pa - pascal

s - second

V - volt

W - watt

Ω - ohm

ug - microgram--10^{-6} gram

(2) Other units of measure:

Btu - British thermal unit

°C - degree Celsius (centrigrade)

cal - calorie

cfm - cubic feet per minute

cu ft - cubic feet

dcf - dry cubic feet

dcm - dry cubic meter

dscf - dry cubic feet at standard conditions

dscm - dry cubic meter at standard conditions

eq - equivalent

°F - degree Fahrenheit

ft - feet

gal - gallon

gr - grain

g-eq - gram equivalent

hr - hour

in - inch

k - 1,000

l - liter

lpm - liter per minute

lb - pound

meq - milliequivalent

min - minute

ml - milliliter

mol. wt. - molecular weight

ppb - parts per billion

ppm - parts per million

psia - pounds per square inch absolute

psig - pounds per square inch gauge

°R - degree Rankine

scf - cubic feet at standard conditions

scfh - cubic feet per hour at standard conditions

scm - cubic meter at standard conditions

sec - second

sq ft - square feet

std - at standard conditions

(3) Chemical nomenclature:

CdS - cadmium sulfide

CO - carbon monoxide

CO_2 - carbon dioxide

HCl - hydrochloric acid

Hg - mercury

H_2O - water

H_2S - hydrogen sulfide

H_2SO_4 - sulfuric acid

N_2 - nitrogen

NO - nitric oxide

NO_2 - nitrogen dioxide

NO_x - nitrogen oxides

O_2 - oxygen

SO_2 - sulfur dioxide

SO_3 - sulfur trioxide

SO_x - sulfur oxides

(4) Miscellaneous:

ASTM -- American Society for Testing and Materials

NR 440.04 ADDRESS. All requests, reports, applications, submittals and other communications to the department under this chapter shall be submitted in duplicate and addressed to the appropriate district office of the department of natural resources, to the attention of the district director. The district offices are:

(1) DNR Southern District, 3911 Fish Hatchery Rd., Madison, WI 53711.

(2) DNR Lake Michigan District, 1125 N. Military Ave., P.O. Box 3600, Green Bay, WI 54303.

(3) DNR West Central District, 1300 Clairemont Ave., Eau Claire, WI 54701.

(4) DNR Southeast District, Air Management Section, 1011 N. Mayfair Rd., Box 13248, Milwaukee, WI 53213.

(5) DNR North Central District, Schiek Plaza, Box 818, Rhinelander, WI 54501.

(6) DNR Northwest District, Hwy. 70 West, Box 309, Spooner, WI 54801.

Note: The counties in each administrative district are:

(1) Southern District—Columbia, Dane, Dodge, Fond du Lac, Grant, Green, Green Lake, Iowa, Jefferson, LaFayette, Marquette, Richland, Rock and Sauk Counties

(2) Lake Michigan District--Brown, Calumet, Door, Florence, Kewaunee, Manitowoc, Marinette, Menominee, Oconto, Outagamie, Shawano, Waupaca, Waushara and Winnebago Counties

(3) West Central District--Buffalo, Chippewa, Clark, Crawford, Dunn, Eau Claire, Jackson, LaCrosse, Monroe, Pepin, Pierce, St. Croix, Trempealeau and Vernon Counties

(4) Southeast District--Kenosha, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington and Waukesha Counties

(5) North Central District--Adams, Forest, Juneau, Langlade, Lincoln, Marathon, Oneida, Portage, Vilas and Wood Counties

(6) Northwest District--Ashland, Barron, Bayfield, Burnett, Douglas, Iron, Polk, Price, Rusk, Sawyer, Taylor and Washburn Counties

NR 440.05 DETERMINATION OF CONSTRUCTION OR MODIFICATION. (1) When requested to do so by an owner or operator, the department shall make a determination of whether action taken or intended to be taken by the owner or operator constitutes construction, including reconstruction, or modification or the commencement thereof within the meaning of this chapter.

(2) The department shall respond to any request for a determination under sub. (1) within 30 days of receipt of the request.

NR 440.06 REVIEW OF PLANS. (1) When requested to do so by an owner or operator, the department shall review plans for construction or modification for the purpose of providing technical advice to the owner or operator.

(a) A separate request shall be submitted for each construction or modification project.

(b) Each request shall identify the location of the project and be accompanied by technical information describing the proposed nature, size, design and method of operation of each affected facility involved in the project, including information on any equipment to be used for measurement or control of emissions.

(2) Neither a request for plans review nor advice furnished by the department in response to a request shall relieve an owner or operator of legal responsibility for compliance with any provision of this chapter or of any other applicable requirement, or prevent the department from implementing or enforcing any provision of this chapter or taking any other action authorized by the law.

NR 440.07 NOTIFICATION AND RECORD KEEPING. (1) Any owner or operator subject this chapter shall furnish the department written notification as follows:

(a) A notification of the date construction, or reconstruction as defined under s. NR 440.15, of an affected facility is commenced, postmarked no later than 30 days after such date. This requirement does not apply in case of mass-produced facilities which are purchased in completed form.

(b) A notification of the anticipated date of initial startup of an affected facility, postmarked not more than 60 days nor less than 30 days prior to such date.

(c) A notification of the actual date of initial startup of an affected facility, postmarked within 15 days after such date.

(d) A notification of any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies, unless that change is specifically exempted under an applicable section of this chapter or in s. NR 440.14(5). This notice shall be postmarked 60 days or as soon as practicable before the change is commenced and shall include information describing the precise nature of the change, present and proposed emission control systems, productive capacity of the facility before and after the change, and the expected completion date of the change. The department may request additional relevant information subsequent to this notice.

(e) A notification of the date upon which demonstration of the continuous monitoring system performance commences in accordance with s. NR 440.13(3). Notification shall be postmarked not less than 30 days prior to such date.

(2) Any owner or operator subject to this chapter shall maintain records of the occurence and duration of any startup, shutdown or malfunction in the operation of an affected facility, any malfunction of the air pollution control equipment and any periods during which a continuous monitoring system or monitoring device is inoperative.

(3) Each owner or operator required to install a continuous monitoring system shall submit a written report of excess emissions, as defined in applicable sections of this chapter, to the department for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter and shall include the following information:

(a) The magnitude of excess emissions computed in accordance with s. NR 440.13(8), any conversion factor or factors used, and the date and time of commencement and completion of each time period of excess emissions.

(b) Specific identification of each period of excess emissions that occurs during startups, shutdowns and malfunctions of the affected facility. The nature and cause of any malfunction, if known, and the corrective action taken or preventative measures adopted.

(c) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.

(d) When no excess emissions have occurred or the continuous monitoring system or systems have not been inoperative, repaired or adjusted, such information shall be stated in the report.

(4) Any owner or operator subject to this chapter shall maintain a file of all measurements, including continuous monitoring system, monitoring device and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by this chapter recorded in a permanent form suitable for inspection. The file shall be retained for at least 2 years following the date of such measurements, maintenance, reports and records.

NR 440.08 PERFORMANCE TESTS. (1) Within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of the facility and at such other times as may be required by the department, the owner or operator of the facility shall conduct performance tests and furnish the department a written report of the results of the performance tests.

(2) Performance tests shall be conducted and data reduced in accordance with the test methods and procedures contained in each applicable section of this chapter unless the department:

(a) Specifies or approves, in specific cases, the use of a reference method with minor changes in methodology,

(b) Approves the use of an equivalent method,

(c) Approves the use of an alternative method the results of which it has determined to be adequate for indicating whether a specific source is in compliance, or

(d) Waives the requirement for performance tests because the owner or operator of a source has demonstrated by other means to the department's satisfaction that the affected facility is in compliance with the standard.

(3) Performance tests shall be conducted under such conditions as the department shall specify to the plant operator based on representative performance of the affected facility. The owner or operator shall make available to the department such records as may be necessary to determine the conditions of the performance tests. Operations during periods of startup, shutdown and malfunction do not constitute representative conditions for the purpose of a performance test nor will emissions in excess of the level of the applicable emission limit during periods of startup, shutdown and malfunction be considered a violation of the applicable emission limit unless otherwise specified in the applicable standard.

(4) The owner or operator of the affected facility shall provide the department at least 30 days prior notice of any performance tests, except as specified under other sections of this chapter, to afford the department the opportunity to have an observer present.

(5) The owner or operator of the affected facility shall provide, or cause to be provided, performance testing facilities as follows:

(a) Sampling ports adequate for test methods applicable to the facility.

(b) Safe sampling platform or platforms.

(c) Safe access to sampling platform or platforms.

(d) Utilities for sampling and testing equipment.

(e) Unless otherwise specified in an applicable section of this chapter, each performance test shall consist of 3 separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of determining compliance with an applicable standard, the arithmetic means of results of the 3 runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one of the 3 runs must be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions or other circumstances beyond the owner or operator's control, compliance may, upon the department's approval, be determined using the arithmetic mean of the results of the 2 other runs.

NR 440.09 ENFORCEMENT; PENALTIES. (1) If the department has reason to believe that a violation of this chapter has occurred, it may proceed under s. 144.423, Stats.

(2) Any person who violates any provision of this chapter is subject to the penalties provided under s. 144.426, Stats.

NR 440.10 OTHER REQUIREMENTS APPLY. (1) Exemption or the granting of an exemption from any requirement of this chapter does not relieve any person from compliance with ch. NR 101, 154 or 155 or from ss. 144.30 to 144.426 or 144.96, Stats.

(2) In cases where an emission limitation or other requirement set in ch. NR 154, a permit, plan approval or special order also applies to a source or facility affected by this chapter, the more restrictive limitation shall be met.

NR 440.11 COMPLIANCE WITH STANDARDS AND MAINTENANCE REQUIREMENTS. (1) Compliance with standards in this chapter, other than opacity standards, shall be determined only by performance tests established by s. NR 440.08, unless otherwise specified in the applicable standard.

(2) Compliance with opacity standards in this chapter shall be determined by conducting observations in accordance with Reference Method 9 in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, or any alternative method that is approved by the department. Opacity readings of portions of plumes which contain condensed, uncombined water vapor may not be used for purposes of determining compliance with opacity standards. The results of continuous monitoring by transmissometer which indicate that the opacity at the time visual observations were made was not in excess of the standard are probative but not conclusive evidence of the actual opacity of an emission, provided that the owner or operator of the source shall meet the burden of proving that the instrument used meets, at the time of the alleged violation, Performance Specification 1 in 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, has been properly maintained and (at the time of the alleged violation) calibrated, and that the resulting data have not been tampered with in any way.

(3) The opacity standards set forth in this chapter shall apply at all times except during periods of startup, shutdown, malfunction and as otherwise provided in the applicable standard.

(4) At all times, including periods of startup, shutdown and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the department which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures and inspection of the source.

(5)(a) An owner or operator of an affected facility may request the department to determine opacity of emissions from the affected facility during the initial performance tests required by s. NR 440.08.

(b) Upon receipt from the owner or operator of the written report of the results of the performance tests required by s. NR 440.08, the department shall make a finding concerning compliance with opacity and other applicable standards. If the department finds that an affected facility is in compliance with all applicable standards for which performance tests are conducted in accordance with s. NR 440.08 but during the time the performance tests are being conducted fails to meet any applicable opacity standard, it shall notify the owner or operator and advise the owner or operator that the owner or operator may petition the department within 10 days of receipt of notification to make appropriate adjustment to the opacity standard for the affected facility.

(c) The department shall grant a petition filed under par. (b) upon a demonstration by the owner or operator that the affected facility and associated air pollution control equipment was operated and maintained in a manner to minimize the opacity of emissions during the performance tests; that the performance tests were performed under the conditions established by the department; and that the affected facility and associated air pollution control equipment were incapable of being adjusted or operated to meet the applicable opacity standard.

(d) The department shall establish an opacity standard for the affected facility meeting the requirements of this subsection at a level at which the source will be able, as indicated by the performance and opacity tests, to meet the opacity standard at all times during which the source is meeting the mass or concentration emission standard.

NR 440.12 CIRCUMVENTION. No owner or operator subject to the provisions of this chapter may build, erect, install or use any article, machine, equipment or process, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere.

NR 440.13 MONITORING REQUIREMENTS. (1) For the purposes of this section, all continuous monitoring systems required under applicable sections of this chapter shall be subject to the provisions of this section upon promulgation of performance specifications for continuous monitoring systems under 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, unless:

(a) The continuous monitoring system is subject to the provisions of sub. (3)(b) and (c), or

(b) Otherwise specified in an applicable section of this chapter or by the department.

(2) All continuous monitoring systems and monitoring devices shall be installed and operational prior to conducting performance tests under s. NR 440.08. Verification of operational status shall, at a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation and calibration of the device.

(3) During any performance tests required under s. NR 440.08 or within 30 days thereafter and at such other times as may be required by the department, the owner or operator of any affected facility shall conduct continuous monitoring system performance evaluations and furnish the department within 60 days thereof 2 or, upon request, more copies of a written report of the results of such tests. These continuous monitoring system performance evaluations shall be conducted in accordance with the specifications and procedures of this subsection.

(a) Continuous monitoring systems listed within this subsection, except as provided in par. (b), shall be evaluated in accordance with the requirements and procedures contained in the applicable performance specification of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, as follows:

1. Continuous monitoring systems for measuring opacity of emissions installed on or after March 30, 1983 shall comply with all the provisions and requirements in Performance Specification 1. If an existing opacity monitoring system is replaced on or after March 30, 1983, the new opacity monitoring system shall comply with the requirements of Performance Specification 1, except the new monitoring system may be located at the same measurement location as for the replaced monitoring system. If a new measurement location is to be determined at the time of replacement, the new location shall meet the requirements of Performance Specification 1. Continuous monitoring systems for measuring opacity of emissions installed before March 30, 1983 shall comply with the provisions and requirements of Performance Specification 1 except for the following:

a. Section 4 - Installation Specifications.

b. Paragraphs 5.1.4 - Optical Alignment Sight, 5.1.6 - Access to External Optics, 5.1.7 - Automatic Zero Compensation Indicator, and 5.1.8 - Slotted Tube of Section 5 - Design and Performance Specification 1.

c. Paragraph 6.4 - Optical Alignment Sight of Section 6. Design Specifications Verification Procedure.

2. Continuous monitoring systems for measuring nitrogen oxides emissions shall comply with Performance Specification 2.

3. Continuous monitoring systems for measuring sulfur dioxide emissions shall comply with Performance Specification 2.

4. Continuous monitoring systems for measuring the oxygen content or carbon dioxide content of effluent gases shall comply with Performance Specification 3.

(b) An owner or operator who, prior to September 11, 1974, entered into a binding contractual obligation to purchase specific continuous monitoring system components except as referenced by subd. 3. shall comply with the following requirements:

1. Continuous monitoring systems for measuring opacity of emissions shall be capable of measuring emission levels within plus or minus 20% with a confidence level of 95%. The Calibration Error Test and associated calculation procedures set forth in Performance Specification 1 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, shall be used for demonstrating compliance with this specification.

2. Continuous monitoring systems for measurement of nitrogen oxides or sulfur dioxide shall be capable of measuring emission levels within plus or minus 20% with a confidence level of 95%. The Calibration Error Test, the Field Test for Accuracy (Relative), and associated operating and calculation procedures set forth in Performance Specification 2 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, shall be used for demonstrating compliance with this specification.

3. Owners or operators of all continuous monitoring systems installed on an affected facility prior to October 6, 1975 are not required to conduct tests under subd. 1. or 2. unless requested by the department.

(c) All continuous monitoring systems referenced by par. (b) shall be upgraded or replaced, if necessary, with new continuous monitoring systems, and the new or improved systems shall be demonstrated to comply with applicable performance specifications under par. (a) on or before September 11, 1979.

(4)(a) Owners and operators of all continuous emission monitoring systems installed in accordance with the provisions of this chapter shall check the zero (or low-level value between 0 and 20% of span value) and span (50 to 100% of span value) calibration drifts at least once daily in accordance with a written procedure. The zero span shall, at a minimum, be adjusted whenever the 24-hour zero drift or 24-hour span drift exceeds 2 times the limits of the applicable performance specifications in 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17. The system must allow the amount of excess zero and span drift measured at the 24-hour interval checks to be recorded and quantified, whenever specified. For continuous monitoring systems measuring opacity of emissions, the optical surfaces exposed to the emissions shall be cleaned prior to performing the zero and span drift adjustments, except that for systems using automatic zero adjustments the optical surfaces shall be cleaned when the cumulative automatic zero compensation exceeds 4% opacity.

(b) Unless otherwise approved by the department, the following procedures shall be followed for continuous monitoring systems measuring opacity of emissions. Minimum procedures shall include a method for producing a simulated zero (or no greater than 10%) opacity condition and an upscale (span value) opacity condition using a certified neutral density filter or other related technique to produce a known obscuration of the light beam. Such procedures shall provide a system check of the analyzer internal optical surfaces and all electronic circuitry including the lamp and photodetector assembly.

(5) Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under sub. (4), all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation requirements as follows:

(a) All continuous monitoring systems referenced by sub. (3)(a) and (b) for measuring opacity of emissions shall complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle of data recording for each successive 6-minute period.

(b) All continuous monitoring systems referenced by sub. (3)(a) for measuring oxides of nitrogen, sulfur dioxide, carbon dioxide or oxygen shall complete a minimum of one cycle of operation (sampling, analyzing and data recording) for each successive 15-minute period.

(c) All continuous monitoring systems referenced by sub. (3)(b), except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing and data recording) for each successive one-hour period.

(6) All continuous monitoring systems or monitoring devices shall be installed such that representative measurements of emissions or process parameters from the affected facility are obtained. Additional procedures for location of continuous monitoring systems contained in the applicable performance specifications of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, shall be used.

(7) When the emissions from a single affected facility or 2 or more affected facilities subject to the same emission standards are combined before being released to the atmosphere, the owner or operator may install applicable continuous monitoring systems on each emission or on the combined emissions. When the affected facilities are not subject to the same emission standards, separate continuous monitoring systems shall be installed on each emission. When the emission from one affected facility is released to the atmosphere through more than one point, the owner or operator shall install an applicable continuous monitoring system on each separate emission unless the installation of fewer systems is approved by the department. When more than one continuous monitoring system is used to measure the emissions from one affected facility (e.g., multiple breechings, multiple outlets), the owner or operator shall report the results as required from each continuous monitoring system.

(8) Owners or operators of all continuous monitoring systems for measurement of opacity shall reduce all data to 6-minute averages and for continuous monitoring systems other than opacity to one-hour averages for time periods as defined under s. NR 440.02(29) and (20), respectively. Six-minute opacity averages shall be calculated from 36 or more data points equally spaced over each 6-minute period. For continuous monitoring systems other than opacity, one-hour averages shall be computed from 4 or more data points equally spaced over each one-hour period. Data recorded during periods of continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages computed under this subsection. An arithmetic or integrated average of all data may be used. The data may be recorded in reduced or nonreduced form (e.g. ppm pollutant and percent O_2 or ng/J of pollutant). All excess emissions

shall be converted into units of the standard using the applicable conversion procedures specified in the standards. After conversion into units of the standard, the data may be rounded to the same number of significant digits used in the standard to specify the emission limit (e.g., rounded to the nearest one percent opacity).

(9) After receipt and consideration of written application, the department may approve alternatives to any monitoring procedures or requirements of this chapter including, but not limited to the following:

(a) Alternative monitoring requirements when installation of a continuous monitoring system or monitoring device specified by this chapter would not provide accurate measurements due to liquid water or other interferences caused by substances with the effluent gases.

(b) Alternative monitoring requirements when the affected facility is infrequently operated.

(c) Alternative monitoring requirements to accommodate continuous monitoring systems that require additional measurements to correct for stack moisture conditions.

(d) Alternative locations for installing continuous monitoring systems or monitoring devices when the owner or operator can demonstrate that installation at alternate locations will enable accurate and representative measurements.

(e) Alternative methods of converting pollutant concentration measurements to units of the standards.

(f) Alternative procedures for performing daily checks of zero and span drift that do not involve use of span gases or tests cells.

(g) Alternatives to the ASTM test methods or sampling procedures specified by any section of this chapter.

(h) Alternative continuous monitoring systems that do not meet the design or performance requirements in Performance Specification I of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, but adequately demonstrate a definite and consistent relationship between their measurements and the measurements of opacity by a system complying with the requirements in

Performance Specification 1. The department may require that a demonstration be performed for each affected facility.

(i) Alternative monitoring requirements when the emission from a single affected facility or the combined emissions from 2 or more affected facilities are released to the atmosphere through more than one point.

NR 440.14 MODIFICATION. (1) Except as provided under subs. (5) and (6), any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of this chapter. Upon modification, an existing facility becomes an affected facility for each pollutant to which a standard applies and for which there is an increase in the emission rate to the atmosphere.

(2) Emission rate shall be expressed as kg/hr of any pollutant discharged into the atmosphere for which a standard is applicable. The department shall use the following to determine emission rate:

(a) Emission factors as specified in the latest issue of "Compilation of Air Pollutant Emission Factors," EPA Publication No. AP-42, or other emission factors determined by the department to be superior to AP-42 emission factors, in cases where utilization of emission factors demonstrate that the emission level resulting from the physical or operational change will either clearly increase or clearly not increase.

(b) Material balances, continuous monitor data, or manual emission tests in cases where utilization of emission factors as referenced in par. (a) does not demonstrate to the department's satisfaction whether the emission level resulting from the physical or operational change will either clearly increase or clearly not increase, or where an owner or operator demonstrates to the department's satisfaction that there are reasonable grounds to dispute the result obtained by the department utilizing emission factors as referenced in par. (a). When the emission rate is based on results from manual emission tests or continuous monitoring systems, the procedures specified in 40 C.F.R. pt. 60, Appendix C, incorporated by reference in s. NR 440.17, shall be used to determine whether an increase in emission rate has occurred. Tests shall be conducted under such conditions as the department may specify to the owner or operator based on representative performance of the facility. At least 3 valid test runs shall be conducted before and at least 3 after the physical or operational change. All operating parameters which may affect emissions shall be held constant to the maximum feasible degree for all test runs.

(3) The addition of an affected facility to a stationary source as an expansion to that source or as a replacement for an existing facility will not by itself bring within the applicability of this chapter any other facility within that source.

(4)[Reserved]

(5) The following may not, by themselves, be considered modifications under this chapter:

(a) Maintenance, repair and replacement which the department determines to be routine for a source category, subject to the provisions of sub. (3) and s. NR 440.15.

(b) An increase in production rate of an existing facility, if that increase can be accomplished without a capital expenditure on that facility.

(c) An increase in the hours of operation.

(d) Use of an alternative fuel or raw material if, prior the date any standard under this chapter became applicable to that source type, the existing facility was designed to accommodate that alternative use. A facility shall be considered to be designed to accommodate an alternative fuel or raw material if that use could be accomplished under the facility's construction specifications as amended prior to the change. Conversion to coal required for energy considerations, as specified in section 7411(a)(8) of the act, will not be considered a modification under this chapter.

(e) The addition or use of any system or device whose primary function is the reduction of air pollutants, except when an emission control system is removed or is replaced by a system which the department determines to be less environmentally beneficial.

(f) The relocation or change in ownership of an existing facility.

(6) Special provisions set forth under any other applicable section of this chapter shall supersede any conflicting provisions of this section.,

(7) Within 180 days of the completion of any physical or operational change subject to the control measures specified in sub. (1), compliance with all applicable standards shall be achieved.

NR 440.15 RECONSTRUCTION. (1) An existing facility, upon reconstruction, becomes an affected facility, irrespective of any change in emission rate.

(2) "Reconstruction" means the replacement of components of an existing facility to such an extent that:

(a) The fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable entirely new facility, and

(b) It is technologically and economically feasible to meet the applicable standards set forth in this chapter.

(3) "Fixed capital cost" means the capital needed to provide all the depreciable components.

(4) If an owner or operator of an existing facility proposes to replace components, and the fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable entirely new facility, the owner or operator shall notify the department of the proposed replacements. The notice shall be postmarked 60 days (or as soon as practicable) before construction of the replacements is commenced and shall include the following information:

(a) Name and address of the owner or operator.

(b) The location of the existing facility.

(c) A brief description of the existing facility and the components which are to be replaced.

(d) A description of the existing air pollution control equipment and the proposed air pollution control equipment.

(e) An estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new facility.

(f) The estimated life of the existing facility after the replacements.

(g) A discussion of any economic or technical limitations the facility may have in complying with the applicable standards of performance after the proposed replacements.

(5) The department shall determine, within 30 days of the receipt of the notice required by sub. (4) and any additional information it may reasonably require, whether the proposed replacement constitutes reconstruction.

(6) The department's determination under sub. (5) shall be based on:

(a) The fixed capital cost of the replacements in comparison to the fixed capital cost that would be required to construct a comparable entirely new facility;

(b) The estimated life of the facility after the replacements compared to the life of a comparable entirely new facility;

(c) The extent to which the components being replaced cause or contribute to the emissions from the facility; and

(d) Any economic or technical limitations on compliance with applicable standards of performance which are inherent in the proposed replacements.

(7) Individual sections of this chapter may include specific provisions which refine and delimit the concept of reconstruction set forth in this section.

NR 440.16 [Reserved]

NR 440.17 INCORPORATION BY REFERENCE OF APPENDICES A, B AND C OF 40 C.F.R. PART 60 AND OTHER MATERIALS. (1) APPENDICES A, B AND C. Appendices A, B and C of 40 C.F.R. pt. 60 as in effect on June 30, 1983 are incorporated by reference and made a part of this chapter. Copies of these Appendices are available for inspection in the offices of the department of natural resources, secretary of state and revisor of statutes, Madison, Wisconsin, or may be purchased for personal use from the superintendent of documents, U.S. government printing office, Washington, D. C. 20402.

(2) OTHER MATERIALS. The materials listed in this subsection are incorporated by reference in the corresponding sections noted. Some of the materials are also incorporated in Appendices A, B and C of 40 C.F.R. pt. 60 as in effect on June 30, 1983 by the administrator. Since these Appendices are incorporated by reference in this chapter by sub. (1), materials incorporated by reference in the Appendices are hereby also incorporated by reference and made a part of this chapter. The materials are available for inspection in the offices of the department of natural resources, secretary of state and revisor of statutes, Madison, Wisconsin or may be purchased for personal use at the corresponding address noted.

(a) The following materials are available for purchase from at least one of the following addresses: American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103; or the University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106.

1. ASTM D388-77, Standard Specification for Classification of Coals by Rank, for ss. NR 440.19(2)(a), and (6)(f)4.a.,b. and f., 440.20(2)(b),(m) and (x), and 440.42(2)(a) and (b).

2. ASTM D3178-73, Standard Test Methods for Carbon and Hydrogen in the Analysis Sample of Coal and Coke, for s. NR 440.19(6)(f)5.a.

3. ASTM D3176-74, Standard Method for Ultimate Analysis of Coal and Coke, for s. NR 440.19(6)(f)5.a.

4. ASTM D1137-53 (Reapproved 1975), Standard Method for Analysis of Natural Gases and Related Types of Gaseous Mixtures by the Mass Spectrometer, for s. NR 440.19(6)(f)5.a.

5. ASTM D1945-64 (Reapproved 1976), Standard Method for Analysis of Natural Gas by Gas Chromatography, for s. NR 440.19(6)(f)5.a.

6. ASTM D1946-77, Standard Method for Analysis of Reformed Gas by Gas Chromatography, for s. NR 440.19(6)(f)5.a.

7. ASTM D2015-77, Standard Test Method for Gross Calorific Value of Solid Fuel by the Adiabatic

Bomb Calorimeter, for s. NR 440.19(6)(f)5.b. and (7)(g) and for 40 C.F.R. pt. 60, Appendix A, Method 19, par. 5.2.2.

8. ASTM D1826-77, Standard Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter, for s. NR 440.19(6)(f)5.b. and (7)(g), and for 40 C.F.R. pt. 60, Appendix A, Method 19, par. 5.2.2.

9. ASTM D240-76, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, for ss. NR 440.19(7)(g) and 440.46(7)(f), and for 40 C.F.R. pt. 60, Appendix A, Method 19, pars. 2.2.3. and 5.2.2.

10. ASTM D396-78, Standard Specifications for Fuel Oils, for ss. NR 440.27(2)(g) and 440.28(2)(f).

11. ASTM D2880-78, Standard Specification for Gas Turbine Fuel Oils, for ss. NR 440.27(2)(g), 440.28(2)(f), and 440.50(6)(b)2.

12. ASTM D975-78, Standard Specification for Diesel Fuel Oils, for ss. NR 440.27(2)(g) and 440.28(2)(f).

13. ASTM D323-72 (Reapproved 1977), Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method), for ss. NR 440.27(2)(i) and 440.28(2)(h).

14. ASTM A99-76, Standard Specification for Ferromanganese, for s. NR 440.43(2)(v).

15. ASTM A483-64 (Reapproved 1974), Standard Specification for Silicomanganese, for s. NR 440.43(2)(q).

16. ASTM A101-73, Standard Specification for Ferrochromium, for s. NR 440.43(2)(o).

17. ASTM A100-69, (Reapproved 1974), Standard Specification for Ferrosilicon, for s. NR 440.43(2)(k) and (t).

18. ASTM A482-76, Standard Specification for Ferrochromesilicon, for s. NR 440.43(2)(i).

19. ASTM A495-76, Standard Specification for Calcium - Silicon and Calcium Manganese-Silicon, for s. NR 440.43(2)(c).

20. ASTM D1072-56 (Reapproved 1975), Standard Test Method for Total Sulfur in Fuel Gases, for s. NR 440.50(6)(b)2.

21. ASTM D2986-71 (Reapproved 1978), Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test, for 40 C.F.R. pt. 60, Appendix A, Method 5, par. 3.1.1., Method 12, par. 4.1.1., and Method 17, par. 3.1.1.

22. ASTM D1193-77, Standard Specification for Reagent Water, for 40 C.F.R. pt. 60, Appendix A, Method 6, par. 3.1.1., Method 7, par. 3.2.2., Method 8, par. 3.1.3., and Method 12, par. 4.1.3.

23. [Reserved]

24. ASTM D2234-76, Standard Methods for Collection of a Gross Sample of Coal, for 40 C.F.R. pt. 60, Appendix A, Method 19, par. 2.1.1.

25. ASTM D3173-73, Standard Test Method for Moisture in the Analysis Sample of Coal and Coke, for 40 C.F.R. pt. 60, Appendix A, Method 19, par. 2.1.3.

26. ASTM D3177-75, Standard Test Methods for Total Sulfur in the Analysis Sample of Coal and Coke, for 40 C.F.R. pt. 60, Appendix A, Method 19, par. 2.1.3.

27. ASTM D2013-72, Standard Method for Preparing Coal Samples for Analysis, for 40 C.F.R. pt. 60, Appendix A, Method 19, par. 2.1.3.

28. ASTM D270-65 (Reapproved 1975), Standard Method of Sampling Petroleum and Petroleum Products, for 40 C.F.R. pt. 60, Appendix A, Method 19, par. 2.2.1.

29. [Reserved]

30. ASTM D1475-60 (Reapproved 1980), Standard Test Method for Density of Paint, Varnish, Lacquer, and Related Products, for s. NR 440.56(6)(d)1., and for 40 C.F.R. pt. 60, Appendix A, Method 24, par. 2.1., and Method 24A, par. 2.2.

31. ASTM D2369-81, Standard Test Method for Volatile Content of Coatings, for 40 C.F.R. pt. 60, Appendix A, Method 24, par. 2.2.

32. ASTM D3792-79, Standard Method for Water Content of Water-Reducible Paints by Direct Injection Into a Gas Chromatograph, for 40 C.F.R. pt. 60, Appendix A, Method 24, par. 2.3.

33. ASTM D4017-81, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method, for 40 C.F.R. pt. 60, Appendix A, Method 24, par. 2.4.

(b) The following material is available for purchase from the Association of Official Analytical

Chemists, 1111 North 19th Street, Suite 210, Arlington, Virginia 22209.

1. AOAC Method 9, Official Methods of Analysis of the Association of Official Analytical Chemists, 11th edition, 1970, pp. 11-12, for ss. NR 440.37(5)(d)2., 440.28(5)(d)2., 440.39(5)(d)2., 440.40(5)(d)2., and 440.41(5)(f)2.

2. [Reserved]

(c) The following material is available for purchase from the American Petroleum Institute, 2101 L Street, N.W., Washington, D.C. 20037.

1. API Publication 2517, Evaporation Loss from External Floating-Roof Tanks, Second Edition, February 1980, for ss. NR 440.27(2) and (4)(b), 440.28(2) and (6)(b), and 440.46(2).

2. [Reserved]

(d) The following material is available for purchase from the Technical Association of the Pulp and Paper Industry (TAPPI), Dunwoody Park, Atlanta, Georgia 30341.

1. TAPPI Method T624 os-68, for s. NR 440.45(6)(d)4.

2. [Reserved]

(e) The following material is available for purchase from American Public Health Association, Inc., 1015 18th Street, N.W., Washington, D.C. 20036.

1. 224 G. Method for Solid and Semisolid Samples, Standard Methods for the Examination of Water and Wastewater, Thirteenth Edition, 1971, pp. 539-41, for s. NR 440.32(5)(c)2.

2. [Reserved]

(f) The following material is available from the U.S. Government Printing Office, Washington, D.C. 20402

1. The Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement (U.S. Government Printing Office Stock numbers 4101-0066 and 003-005-00176-0, respectively), for s. NR 440.46(2)(c), (d), (i) and (l).

NR 440.18 SEVERABILITY. Should any section, subsection, paragraph, phrase, sentence or clause of this chapter be declared invalid or unconstitutional for any reason, the remainder of this chapter shall not be affected thereby.

NR 440.19 STANDARDS OF PERFORMANCE FOR FOSSIL-FUEL-FIRED STEAM GENERATORS FOR WHICH CONSTRUCTION IS COMMENCED AFTER AUGUST 17, 1971. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facilities to which the provisions of this section apply are:

1. Each fossil-fuel-fired steam generating unit of more than 73 megawatts heat input rate (250 million Btu per hour).

2. Each fossil-fuel and wood-residue-fired steam generating unit capable of firing fossil fuel at a heat input rate of more than 73 megawatts (250 million Btu per hour).

(b) Any change to an existing fossil-fuel-fired steam generating unit to accommodate the use of combustible materials other than fossil fuels as defined in this section shall not bring that unit under the applicability of this section.

(c) Except as provided in par. (d), any facility under par. (a) that commenced construction or modification after August 17, 1971, is subject to the requirements of this section.

(d) The requirements of subs. (5)(a)4. and 5., (b) and (d), and (6)(f)4.f. are applicable to lignite-fired steam generating units that commenced construction or modification after December 22, 1976.

(e) Any facility covered under s. NR 440.20 is not covered under this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Coal" means all solid fuels classified as anthracite, bituminous, subbituminous, or lignite by ASTM D388-77, incorporated by reference in s. NR 440.17.

(b) "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.

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

(d) "Fossil-fuel and wood-residue-fired steam generating unit" means a furnace or boiler used in the process of burning fossil fuel and wood residue for the purpose of producing steam by heat transfer.

(e) "Fossil-fuel-fired steam generating unit" means a furnace or boiler used in the process of burning fossil fuel for the purpose of producing steam by heat transfer.

(f) "Wood residue" means bark, sawdust, slabs, chips, shavings, mill trim and other wood products derived from wood processing and forest management operations.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which:

1. Contain particulate matter in excess of 43 nanograms per joule heat input (0.10 lb per million Btu) derived from fossil fuel or fossil fuel and wood residue.

2. Exhibit greater than 20% opacity except for one 6-minute period per hour of not more than 27% opacity.

(b) [Reserved]

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain sulfur dioxide in excess of:

1. 340 nanograms per joule heat input (0.80 lb per million Btu) derived from liquid fossil fuel or liquid fossil fuel and wood residue.

2. 520 nanograms per joule heat input (1.2 lb per million Btu) derived from solid fossil fuel or solid fossil fuel and wood residue.

(b) When different fossil fuels are burned simultaneously in any combination, the applicable standard (in ng/J) shall be determined by proration using the following formula:

$$PS_{SO_2}=[y(340) + z(520)]/y+z$$

in which:

PS_{SO} is the prorated standard for sulfur dioxide when burning different fuels simultaneously, in nanograms per joule heat input derived from all fossil fuels fired or from all fossil fuels and wood residue fired

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

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

(c) Compliance shall be based on the total heat input from all fossil fuels burned, including gaseous fuels.

(5) STANDARD FOR NITROGEN OXIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain nitrogen oxides, expressed as NO_2 in excess of:

1. 86 nanograms per joule heat input (0.20 lb per million Btu) derived from gaseous fossil fuel or gaseous fossil fuel and wood residue.

2. 130 nanograms per joule heat input (0.30 lb per million Btu) derived from liquid fossil fuel or liquid fossil fuel and wood residue.

3. 300 nanograms per joule heat input (0.70 lb per million Btu) derived from solid fossil fuel or solid fossil fuel and wood residue (except lignite or a solid fuel containing 25%, by weight, or more of coal refuse).

4. 260 nanograms per joule heat input (0.60 lb per million Btu) derived from lignite or lignite and wood residue, except as provided under subd. 5.

5. 340 nanograms per joule heat input (0.80 lb per million Btu) derived from lignite which is mined in North Dakota, South Dakota or Montana and which is burned in a cyclone-fired unit.

(b) Except as provided under pars. (c) and (d), when different fossil fuels are burned simultaneously in any combination, the applicable standard (in ng/J) is determined by proration using the following formula:

$$PS_{NOx} = \frac{w(260)+x(86)+y(130)+z(300)}{w+x+y+z}$$

in which:

PS_{NOx} is the prorated standard for nitrogen oxides when burning different fuels simultaneously, in nanograms per joule heat input derived from all fossil fuels fired or from all fossil fuels and wood residue fired

w is the percentage of total heat input derived from lignite

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

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

z is the percentage of total heat input derived from solid fossil fuel (except lignite)

(c) When a fossil fuel containing at least 25%, by weight, of coal refuse is burned in combination with gaseous, liquid or other solid fossil fuel or wood residue, the standard for nitrogen oxides does not apply.

(d) Cyclone-fired units which burn fuels containing at least 25% of lignite that is mined in North Dakota, South Dakota or Montana remain subject to par. (a)5. regardless of the types of fuel combusted in combination with that lignite.

(6) EMISSION AND FUEL MONITORING. (a) Each owner or operator shall install, calibrate, maintain and operate continuous monitoring systems for measuring the opacity of emissions, sulfur dioxide emissions, nitrogen oxides emissions, and either oxygen or carbon dioxide except as provided in par. (b).

(b) Certain of the continuous monitoring system requirements under par. (a) do not apply to owners or operators under the following conditions:

1. For a fossil-fuel-fired steam generator that burns only gaseous fossil fuel, continuous monitoring systems for measuring the opacity of emissions and sulfur dioxide emissions are not required.

2. For a fossil-fuel-fired steam generator that does not use a flue gas desulfurization device, a continuous monitoring system for measuring sufur dioxide emissions is not required if the owner or operator monitors sulfur dioxide emissions by fuel sampling and analysis under par. (d).

3. Notwithstanding s. NR 440.13(2), installation of a continuous monitoring system for nitrogen oxides may be delayed until after the initial performance tests under s. NR 440.08 have been conducted. If the owner or operator demonstrates during the performance test that emissions of nitrogen oxides are less than 70% of the applicable standards in sub. (5), a continuous monitoring system for measuring nitrogen oxides emissions is not required. If the initial performance test results show that nitrogen oxide emissions are greater than 70% of the applicable standard, the owner or operator shall install a continuous monitoring system for nitrogen oxides within one year after the date of the initial performance tests under s. NR 440.08 and comply with all other applicable monitoring requirements under this chapter.

4. If an owner or operator does not install any continuous monitoring systems for sulfur oxides and nitrogen oxides, as provided under subds. 1. and 3. or subds. 2. and 3., a continuous monitoring system for measuring either oxygen or carbon dioxide is not required.

(c) For performance evaluations under s. NR 440.13(3) and calibration checks under s. NR 440.13(4), the following procedures shall be used:

1. Reference Methods 6 or 7 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, as applicable, shall be used for conducting performance evaluations of sulfur dioxide and nitrogen oxides continuous monitoring systems.

2. Sulfur dioxide or nitric oxide, as applicable, shall be used for preparing calibration gas mixtures under Performance Specification 2 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17.

3. For affected facilities burning fossil fuel, the span value for a continuous monitoring system measuring the opacity of emissions shall be 80, 90 or 100 percent and for a continuous monitoring system measuring sulfur oxides or nitrogen oxides the span value shall be determined as follows:

[In parts per million]

Fossil fuel	Span value for sulfur dioxide	Span value for nitrogen oxides
Gas	not applicable	500
Liquid	1,000	500
Solid	1,500	500
Combinations	1,000y + 1,500z	500(x+y) + 1,000z

In which:

x is the fraction of total heat input derived from gaseous fossil fuel

y is the fraction of total heat input derived from liquid fossil fuel

z is the fraction of total heat input derived from solid fossil fuel

4. All span values computed under par. (c)3. for burning combinations of fossil fuels shall be rounded to the nearest 500 ppm.

5. For a fossil-fuel-fired steam generator that simultaneously burns fossil fuel and nonfossil fuel, the span value of all continuous monitoring systems shall be subject to the department's approval.

(d) [Reserved]

(e) For any continuous monitoring system installed under par. (a), the conversion procedures of this paragraph shall be used to convert the continuous monitoring data into units of the applicable standards (ng/J, lb/million Btu).

1. When a continuous monitoring system for measuring oxygen is selected, the measurement of the pollutant concentration and oxygen concentration shall each be on a consistent basis (wet or dry). Alternative procedures approved by the department shall be used when measurements are on a wet basis. When measurements are on a dry basis, the following conversion procedures shall be used:

$E = CF[20.9/20.9 - \text{percent } O_2]$

where E, C, F, and percent O_2 are determined under par. (f).

2. When a continuous monitoring system for measuring carbon dioxide is selected, the measurement of the pollutant concentration and carbon dioxide concentration shall each be on a consistent basis (wet or dry) and the following conversion procedure shall be used:

$E = CF_c\ [100/\text{percent } CO_2]$

where E, C, F_c and percent CO_2 are determined under par. (f).

(f) The values used in the equations under par. (e)1. and 2. are derived as specified in this paragraph.

1. E = pollutant emissions, ng/J (lb/million Btu).

2. C = pollutant concentration, ng/dscm (lb/dscf), determined by multiplying the average concentration (ppm) for each one-hour period by 4.15×10^4 M ng/dscm per ppm (2.59×10^{-9} M lb/dscf per ppm) where M = pollutant molecular weight, g/g-mole (lb/lb-mole). M = 64.07 for sulfur dioxide and 46.01 for nitrogen oxides.

3. $\%O_2$, $\%CO_2$ = oxygen or carbon dioxide volume (expressed as percent), determined with equipment specified under par. (d).

4. F, F_c = a factor representing a ratio of the volume of dry flue gases generated to the calorific value of the fuel combusted (F), and a factor representing a ratio of the volume of carbon dioxide generated to the calorific value of the fuel combusted (F_c), respectively. Values of F and F_c are:

a. For anthracite coal as classified according to ASTM D388-77, incorporated by reference in s. NR 440.17, $F = 2.723 \times 10^{-17}$ dscm/J (10,140 dscf/million Btu) and F_c=0.532×10^{-17} scm CO_2/J (1,980 scf CO_2/million Btu).

b. For subbituminous and bituminous coal as classified according to ASTM D388-77, incorporated be reference in s. NR 440.17, $F = 2.637 \times 10^{-7}$ dscm/J (9,820 dscf/million Btu) and $F_c = 0.486 \times 10^{-7}$ scm CO_2/J (1,810 scf CO_2/million Btu).

c. For liquid fossil fuels including crude, residual and distillate oils, $F = 2.476 \times 10^{-7}$ dscm/J (9,220 dscf/million Btu) and $F_c = 0.384 \times 10^{-7}$ scm CO_2/J (1,430 scf CO_2/million Btu).

d. For gaseous fossil fuels, $F = 2.347 \times 10^{-7}$ dscm/J (8,740 dscf/million Btu). For natural gas, propane and butane fuels, $F_c = 0.279 \times 10^{-7}$ scm CO_2/J (1,040 scf CO_2/million Btu) for natural gas, 0.322×10^{-7} scm CO_2/J (1,200 scf CO_2/million Btu) for propane, and 0.338×10^{-7} scm CO_2/J (1,260 scf CO_2/million Btu) for butane.

e. For bark, $F = 2.589 \times 10^{-7}$ dscm/J (9,640 dscf/million Btu) and $F_c = 0.500 \times 10^{-7}$ scm CO_2/J (1,840 scf CO_2/million Btu). For wood residue other than bark, $F = 2.492 \times 10^{-7}$ dscm/J (9,280 dscf/million Btu) and $F_c = 0.494 \times 10^{-7}$ scm CO_2/J (1,860 scf CO_2/million Btu).

f. For lignite coal as classified according to ASTM D388-77, incorporated by reference in s. NR 440.17, $F = 2.659 \times 10^{-7}$ dscm/J (9900 dscf/million Btu) and $F_c = 0.516 \times 10^{-7}$ scm CO_2/J (1,920 scf CO_2/million Btu).

5. The owner or operator may use the following equation to determine an F factor (dscm/J or dscf/million Btu) on a dry basis (if it is desired to calculate F on a wet basis, consult the department) or F_c factor (scm CO_2/J, or scf CO_2/million Btu) on either basis in lieu of the F or F_c factors specified in subd. 4.:

$$F = 10^{-6} \frac{[227.2\ (\text{pct. H})+95.5\ (\text{pct. C})+35.6\ (\text{pct. S})+8.7\ (\text{pct. N})-28.7\ (\text{pct.O})]}{GCV}$$

$$F_c = \frac{2.0 \times 10^{-5}\ (\text{pct. C})}{GCV}$$

(SI units)

$$F = \frac{10\ [3.64(\%H)+1.53(\%C)+0.57(\%S)+0.14(\%N)-0.46(\%O)]}{GCV}$$

(English Units)

$$F_c = \frac{20.0(\%C)}{GCV}$$

(SI units)

$$F_c = \frac{321 \times 10^3\ (\%C)}{GCV}$$

(English units)

a. H, C, S, N, and O are content by weight of hydrogen, carbon, sulfur, nitrogen, and oxygen (expressed as percent), respectively, as determined on the same basis as GCV by ultimate analysis of the fuel fired, using ASTM method D3178-74 or D3176 (solid fuels), or computed from results using ASTM methods D1137-53(75), D1945-64(76), or D1946-77 (gaseous fuels) as applicable. These 5 ASTM methods are incorporated by reference in s. NR 440.17.

b. GCV is the gross calorific value (kJ/kg, Btu/lb) of the fuel combusted, determined by the ASTM test methods D2015-77 for solid fuels and D1826-77 for gaseous fuels as applicable. These 2 ASTM methods are incorporated by reference in s. NR 440.17.

c. For affected facilities which fire both fossil fuels and nonfossil fuels, the F or F_c value shall be subject to the department's approval.

6. For affected facilities firing combinations of fossil fuels or fossil fuels and wood residue, the F or F_c factors determined by subd. 4. or 5. shall be prorated in accordance with the applicable formulas as follows:

$$F = \sum_{i=1}^{n} X_i F_i \text{ or } F_c = \sum_{i=1}^{n} X_i (F_c)_i$$

in which:

X_i is the fraction of total heat input derived from each type of fuel (e.g. natural gas, bituminous coal, wood residue, etc.)

F_i or $(F_c)_i$ is the applicable F or F_c factor for each fuel type determined in accordance with subd. 4. or 5.

n is the number of fuels being burned in combination

(g) For the purpose of reports required under s. NR 440.07(3), periods of excess emissions that shall be reported are defined in this paragraph.

1. 'Opacity.' Excess emissions are defined as any 6-minute period during which the average opacity of emissions exceeds 20% opacity, except that one 6-minute average per hour of up to 27% opacity need not be reported.

2. 'Sulfur dioxide.' Excess emissions for affected facilities are defined as:

a. Any 3-hour period during which the average emissions (arithmetic average of 3 contiguous one-hour periods) of sulfur dioxide as measured by a continuous monitoring system exceed the applicable standard under sub. (4).

3. 'Nitrogen oxides.' Excess emissions for affected facilities using a continuous monitoring system for measuring nitrogen oxides are defined as any 3-hour period during which the average emissions (arithmetic average of 3 contiguous one-hour periods) exceed the applicable standards under sub. (5).

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08(2), shall be used to determine compliance with the standards as prescribed in subs. (3), (4) and (5) as follows:

1. Method 1 for selection of sampling site and sample traverses,

2. Method 3 for gas analysis to be used when applying Reference Methods 5, 6 and 7,

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

4. Method 6 for concentration of SO_2 but Method 6A may be used whenever Methods 6 and 3 data are used to determine the SO_2 emission rate in ng/J, and

5. Method 7 for concentration of NO_x.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, Method 1 shall be used to select the sampling site and the number of traverse sampling points. 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 department. The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature no greater than 433 K (320°F).

(c) For Methods 6 and 7 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling site shall be the same as that selected for Method 5. 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 samples shall be extracted at a rate proportional to the gas velocity at the sampling point.

(d) For Method 6 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, 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 2 samples shall constitute one run. Samples shall be taken at approximately 30-minute intervals.

(e) For Method 7 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, each run shall consist of at least 4 grab samples taken at approximately 15-minute intervals. The arithmetic mean of the samples shall constitute the run value.

(f) For each run using the methods specified by par. (a)3., 4. and 5., the emissions expressed in ng/J (lb/million Btu) shall be determined by the following procedure:

$E = CF(20.9/20.9 - \text{percent } O_2)$

where:

1. E = pollutant emission ng/J (lb/million Btu).

2. C = pollutant concentration, ng/dscm (lb/dscf), determined by Method 5, 6 or 7 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

3. Percent O_2 = oxygen content by volume (expressed as percent), dry basis. Percent oxygen shall be determined by using the integrated or grab sampling and analysis procedures of Method 3 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, as applicable. The sample shall be obtained as follows:

a. For determination of sulfur dioxide and nitrogen oxides emissions, the oxygen sample shall be obtained simultaneously at the same point in the duct as used to obtain the samples for Methods 6 and 7 determinations, respectively (par. (c)). For Method 7, the oxygen sample shall be obtained using the grab sampling and analysis procedures of Method 3.

b. 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 under par. (b). Method I shall be used for selection of the number of traverse points except that no more than 12 sample points are required.

4. F = a factor as determined in sub. (6)(f)4., 5. or 6.

(g) When combinations of fossil fuels or fossil fuel and wood residue are fired, the heat input, expressed in watts (Btu/hr), is determined during each testing period by multiplying the gross calorific value of each fuel fired (in J/kg or Btu/lb) by the rate of each fuel burned (in kg/sec or lb/hr). Gross calorific values are determined in accordance with ASTM methods D2015-77 (solid fuels), D240-76 (liquid fuels), or D1826-77 (gaseous fuels) as applicable. These 3 ASTM methods are incorporated by reference in s. NR 440.17. The method used to determine calorific value of wood residue shall be approved by the department. The owner or operator shall determine the rate of fuels burned during each testing period by suitable methods and shall confirm the rate by a material balance over the steam generation system.

NR 440.20 STANDARDS OF PERFORMANCE FOR ELECTRIC STEAM GENERATING UNITS FOR WHICH CONSTRUCTION IS COMMENCED AFTER SEPTEMBER 18, 1978. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which this section applies is each electric utitlity steam generating unit:

1. That is capable of combusting more than 73 megawatts (250 million Btu/hour) heat input of fossil fuel, either alone or in combination with any other fuel; and

2. For which construction or modification is commenced after September 18, 1978.

(b) This section applies to electric utility combined cycle gas turbines that are capable of combusting more than 73 megawatts (250 million Btu/hour) heat input of fossil fuel in the steam generator. Only emissions resulting from combustion of fuels in the steam generating unit are subject to this section.

Note: The gas turbine emissions are subject to s. NR 440.50.

(c) Any change to an existing fossil-fuel-fired steam generating unit to accommodate the use of combustible materials, other than fossil fuels, will not bring that unit under the applicability of this section.

(d) Any change to an existing steam generating unit originally designed to fire gaseous or liquid fossil fuels, to accommodate the use of any other fuel (fossil or nonfossil) will not bring that unit under the applicability of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "24-hour period" means the period of time between 12:01 a.m. and 12:00 midnight.

(b) "Anthracite" means coal that is classified as anthracite according to the American Society of Testing and Materials (ASTM) Standard Specification for Classification of Coals by Rank D388-77, incorporated by reference in s. NR 440.17.

(c) "Available purchase power" means the lesser of the following:

1. The sum of available system capacity in all neighboring companies.

2. The sum of the rated capacities of the power interconnection devices between the principal company and all neighboring companies, minus the sum of the electric power load on these interconnections.

3. The rated capacity of the power transmission lines between the power interconnection devices and the electric generating units (the unit in the principal company that has the malfunctioning flue gas desulfurization system and the unit or units in the neighboring company supplying replacement electrical power) less the electric power load on these transmission lines.

(d) "Available system capacity" means the capacity determined by subtracting the system load and the system emergency reserves from the net system capacity.

(e) "Boiler operating day" means a 24-hour period during which fossil fuel is combusted in a steam generating unit for the entire 24 hours.

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

(g) "Combined cycle gas turbine" means a stationary turbine combustion system where heat from the turbine exhaust gases is recovered by a steam generating unit.

(h) "Electric utility combined cycle gas turbine" means any combined cycle gas turbine used for electric generation that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW electrical output to any utility power distribution system for sale. Any steam distribution system that is constructed for the purpose of providing steam to a steam electric generator that would produce electrical power for sale is also considered in determining the electrical energy output capacity of the affected facility.

(i) "Electric utility company" means the largest interconnected organization, business or governmental entity that generates electric power for sale (e.g., a holding company with operating subsidiary companies).

(j) "Electric utility steam generating unit" means any steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW electrical output to any utility power distribution system for sale. Any steam supplied to a steam distribution system for the purpose of providing steam to a steam-electric generator that would produce electrical energy for sale is also considered in determining the electrical energy output capacity of the affected facility.

(k) "Emergency condition" means that period of time when:

1. The electric generation output of an affected facility with a malfunctioning flue gas desulfurization system cannot be reduced or electrical output must be increased because:

a. All available system capacity in the principal company interconnected with the affected facility is being operated, and

b. All available purchase power interconnected with the affected facility is being obtained, or

2. The electric generation demand is being shifted as quickly as possible from an affected facility with a malfunctioning flue gas desulfurization system to one or more electrical generating units held in reserve by the principal company or by a neighboring company, or

3. An affected facility with a malfunctioning flue gas desulfurization system becomes the only available unit to maintain a part or all of the principal company's system emergency reserves and the unit is operated in spinning reserve at the lowest practical electric generation load consistent with not causing significant physical damage to the unit. If the unit is operated at a higher load to meet load demand, an emergency condition would not exist unless the conditions under subd. 1. apply.

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

(m) "Interconnected" means that 2 or more electric generating units are electrically tied together by a network of power transmission lines, and other power transmission equipment.

(n) "Lignite" means coal that is classified as lignite A or B according to the American Society of Testing and Materials (ASTM) Standard Specification for Classification of Coals by Rank D388-77, incorporated by reference in s. NR 440.17.

(o) "Neighboring company" means any one of those electric utility companies with one or more electric power interconnections to the principal company and which have geographically adjoining service areas.

(p) "Net system capacity" means the sum of the net electric generating capability (not necessarily equal to rated capacity) of all electric generating equipment owned by an electric utility company (including steam generating units, internal combustion engines, gas turbines, nuclear units, hydroelectric units, and all other electric generating equipment) plus firm contractual purchases that are interconnected to the affected facility that has the malfunctioning flue gas desulfurization system. The electric generating capability of equipment under multiple ownership is prorated based on ownership unless the proportional entitlement to electric output is otherwise established by contractual arrangement.

(q) "Potential combustion concentration" means the theoretical emissions (ng/J, lb/million Btu heat input) that would result from combustion of a fuel in an uncleaned state without emission control systems) and:

1. For particulate matter is:

a. 3,000 ng/J (7.0 lb/million Btu) heat input for solid fuel; and

b. 75 ng/J (0.17 lb/million Btu) heat input for liquid fuels.

2. For sulfur dioxide is determined under sub. (9)(b).

3. For nitrogen oxides is:

a. 290 ng/J (0.67 lb/million Btu) heat input for gaseous fuels;

b. 310 ng/J (0.72 lb/million Btu) heat input for liquid fuels; and

c. 990 ng/J (2.30 lb/million Btu) heat input for solid fuels.

(r) "Potential electrical output capacity" means 33% of the maximum design heat input capacity of the system generating unit (e.g., a steam generating unit with a 100-MW (340 million Btu/hr) fossil-fuel heat input capacity would have a 33-MW potential electrical output capacity). For electric utility combined cycle gas turbines the potential electrical output capacity is determined on the basis of the fossil-fuel firing capacity of the steam generator exclusive of the heat input and electrical power contribution by the gas turbine.

(s) "Principal company" means the electric utility company which owns the affected facility.

(t) "Resource recovery unit" means a facility that combusts more than 75% nonfossil fuel on a quarterly (calendar) heat input basis.

(u) "Solid-derived fuel" means any solid, liquid or gaseous fuel derived from solid fuel for the purpose of creating useful heat and includes, but is not limited to, solvent refined coal, liquified coal and gasified coal.

(v) "Spare flue gas desulfurization system module" means a separate system of sulfur dioxide emission control equipment capable of treating an amount of flue gas equal to the total amount of flue gas generated by an affected facility when operated at maximum capacity divided by the total number of nonspare flue gas desulfurization modules in the system.

(w) "Spinning reserve" means the sum of the unutilized net generating capability of all units of the electric utility company that are synchronized to the power distribution system and that are capable of immediately accepting additional load. The electric generating capability of equipment under multiple ownership shall be prorated based on ownership unless the proportional entitlement to electric output is otherwise established by contractual arrangement.

(x) "Steam generating unit" means any furnace, boiler, or other device used for combusting fuel for the purpose of producing steam including fossil-fuel-fired steam generators associated with combined cycle gas turbines but nuclear steam generators are not included.

(y) "Subbituminous coal" means coal that is classified as subbituminous A, B or C according to the American Society of Testing and Materials (ASTM) Standard Specification for Classification of Coals by Rank D388-77, incorporated by reference in s. NR 440.17.

(z) "System emergency reserves" means an amount of electric generating capacity equivalent to the rated capacity of the single largest electric generating unit in the electric utility company (including steam generating units, internal combustion engines, gas turbines, nuclear units, hydroelectric units and all other electric generating equipment) which is interconnected with the affected facility that has the malfunctioning flue gas desulfurization system. The electric generating capability of equipment under multiple ownership shall be prorated based on ownership unless the proportional entitlement to electric output is otherwise established by contractual arrangement.

(zm) "System load" means the entire electric demand of an electric utility company's service area interconnected with the affected facility that has the malfunctioning flue gas desulfurization system plus firm contractual sales to other electric utility companies. Sales to other electric utility companies (e.g., emergency power) not on a firm contractual basis may also be included in the system load when no available system capacity exists in the electric utility company to which the power is supplied for sale.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain particulate matter in excess of:

1. 13 ng/J (0.03 lb/million Btu) heat input derived from the combustion of solid, liquid or gaseous fuel;

2. One percent of the potential combustion concentration (99% reduction) when combusting solid fuel; and

3. 30% of potential combustion concentration (70% reduction) when combusting liquid fuel.

(b) On and after the date the particulate matter performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which exhibit greater than 20% opacity (6-minute average), except for one 6-minute period per hour of not more than 27% opacity.

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the initial performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility which combusts solid fuel or solid-derived fuel, except as provided under par. (c), (d), (f) or (h), any gases which contain sulfur dioxide in excess of:

1. 520 ng/J (1.20 lb/million Btu) heat input and 10% of the potential combustion concentration (90% reduction), or

2. 30% of the potential combustion concentration (70% reduction), when emissions are less than 260 ng/J (0.60 lb/million Btu) heat input.

(b) On and after the date on which the initial performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility which combusts liquid or gaseous fuels (except for liquid or gaseous fuels derived from solid fuels and as provided under par. (e) or (h)), any gases which contain sulfur dioxide in excess of:

1. 340 ng/J (0.80 lb/million Btu) heat input and 10% of the potential combustion concentration (90% reduction), or

2. 100% of the potential combustion concentration (zero percent reduction) when emissions are less than 86 ng/J (0.20 lb/million Btu) heat input.

(c) On and after the date on which the initial performance test required to be conducted under s. NR 440.08 is complete, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility which combusts solid solvent refined coal (SRC-I) any gases which contain sulfur dioxide in excess of 520 ng/J (1.20 lb/million Btu) heat input and 15% of the potential combustion concentration (85% reduction) except as provided under par. (f); compliance with the emission limitation is determined on a 30-day rolling average basis and compliance with the percent reduction requirement is determined on a 24-hour basis.

(d) Sulfur dioxide emissions shall be limited to no more than 520 ng/J (1.20 lb/million Btu) heat input from any affected facility which:

1. Combusts 100% anthracite, or

2. Is classified as a resource recovery facility.

(e) [Reserved]

(f) The emission reduction requirements under this subsection do not apply to any affected facility that is operated under an SO_2 commercial demonstration permit issued by the administrator in accordance with the provisions of 40 C.F.R. s. 60.45a.

(g) Compliance with the emission limitation and percent reduction requirements under this subsection are both determined on a 30-day rolling average basis except as provided under par. (c).

(h) When different fuels are combusted simultaneously, the applicable standard is determined by proration using the following formula:

1. If emissions of sulfur dioxide to the atmosphere are greater than 260 ng/J (0.60 lb/million Btu) heat input:

$E_{SO}2 = [340\ x + 520\ y]/100$ and

$P_{SO}2 = 10\%$

2. If emissions of sulfur dioxide to the atmosphere are equal to or less than 260 ng/J (0.60 lb/million Btu) heat intput:

$E_{SO}2 = [340\ x + 520\ y]/100$ and

$P_{SO}2 = [90\ x + 70\ y]/100$

where:

$E_{SO}2$ is the prorated sulfur dioxide emission limit (ng/J heat input)

$P_{SO}2$ is the percentage of potential sulfur dioxide emission allowed (percent reduction required = $100 - P_{SO}2$)

x is the percentage of total heat input derived from the combustion of liquid or gaseous fuels (excluding solid-derived fuels)

y is the percentage of total heat input derived from the combustion of solid fuel (including solid-derived fuels)

(5) STANDARD FOR NITROGEN OXIDES. (a) On and after the date on which the initial performance test required to be conducted under s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility, except as provided under par. (b), any gases which contain nitrogen oxides in excess of the following emission limits, based on a 30-day rolling average.

1. 'NO_x emission limits'.

Fuel Type	Emission limit for heat input ng/J	Emission limit for heat input (lb/million Btu
Gaseous fuels:		
Coal-derived fuels	210	0.50
All other fuels	86	0.20
Liquid fuels:		
Coal-derived fuels	210	0.50
Shale oil.	210	0.50
All other fuels.	130	0.30
Solid fuels:		
Coal-derived fuels	210	0.50
Any fuel containing more than 25%, by weight, coal refuse	([1])	([1])
Any fuel containing more than 25%, by weight, lignite if the lignite is mined in North Dakota, South Dakota, or Montana, and is combusted in a slag tap furnace	340	0.80
Lignite not subject to the 340 ng/J heat input emission limit	260	0.60
Subbituminous coal	210	0.50
Bituminous coal	260	0.60
Anthracite coal	260	0.60
All other fuels	260	0.60

[1] Exempt from NO_x standards and NO_x monitoring requirements.

2. 'NO_x reduction requirements'.

Fuel type	Percent reduction of potential combustion concentration
Gaseous fuels	25
Liquid fuels	30
Solid fuels	65

(b) The emission limitations under par. (a) do not apply to any affected facility which is combusting coal-derived liquid fuel and is operating under a commercial demonstration permit issued by the administrator in accordance with the provisions of 40 C.F.R. s. 60.45a.

(c) When 2 or more fuels are combusted simultaneously, the applicable standard is determined by proration using the following formula:

$$E_{NO}2 = [86\ W + 130\ X + 210\ y + 260\ z]/100$$

in which:

$E_{NO}2$ is the applicable standard for nitrogen oxides when multiple fuels are combusted simultaneously (ng/J heat input)

W is the percentage of total heat input derived from the combustion of fuels subject to the 86 ng/J heat input standard

X is the percentage of total heat input derived from the combustion of fuels subject to the 130 ng/J heat input standard

y is the percentage of total heat input derived from the combustion of fuels subject to the 210 ng/J heat input standard

z is the percentage of total heat input derived from the combustion of fuels subject to the 260 ng/J heat input standard

(6) COMPLIANCE PROVISIONS. (a) Compliance with the particulate matter emission limitation under sub. (3)(a)1. constitutes compliance with the percent reduction requirements for particulate matter under sub. (3)(a)2. and 3.

(b) Compliance with the nitrogen oxides emission limitation under sub. (5)(a)1. constitutes compliance with the percent reduction requirements under sub. (5)(a)2.

(c) The particulate matter emissions standards under sub. (3) and the nitrogen oxides emission standards under sub. (5) apply at all times except during periods of startup, shutdown or malfunction. The sulfur dioxide emission standards under sub. (4) apply at all times except during periods of startup, shutdown or when both emergency conditions exist and the procedures under par. (d) are implemented.

(d) During emergency conditions in the principal company, an affected facility with a malfunctioning flue gas desulfurization system may be operated if sulfur dioxide emissions are minimized by:

1. Operating all operable flue gas desulfurization system modules, and bringing back into operation any malfunctioned module as soon as repairs are completed.

2. Bypassing flue gases around only those flue gas desulfurization system modules that have been taken out of operation because they were incapable of any sulfur dioxide emission reduction or which would have suffered signficant physical damage if they had remained in operation, and

3. Designing, constructing and operating a spare flue gas desulfurization system module for an affected facility larger than 365 MW (1,250 million Btu/hr) heat input (approximately 125 MW electrical output capacity). The department may at its discretion require the owner or operator within 60 days of notification to demonstrate spare module capability. To demonstrate this capability, the owner or operator shall demonstrate compliance with the appropriate requirements under sub. (4)(a), (b), (d) and (i) for any period of operation lasting from 24 hours to 30 days when:

a. Any one flue gas desulfurization module is not operated.

b. The affected facility is operating at the maximum heat input rate,

c. The fuel fired during the 24-hour to 30-day period is representative of the type and average sulfur content of fuel used over a typical 30-day period, and

d. The owner or operator has given the department at least 30 days notice of the date and period of time over which the demonstration will be performed.

(e) After the initial performance test required under s. NR 440.08, compliance with the sulfur dioxide emission limitations and percentage reduction requirements under sub. (4) and the nitrogen oxides emission limitations under sub. (5) shall be based on the average emission rate for 30 successive boiler operating days. A separate performance test is completed at the end of each boiler operating day after the initial performance test, and a new 30-day average emission rate for both sulfur dioxide and nitrogen oxides and a new percent reduction of sulfur dioxide are calculated to show compliance with the standards.

(f) For the initial performance test required under s. NR 440.08, compliance with the sulfur dioxide emission limitations and percent reduction requirements under sub. (4) and the nitrogen oxides emission limitation under sub. (5) shall be based on the average emission rates for sulfur dioxide, nitrogen oxides, and percent reduction for sulfur dioxide for the first 30 successive boiler operating days. The initial performance test is the only test in which at least 30 days prior notice is required unless otherwise specified by the department. The initial performance test shall be scheduled so that the first boiler operating day of the 30 successive boiler operating days is completed within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of the facility.

(g) Compliance shall be determined by calculating the arithmetic average of all hourly emission rates for SO_2 and NO_x for the 30 successive boiler operating days, except for data obtained during startup, shutdown, malfunction (NO_x only) or emergency conditions (SO_2 only). Compliance with the percentage reduction requirement for SO_2 shall be determined based on the average inlet and average outlet SO_2 emission rates for the 30 successive boiler operating days.

(h) If an owner or operator has not obtained the minimum quantity of emission data as required under sub. (7), compliance of the affected facility with the emission requirements under subs. (4)

and (5) for the day on which the 30-day period ends may be determined by the department by following the applicable procedures in sections 6.0 and 7.0 of Reference Method 19, 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

(7) EMISSION MONITORING. (a) The owner or operator of an affected facility shall install, calibrate, maintain and operate a continuous monitoring system, and record the output of the system, for measuring the opacity of emissions discharged to the atmosphere, except where gaseous fuel is the only fuel combusted. If opacity interference due to water droplets exists in the stack (for example, from the use of a flue gas desulfurization (FGD) system), the opacity shall be monitored upstream of the interference (at the inlet to the FGD system). If opacity interference is experienced at all locations (both at the inlet and outlet of the sulfur dioxide control system), alternate parameters indicative of the particulate matter control system's performance shall be monitored (subject to the approval of the department).

(b) The owner or operator of an affected facility shall install, calibrate, maintain and operate a continuous monitoring system, and record the output of the system, for measuring sulfur dioxide emissions, except where natural gas is the only fuel combusted, as follows:

1. Sulfur dioxide emissions shall be monitored at both the inlet and outlet of the sulfur dioxide control device.

2. For a facility which qualifies under the provisions of sub. (4)(d), sulfur dioxide emissions shall only be monitored as discharged to the atmosphere.

3. An "as fired" fuel monitoring system (upstream of coal pulverizers) meeting the requirements of Method 19, 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, may be used to determine potential sulfur dioxide emissions in place of a continuous sulfur dioxide emission monitor at the inlet to the sulfur dioxide control device as required under subd. 1.

(c) The owner or operator of an affected facility shall install, calibrate, maintain and operate a continuous monitoring system, and record the output of the system for measuring nitrogen oxides emissions discharged to the atmosphere.

(d) The owner or operator of an affected facility shall install, calibrate, maintain and operate a continuous monitoring system, and record the output of the system, for measuring the oxygen or carbon dioxide content of the flue gases at each location where sulfur dioxide or nitrogen oxides emissions are monitored.

(e) The continuous monitoring systems under pars. (b), (c) and (d) shall be operated and data recorded during all periods of operation of the affected facility including period of startup, shutdown, malfunction or emergency conditions, except for continuous monitoring system breakdowns, repairs, calibration checks and zero and span adjustments.

(f) When emission data are not obtained because of continuous monitoring system breakdowns, repairs, calibration checks and zero and span adjustments, emission data shall be obtained by using other monitoring systems as approved by the department or the reference methods as described in par. (h) to provide emission data for a minimum of 18 hours in at least 22 out of 30 successive boiler operating days.

(g) The one-hour averages required under s. NR 440.13(8) shall be expressed in ng/J (lbs/million Btu) heat input and used to calculate the average emission rates under sub. (6). The one-hour averages shall be calculated using the data points required under s. NR 440.13(2). At least 2 data points shall be used to calculate the one-hour averages.

(h) Reference methods of Appendix A, 40 C.F.R. pt. 60, incorporated by reference - in s. NR 440.17, used to supplement continuous monitoring system data to meet the minimum data requirements in par. (f) shall be used as specified in this paragraph or otherwise approved by the department.

1. Reference Methods 3, 6 and 7, as applicable, shall be used. Method 6B may be used whenever Methods 6 and 3 data are required to determine the SO_2 emission rate in ng/J. The sampling location or locations shall be the same as those specified for the continuous emission monitoring system.

2. For Method 6, the minimum sampling time shall be 20 minutes and the minimum sampling volume shall be 0.02 dscm (0.71 dscf) for each sample. Samples shall be taken at approximately 60-minute intervals. Each sample represents a one-hour average.

3. For Method 7, samples shall be taken at approximately 30-minute intervals. The arithmetic average of these 2 consecutive samples represent a one-hour average.

4. For Method 3, the oxygen or carbon dioxide sample shall be taken for each hour when continuous SO_2 and NO_x data are taken or when Methods 6 and 7 are required. Each sample shall be taken for a minimum of 30 minutes in each hour using the integrated bag method specified in Method 3. Each sample represents a one-hour average.

5. For each one-hour average, the emissions expressed in ng/J (lb/million Btu) heat input shall be determined and used as needed to achieve the minimum data requirements of par. (f).

(i) The procedures of this paragraph shall be used to conduct monitoring system performance evaluations under s. NR 440.13(3) and calibration checks under s. NR 440.13(4).

1. Reference Method 6 or 7, of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, as applicable, shall be used for conducting performance evaluations of sulfur dioxide and nitrogen oxides continuous monitoring systems.

2. Sulfur dioxide or nitrogen dioxides, as applicable, shall be used for preparing calibration gas mixtures under Performance Specification 2 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17.

3. For affected facilities burning only fossil fuel, the span value for a continuous monitoring system for measuring opacity shall be between 60 and 80% and for a continuous monitoring system measuring nitrogen oxides shall be determined as follows:

Fossil fuel	Span value for nitrogen oxides (ppm)
Gas	500
Liquid	500
Solid	1,000
Combination	500(x+y)+1,000z

where:

x is the fraction of total heat input derived from gaseous fossil fuel

y is the fraction of total heat input derived from liquid fossil fuel

z is the fraction of total heat input derived from solid fossil fuel

4. All span values computed under par. (b)3. for burning combinations of fossil fuels shall be rounded to the nearest 500 ppm.

5. For affected facilities burning fossil fuel, alone or in combination with nonfossil fuel, the span value of the sulfur dioxide continuous monitoring system at the inlet to the sulfur dioxide control device shall be 125% of the maximum estimated hourly potential emissions of the fuel fired, and the outlet of the sulfur dioxide control device shall be 50% of maximum estimated hourly potential emissions of the fuel fired.

(8) COMPLIANCE DETERMINATION PROCEDURES AND METHODS. (a) The following procedures and reference methods of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine compliance with the standards for particulate matter under sub. (3):

1. Method 3 for gas analysis when applying Method 5 or Method 17, and

2. Method 5 for determining particulate matter emissions and associated moisture content, but Method 17 may be used for stack gas temperatures less than 160°C (320°F),

3. For Methods 5 or 17, Method 1 shall be used to select the sampling site and the number of traverse sampling points. The sampling time for each run shall be at least 120 minutes and the minimum sampling volume shall be 1.7 dscm (60 dscf) except that smaller sampling times or volumes, when necessitated by process variables or other factors, may be approved by the department.

4. For Method 5, the probe and filter holder heating system in the sampling train shall be set to provide a gas temperature no greater than 160°C (320°F).

5. For determination of particulate emissions, the oxygen or carbon-dioxide sample shall be obtained simultaneously with each run of Method 5 or 17 by traversing the duct at the same sampling location. Method 1 shall be used for selection of the number of traverse points except that no more than 12 sample points are required.

6. For each run using Method 5 or 17, the emission rate expressed in ng/J heat input shall be determined using the oxygen or carbon-dioxide measurements and particulate matter measurements obtained under this subsection, the dry basis F_c-factor and the dry basis emission rate calculation procedure contained in Method 19.

7. Prior to the department's issuance of a particulate matter reference method that does not experience sulfuric acid mist interference problems, particulate matter emissions may be sampled prior to a wet flue gas desulfurization system.

(b) The following procedures and reference methods of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine compliance with the sulfur dioxide standards under sub. (4).

1. Determine the percent of potential combustion concentration (percent PCC) emitted to the atmosphere as follows:

a. Fuel pretreatment (% R_f): Determine the percent reduction achieved by any fuel pretreatment using the procedures in Method 19. Calculate the average percent reduction for fuel pretreatment on a quarterly basis using fuel analysis data. The determination of percent R_f to calculate the percent of potential combustion concentration emitted to the atmosphere is optional. For purposes of determining compliance with any percent reduction requirements under sub. (4), any reduction in potential SO_2 emissions resulting from the following processes may be credited:

1) Fuel pretreatment (physical coal cleaning, hydrodesulfurization of fuel oil, etc.),

2) Coal pulverizers, and

3) Bottom and flyash interactions.

b. Sulfur dioxide control system (%R_g): Determine the percent sulfur dioxide reduction achieved by any sulfur dioxide control system using emission rates measured before and after the control system, following the procedures in Method 19; or, a combination of an "as fired" fuel monitor and emission rates measured after the control system, following the procedures in

Method 19. When the "as fired" fuel monitor is used, the percent reduction shall be calculated using the average emission rate from the sulfur dioxide control device and the average SO_2 input rate from the "as fired" fuel analysis for 30 successive boiler operating days.

c. Overall percent reduction (% R_o): Determine the overall percent reduction using the results obtained in subpars. a. and b. following the procedures in Method 19. Results shall be calculated for each 30-day period using the quarterly average percent sulfur reduction determined for fuel pretreatment from the previous quarter and the sulfur dioxide control system for each 30-day period in the current quarter.

d. Percent emitted (% PCC): Calculate the percent of potential combustion concentration emitted to the atmosphere using the following equation: Percent PCC=100-Percent R_o

2. Determine the sulfur dioxide emission rates following the procedures in Method 19.

(c) The procedures and methods outlined in Method 19 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used in conjunction with the 30-day nitrogen-oxides emission data collected under sub. (7) to determine compliance with the applicable nitrogen oxides standard under sub. (5).

(d) Electric utility combined cycle gas turbines shall be performance tested for particulate matter, sulfur dioxide and nitrogen oxides using the procedures of Method 19 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17. The sulfur dioxide and nitrogen oxides emission rates from the gas turbine used in Method 19 calculations shall be determined when the gas turbine is performance tested under s. NR 440.50. The potential uncontrolled particulate matter emissions rate from a gas turbine is defined as 17 ng/J (0.04 lb/million Btu) heat input.

(9) REPORTING REQUIREMENTS. (a) For sulfur dioxide, nitrogen oxides and particulate matter emissions, the performance test data from the initial performance test and from the performance evaluation of the continuous monitors (including the transmissometer) shall be submitted to the department.

(b) For sulfur dioxide and nitrogen oxides the following information shall be reported to the department for each 24-hour period.

1. Calendar date.

2. The average sulfur dioxide and nitrogen oxide emission rates (ng/J or lb/million Btu) for each 30 successive boiler operating days, ending with the last 30-day period in the quarter; reasons for noncompliance with the emission standards; and description of corrective actions taken.

3. Percent reduction of the potential combustion concentration of sulfur dioxide for each 30 successive boiler operating days, ending with the last 30-day period in the quarter; reasons for noncompliance with the standard; and description of corrective actions taken.

4. Identification of the boiler operating days for which pollutant or dilutent data have not been obtained by an approved method for at least 18 hours of operation of the facility; justification for not obtaining sufficient data; and description of corrective actions taken.

5. Identification of the times when emissions data have been excluded from the calculation of average emission rates because of startup, shutdown, malfunction (NO_x only), emergency conditions (SO_2 only) or other reasons, and justification for excluding data for reasons other than startup, shutdown, malfunction or emergency conditions.

6. Identification of "F" factor used for calculations, method of determination and type of fuel combusted.

7. Identification of times when hourly averages have been obtained based on manual sampling methods.

8. Identification of the times when the pollutant concentration exceeded full span of the continuous monitoring system.

9. Description of any modifications to the continuous monitoring system which could affect the ability of the continuous monitoring system to comply with Performance Specification 2 or 3 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17.

(c) If the minimum quantity of emission data as required by sub. (7) is not obtained for any 30 successive boiler operating days, the following information obtained under the requirements of sub. (6)(h) shall be reported to the department for that 30-day period:

1. The number of hourly averages available for outlet emissions rates (n_o) and inlet emission rates (n_i), as applicable.

2. The standard deviation of hourly averages for outlet emission rates (S_o) and inlet emission rates (S_i), as applicable.

3. The lower confidence limit for the mean outlet emission rate (E_o*) and the upper confidence limit for the mean inlet emission rate (E_i*), as applicable.

4. The applicable potential combustion concentration.

5. The ratio of the upper confidence limit for the mean outlet emission rate (E_o*) and the allowable emission rate (E_{std}), as applicable.

(d) If any standards under sub. (4) are exceeded during emergency conditions because of control system malfunction, the owner or operator of the affected facility shall submit a signed statement:

1. Indicating if emergency conditions existed and requirements under sub. (6)(d) were met during each period, and

2. Listing the following information:

a. Time periods the emergency condition existed;

b. Electrical output and demand on the owner or operator's electric utility system and the affected facility;

c. Amount of power purchased from interconnected neighboring utility companies during the emergency period;

d. Percent reduction in emissions achieved;

e. Atmospheric emission rate (ng/J) of the pollutant discharged; and

f. Actions taken to correct control system malfunction.

(e) If fuel pretreatment credit toward the sulfur dioxide emission standard under sub. (4) is claimed, the owner or operator of the affected facility shall submit a signed statement:

1. Indicating what percentage cleaning credit was taken for the calendar quarter, and whether the credit was determined in accordance with the provisions of sub. (8) and Method 19 of 40 C.F.R. pt 60, Appendix A, incorporated by reference in s. NR 440.17; and

2. Listing the quantity, heat content, and date each pretreated fuel shipment was received during the previous quarter; the name and location of the fuel pretreatment facility; and the total quantity and total heat content of all fuels received at the affected facility during the previous quarter.

(f) For any periods for which opacity, sulfur dioxide or nitrogen oxides emissions data are not available, the owner or operator of the affected facility shall submit a signed statement indicating if any changes were made in operation of the emission control system during the period of data unavailability. Operations of the control system and affected facility during periods of data unavailability are to be compared with operation of the control system and affected facility before and following the period of data unavailability.

(g) The owner or operator of the affected facility shall submit a signed statement indicating whether:

1. The required continuous monitoring system calibration, span, and drift checks or other periodic audits have or have not been performend as specified.

2. The data used to show compliance was or was not obtained in accordance with approved methods and procedures of this chapter and is representative of plant performance.

3. The minimum data requirements have or have not been met; or, the minimum data requirements have not been met for errors that were unavoidable.

4. Compliance with the standards has or has not been achieved during the reporting period.

(h) For the purposes of the reports required under s. NR 440.07, periods of excess emissions are defined as all 6-minute periods during which the average opacity exceeds the applicable opacity standards under sub. (3)(b). Opacity levels in excess of the applicable opacity standard and the date of such excesses shall be submitted to the department each calendar quarter.

(i) The owner or operator of an affected facility shall submit the written reports required under this subsection and ss. NR 440.01 to NR 440.15 to the department for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

NR 440.21 STANDARDS OF PERFORMANCE FOR INCINERATORS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to each incinerator of more than 45 metric tons per day charging rate (50 tons/day), which is the affected facility.

(b) Any facility under par. (a) that commences construction or modification after August 17, 1971, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Day" means 24 hours.

(b) "Incinerator" means any furnace used in the process of burning solid waste for the purpose of reducing the volume of the waste by removing combustible matter.

(c) "Solid waste" means refuse, more than 50% of which is municipal type waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber and other combustibles, and noncombustible materials such as glass and rock.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain particulate matter in excess of 0.18 g/dscm (0.08 gr/dscf) corrected to 12% CO_2.

(b) [Reserved]

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any incinerator subject to the provisions of this section shall record the daily charging rates and hours of operation.

(b) [Reserved]

(5) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standard prescribed in sub. (3) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 4 for gas analysis and calculation of excess air, using the integrated sample technique.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be 0.85 dscm (30.0 dscf) except that smaller sampling times or sample volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) If a wet scrubber is used, the gas analysis sample shall reflect flue gas conditions after the scrubber, allowing for carbon dioxide absorption by sampling the gas on the scrubber inlet and outlet sides according to either the procedure under subds. 1. through 5. or the procedure under subds. 1., 2. and 6. as follows:

1. The outlet sampling site shall be the same as for the particulate matter measurement. The inlet site shall be selected according to Method 1 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, or as specified by the department.

2. Randomly select 9 sampling points within the cross-section at both the inlet and outlet sampling sites. Use the first set of 3 for the first run, the second set for the second run, and the third set for the third run.

3. Simultaneously with each particulate matter run, extract and analyze for CO_2 and integrated gas sample according to Method 3 of 40 C.F.R. pt 60, Appendix A, incorporated by reference in s. NR 440.17, traversing the 3 sample points and sampling at each point for equal increments of time. Conduct the runs at both inlet and outlet sampling sites.

4. Measure the volumetric flow rate at the inlet during each particulate matter run according to Method 2 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, using the full

number of traverse points. For the inlet make 2 full velocity traverses approximately one hour apart during each run and average the results. The outlet volumetric flow rate may be determined from the particulate matter run (Method 5).

5. Calculate the adjusted CO_2 percentage using the following equation:

$$(\%\ CO_2)_{adj} = (\%\ CO_2)_{di} \cdot (Q_{di}/Q_{do})$$

where:

$(\%\ CO_2)_{adj}$ is the adjusted CO_2 percentage which removes the effect of CO_2 absorption and dilution air

$(\%\ CO_2)_{di}$ is the percentage of CO_2 measured before the scrubber, dry basis

Q_{di} is the volumetric flow rate before the scrubber, average of 2 runs, dscf/min (using Method 2 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

Q_{do} is the volumetric flow rate after the scrubber, dscf/min (using Methods 2 and 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

6. Alternatively, the following procedures may be substituted for the procedures under subds. 3., 4. and 5.

a. Simultaneously with each particulate matter run, extract and analyze for CO_2, O_2 and N_2 an integrated gas sample according to Method 3 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, traversing the 3 sample points and sampling for equal increments of time at each point. Conduct the runs at both the inlet and outlet sampling sites.

b. After completing the analysis of the gas sample, calculate the percentage of excess air (% EA) for both the inlet and outlet sampling sites using equation 3-1 in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

c. Calculate the adjusted CO_2 percentage using the following equation:

$$(\%CO_2)_{adj} = (\%CO_2)di \quad \frac{100 + (\%\ EA)i}{100 + (\%\ EA)o}$$

where:

$(\% \ CO_2)_{adj}$ is the adjusted outlet CO_2 percentage

$(\% \ CO_2)_{di}$ is the percentage of CO_2 measured before the scrubber, dry basis

$(\% \ EA)_i$ is the percentage of excess air at the inlet

$(\% \ EA)_o$ is the percentage of excess air at the outlet

(d) Particulate matter emissions, expressed in g/dscm, shall be corrected to 12% CO_2 by using the following formula:

$$c_{12} = 12c/\% \ CO_2$$

where:

c_{12} is the concentration of particulate matter corrected to 12% CO_2

c is the concentration of particulate matter as measured by Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

% CO_2 is the percentage of CO_2 measured by Method 3 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, or when applicable, the adjusted outlet CO_2 percentage as determined by par. (c)

NR 440.22 STANDARDS OF PERFORMANCE FOR PORTLAND CEMENT PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in portland cement plants: Kiln, clinker cooler, raw mill system, finish mill system, raw mill dryer, raw material storage, clinker storage, finished product storage, conveyor transfer points, bagging and bulk loading and unloading systems.

(b) Any facility under par. (a) that commences construction or modification after August 17, 1971, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Portland cement plant" means any facility manufacturing portland cement by either the wet or dry process.

(b) [Reserved]

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any kiln any gases which:

1. Contain particulate matter in excess of 0.15 kg per metric ton of feed (dry basis) to the kiln (0.30 lb per ton).

2. Exhibit greater than 20% opacity.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any clinker cooler any gases which:

1. Contain particulate matter in excess of 0.050 kg per metric ton of feed (dry basis) to the kiln (0.10 lb. per ton).

2. Exhibit 10% opacity, or greater.

(c) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility other than the kiln and clinker cooler any gases which exhibit 10% opacity, or greater.

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any portland cement plant subject to the provisions of this section shall record the daily production rates and kiln feed rates.

(b) [Reserved]

(5) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in sub. (3) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the minimum sampling time and minimum sample volume for each run, except when process variables or other factors justify otherwise to the satisfaction of the department, shall be as follows:

1. 60 minutes and 0.85 dscm (30.0 dscf) for the kiln.

2. 60 minutes and 1.15 dscm (40.6 dscf) for the clinker cooler.

(c) Total kiln feed rate (except fuels), expressed in metric tons per hour on a dry basis, shall be determined during each testing period by suitable methods and shall be confirmed by a material balance over the production system.

(d) For each run, particulate matter emissions, expressed in g/metric ton of kiln feed, shall be determined by dividing the emission rate in g/hr by the kiln feed rate. The emission rate shall be determined by the equation, $g/hr = Q_s \times c$, where Q_s is the volumetric flow rate of the total effluent in dscm/hr as determined in accordance with par. (a)3. and c is the particulate concentration in g/dscm as determined in accordance with par. (a)1.

NR 440.23 STANDARDS OF PERFORMANCE FOR NITRIC ACID PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to each nitric acid production unit, which is the affected facility.

(b) Any facility under par. (a) that commences construction or modification after August 17, 1971, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Nitric acid production unit" means any facility producing weak nitric acid by either the pressure or atmospheric pressure process.

(b) "Weak nitric acid" means acid which is 30 to 70 percent in strength.

(3) STANDARD FOR NITROGEN OXIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which:

1. Contain nitrogen oxides, expressed as NO_2, in excess of 1.5 kg per metric ton of acid produced (3.0 lb per ton), the production being expressed as 100% nitric acid.

2. Exhibit 10% opacity, or greater.

(b) [Reserved]

(4) EMISSION MONITORING. (a) A continuous monitoring system for the measurement of nitrogen oxides shall be installed, calibrated, maintained and operated by the owner or operator. The pollutant gas used to prepare calibration gas mixtures under Performance Specification 2 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, and for calibration checks under s. NR 440.13 shall be nitrogen dioxide (NO_2). The span shall be set at 500 ppm of nitrogen dioxide. Reference Method 7 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used for conducting monitoring system performance evaluations under s. NR 440.13(3).

(b) The owner or operator shall establish a conversion factor for the purpose of converting monitoring data into units of the applicable standard (kg/metric ton, lb/short ton). The conversion factor shall be established by measuring emissions with the continuous monitoring system concurrent with measuring emissions with the applicable reference method tests. Using only that portion of the continuous monitoring emission data that represents emission measurements concurrent with the reference method test periods, the conversion factor shall be determined by dividing the reference method test data averages by the monitoring data averages to obtain a ratio expressed in units of the applicable standard to units of the monitoring data, i.e, kg/metric ton per ppm (lb/short ton per ppm). The conversion factor shall be reestablished during any performance test under s. NR 440.08 or any continuous monitoring system performance evaluation under s. NR 440.13(3).

(c) The owner or operator shall record the daily production rate and hours of operation.

(d) [Reserved]

(e) For the purpose of reports required under s. NR 440.13(3), periods of excess emissions that shall be reported are defined as any 3-hour period during which the average nitrogen oxides emissions (arithmetic average of 3 contiguous one-hour periods) as measured by a continuous monitoring system exceed the standard under sub. (3)(a).

(5) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standard prescribed in sub. (3) as follows:

1. Method 7 for the concentration of NO_x,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 7 in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sample site shall be selected according to Method 1 and the sampling point shall be the centroid of the stack or duct or at a point no closer to the walls than 1 m (3.28 ft). Each run shall consist of at least 4 grab samples taken at approximately 15-minute intervals. The arithmetic mean of the samples shall constitute the run value. A velocity traverse shall be performed once per run.

(c) Acid production rate, expressed in metric tons per hour of 100% nitric acid, shall be determined during each testing period by suitable methods and shall be confirmed by a material balance over the production system.

(d) For each run, nitrogen oxides, expressed in g/metric ton of 100% nitric acid, shall be determined by dividing the emission rate by g/hr by the acid production rate. The emission rate shall be determined by the equation,

$$g/hr = Q_s \times c$$

where:

Q_s is the volumetric flow rate of the effluent in dscm/hr, as determined in accordance with par. (a)3.

c is the NO_x concentration in g/dscm, as determined in accordance with par. (a)1.

NR 440.24 STANDARDS OF PERFORMANCE FOR SULFURIC ACID PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to each sulfuric acid production unit, which is the affected facility.

(b) Any facility under par. (a) that commences construction or modification after August 17, 1971, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Acid mist" means sulfuric acid mist, as measured by Method 8 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, or an equivalent or alternative method.

(b) "Sulfuric acid production unit" means any facility producing sulfuric acid by the contact process by burning elemental sulfur, alkylation acid, hydrogen sulfide, organic sulfides and mercaptans or acid sludge, but does not include facilities where conversion to sulfuric acid is utilized primarily as a means of preventing emissions to the atmosphere of sulfur dioxide or other sulfur compounds.

(3) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain sulfur dioxide in excess of 2 kg per metric ton of acid produced (4 lb per ton), the production being expressed as 100% H_2SO_4.

(b) [Reserved]

(4) STANDARD FOR ACID MIST. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which:

1. Contain acid mist, expressed as H_2SO_4, in excess of 0.075 kg per metric ton of acid produced (0.15 lb per ton), the production being expressed as 100% H_2SO_4.

2. Exhibit 10% opacity, or greater.

(b) [Reserved]

(5) EMISSION MONITORING. (a) A continuous monitoring system for the measurement of sulfur dioxide shall be installed, calibrated, maintained and operated by the owner or operator. The pollutant gas used to prepare calibration gas mixtures under Performance Specification 2 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, and for calibration checks under s. NR 440.13(4) shall be sulfur dioxide (SO_2). Reference Method 8 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used for conducting monitoring system performance evaluations under s. NR 440.13(3), except that only the sulfur dioxide portion of the Method 8 results shall be used. The span shall be set at 1000 ppm of sulfur dioxide.

(b) The owner or operator shall establish a conversion factor for the purpose of converting monitoring data into units of the applicable standard (kg/metric ton, lb/short ton). The conversion factor shall be determined, at a minimum, 3 times daily by measuring the concentration of sulfur dioxide entering the converter using suitable methods (e.g., the Reich test, National Air Pollution Control Administration Publication No. 999-AP-13) and calculating the appropriate conversion factor for each 8-hour period as follows:

$$CF = k[1.000 - 0.015r/r-s]$$

where CF is the conversion factor (kg/metric ton per ppm, lb/short ton per ppm), and k is the constant derived from material balance. For determining CF in metric units, k=0.0653. For determining CF in English units, k=0.1306. r is the percentage of sulfur dioxide by volume entering the gas converter. Appropriate corrections must be made for air injection plants subject to the department's approval. s is the percentage of sulfur dioxide by volume in the emissions to the atmosphere determined by the continuous monitoring system required under par. (a).

(c) The owner or operator shall record all conversion factors and values under par. (b) from which they were computed (i.e., CF, r, and s).

(d) [Reserved]

(e) For the purpose of reports under s. NR 440.07(3), periods of excess emissions shall be all 3-hour periods (or the arithmetic average of 3 consecutive one-hour periods) during which the integrated average sulfur dioxide emissions exceed the applicable standards under sub. (3).

(6) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in subs. (3) and (4) as follows:

1. Method 8 for the concentrations of SO_2 and acid mist,
2. Method 1 for sample and velocity traverses,
3. Method 2 for velocity and volumetric flow rate, and
4. Method 3 for gas analysis.

(b) The moisture content can be considered to be zero. For Method 8 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be 1.15 dscm (40.6 dscf) except that smaller sampling times or sample volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) Acid production rate, expressed in metric tons per hour of 100% H_2SO_4, shall be determined during each testing period by suitable methods and shall be confirmed by a material balance over the production system.

(d) Acid mist and sulfur dioxide emissions, expressed in g/metric ton of 100% H_2SO_4, shall be determined by dividing the emission rate in g/hr by the acid production rate. The emission rate shall be determined by the equation, $g/hr=Q_s x c$, where Q_s is the volumetric flow rate of the effluent in dscm/hr as determined in accordance with par. (a)3. and c is the acid mist and SO_2 concentrations in g/dscm as determined in accordance with par. (a)1.

NR 440.25 STANDARDS OF PERFORMANCE FOR ASPHALT CONCRETE PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each asphalt concrete plant. For the purpose of this section, an asphalt concrete plant is comprised only of any combination of the following: dryers; systems for screening, handling, storing and weighing hot aggregate; systems for loading, transferring and storing mineral filler; systems for mixing asphalt concrete; and the loading, transfer and storage systems associated with emission control systems.

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Asphalt concrete plant" means any facility, as described in sub. (1) used to manufacture asphalt concrete by heating and drying aggregate and mixing with asphalt cement.

(b) [Reserved]

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any affected facility any gases which:

1. Contain particulate matter in excess of 90 mg/dscm (0.04 gr/dscf).

2. Exhibit 20% opacity, or greater.

(b) [Reserved]

(4) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in sub. (3) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.9 dscm/hr (0.53 dscf/min) except that shorter sampling times, when necessitated by process variables or other factors, may be approved by the department.

NR 440.26 STANDARDS OF PERFORMANCE FOR PETROLEUM REFINERIES. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in petroleum refineries: fluid catalytic cracking unit catalyst regenerators, fuel gas combustion devices, and all Claus sulfur recovery plants except Claus plants of 20 long tons per day (LTD) or less. The Claus sulfur recovery plant need not be physically located within the boundaries of a petroleum refinery to be an affected facility, provided it processes gases produced within a petroleum refinery.

(b) Any fluid catalytic cracking unit catalyst regenerator or fuel gas combustion device under par. (a) which commences construction or modification after June 11, 1973, or any Claus sulfur recovery plant under par. (a) which commences construction or modification after October 4, 1976, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Claus sulfur recovery plant" means a process unit which recovers sulfur from hydrogen sulfide by a vapor-phase catalytic reaction of sulfur dioxide and hydrogen sulfide.

(b) "Coke burn-off" means the coke removed from the surface of the fluid catalytic cracking unit catalyst by combustion in the catalyst regenerator. The rate of coke burn-off is calculated by the formula specified in sub. (7).

(c) "Fuel gas" means any gas which is generated at a petroleum refinery and which is combusted. Fuel gas also includes natural gas when the natural gas is combined and combusted in any proportion with a gas generated at a refinery. Fuel gas does not include gases generated by catalytic cracking unit catalyst regenerators and fluid coking burners.

(d) "Fuel gas combustion device" means any equipment, such as process heaters, boilers and flares used to combust fuel gas, except facilities in which gases are combusted to produce sulfur or sulfuric acid.

(e) "Oxidation control system" means an emission control system which reduces emissions from sulfur recovery plants by converting these emissions to sulfur dioxide.

(f) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(g) "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants or other products through distillation of petroleum or through redistillation, cracking or reforming of unfinished petroleum derivatives.

(h) "Process gas" means any gas generated by a petroleum refinery process unit, except fuel gas and process upset gas as defined in this subsection.

(i) "Process upset gas" means any gas generated by a petroleum refinery process unit as a result of startup, shutdown, upset or malfunction.

(j) "Reduced sulfur compounds" means hydrogen sulfide (H_2S), carbonyl sulfide (COS) and carbon disulfide (CS_2).

(k) "Reduction control system" means an emission control system which reduces emissions from sulfur recovery plants by converting these emissions to hydrogen sulfide.

(l) "Refinery process unit" means any segment of the petroleum refinery in which a specific processing operation is conducted.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the

provisions of this section may discharge or cause the discharge into the atmosphere from any fluid catalytic cracking unit catalyst regenerator or from any fluid catalytic cracking unit regenerator:

1. Particulate matter in excess of 1.0 kg/100 kg (1.0 lb/1000 lb) of coke burn-off in the catalyst regenerator.

2. Gases exhibiting greater than 30% opacity, except for one 6-minute average opacity reading in any one hour period.

(b) Where the gases discharged by the fluid catalytic cracking unit catalyst regenerator pass through an incinerator or waste heat boiler in which auxiliary or supplemental liquid or solid fossil fuel is burned, particulate matter in excess of that permitted by par. (a)1. may be emitted to the atmosphere, except that the incremental rate of particulte matter emissions may not exceed 43.0 g/MJ (0.10 lb/million Btu) of heat input attributable to such liquid or solid fossil fuel.

(4) STANDARD FOR CARBON MONOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from the fluid catalytic cracking unit catalyst regenerator any gases which contain carbon monoxide in excess of 0.050% by volume.

(b) [Reserved]

(5) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may:

1. Burn in any fuel gas combustion device any fuel gas which contains hydrogen sulfide in excess of 230 mg/dscm (0.10 gr/dscf), except that the gases resulting from the combustion of fuel gas may be treated to control sulfur dioxide emissions provided the owner or operator demonstrates to the satisfaction of the department that this is as effective in preventing sulfur dioxide emissions to the atmosphere as restricting the H_2 concentration in the fuel gas to 230 mg/dscm or less. The combustion in a flare of process upset gas, or fuel gas which is released to the flare as a result of relief valve leakage, is exempt from this paragraph.

2. Discharge or cause the discharge af any gases into the atmosphere from any Claus sulfur recovery plant containing in excess of:

a. 0.025% by volume of sulfur dioxide at zero percent oxygen on a dry basis if emissions are controlled by an oxidation control system, or a reduction control system followed by incineration, or

b. 0.030% by volume of reduced sulfur compounds and 0.0010% by volume of hydrogen sulfide calculated as sulfur dioxide at zero percent oxygen on a dry basis if emissions are controlled by a reduction control system not followed by incineration.

(b) [Reserved]

(6) EMISSION MONITORING. (a) Continuous monitoring systems shall be installed, calibrated, maintained and operated by the owner or operator as follows:

1. A continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from the fluid catalytic cracking unit catalyst regenerator. The continuous monitoring system shall be spanned at 60, 70 or 80 percent opacity.

2. An instrument for continuously monitoring and recording the concentration of carbon monoxide in gases discharged into the atmosphere from fluid catalytic cracking unit catalyst regenerators. The span of this continuous monitoring system shall be 1,000 ppm.

3. A continuous monitoring system for the measurement of sulfur dioxide in the gases discharged into the atmosphere from the combustion of fuel gases (except where a continuous monitoring system for the measurement of hydrogen sulfide is installed under subd. 4.). The pollutant gas used to prepare calibration gas mixtures under Performance Specification 2 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, and for calibration checks under s. NR 440.13(4), shall be sulfur dioxide (SO_2). The span shall be set at 100 ppm. For conducting monitoring system performance evaluations under s. NR 440.13(3), Reference Method 6 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17 shall be used.

4. An instrument for continuously monitoring and recording concentrations of hydrogen sulfide in fuel gases burned in any fuel gas combustion device, if compliance with sub. (5)(a)1. is achieved by removing H_2S from the fuel gas before it is burned; fuel gas combustion devices having a common source of fuel gas may be monitored at one location, if monitoring at this location accurately represents the concentration of H_2S in the fuel gas burned. The span of this continuous monitoring system shall be 300 ppm.

5. An instrument for continuously monitoring and recording concentrations of SO_2 in the gases discharged into the atmosphere from any Claus sulfur recovery plant if compliance with sub. (5)(a)2. is achieved through the use of an oxidation control system or a reduction control system followed by incineration. The span of this continuous monitoring system shall be set at 500 ppm.

6. One or more instruments for continuously monitoring and recording the concentration of H_2S and reduced sulfur compounds in the gases discharged into the atmosphere from any Claus sulfur recovery plant if compliance with sub. (5)(a)2. is achieved through the use of a reduction control system not followed by incineration. The spans of these continuous monitoring systems shall be set at 20 ppm for monitoring and recording the concentration of H_2S and 600 ppm for monitoring and recording the concentration of reduced sulfur compounds.

(b) [Reserved]

(c) The average coke burn-off rate (thousands of kilogram/hr) and hours of operation for any fluid catalytic cracking unit catalyst regenerator subject to sub. (3) or (4) shall be recorded daily.

(d) For any fluid catalytic cracking unit catalyst regenerator which is subject to sub. (3) and which utilizes an incinerator-waste heat boiler to combust the exhaust gases from the catalyst regenerator, the owner or operator shall record daily the rate of combustion of liquid or solid fossil fuels (liters/hr or kilograms/hr) and the hours of operation during which liquid or solid fossil fuels are combusted in the incinerator-waste heat boiler.

(e) For the purpose of reports under s. NR 440.07(3), periods of excess emissions that shall be reported are defined as follows:

1. 'Opacity'. All one-hour periods which contain 2 or more 6-minute periods during which the average opacity as measured by the continuous monitoring system exceeds 30%.

2. 'Carbon monoxide'. All hourly periods during which the average carbon monoxide concentration in the gases discharged into the atmosphere from any fluid catalytic cracking unit catalyst regenerator subject to sub. (4) exceeds 0.050% by volume.

3. 'Sulfur dioxide'. a. Any 3-hour period during which the average concentration of H_2S in any fuel gas combusted in any fuel gas combustion device subject to sub. (5)(a)l. exceeds 230 mg/dscm (0.10 gr/dscf), if compliance is achieved by removing H_2S from the fuel gas before it is burned; or any 3-hour period during which the average concentration of SO_2 in the gases discharged into the atmosphere from any fuel gas combustion device subject to sub. (5)(a)l. exceeds the level specified in sub. (5)(a)l., if compliance is achieved by removing SO_2 from the combusted fuel gases.

b. Any 12-hour period during which the average concentration of SO_2 in the gases discharged into the atmosphere from any Claus sulfur recovery plant subject to sub. (5)(a)2. exceeds 250 ppm at zero percent oxygen on a dry basis if compliance with sub. (5)(b) is achieved through the use of an oxidation control system or a reduction control system followed by incineration; or any 12-hour period during which the average concentration of H_2S, or reduced sulfur compounds in the gases discharged into the atmosphere of any Claus sulfur plant subject to sub. (5)(a)2.b. exceeds 10 ppm or 300 ppm, respectively, at zero percent oxygen and on a dry basis if compliance is achieved through the use of a reduction control system not followed by incineration.

4. Any 6-hour period during which the average emissions (arithmetic average of 6 contiguous one-hour periods) of sulfur dioxide as measured by a continuous monitoring system exceed the standard under sub. (5).

(7) TEST METHODS AND PROCEDURES. (a) For the purpose of determining compliance with sub. (3)(a)l., the following reference methods of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, and calculation procedures shall be used:

1. For gases released to the atmosphere from the fluid catalytic cracking unit catalyst regenerator:

a. Method 5 for the concentration of particulate matter and moisture content,

b. Method 1 for sample and velocity traverses, and

c. Method 2 for velocity and volumetric flow rate.

2. For Method 5, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.015 dscm/min (0.53 dscf/min.), except that shorter sampling times may be approved by the department when process variables or other factors preclude sampling for at least 60 minutes.

3. For exhaust gases from the fluid catalytic cracking unit catalyst regenerator prior to the emission control system: the integrated sample techniques of Method 3 and Method 4 for gas analysis and moisture content, respectively; Method 1 for velocity traverses; and Method 2 for velocity and volumetric flow rate.

4. Coke burn-off rate shall be determined by the following formula:

$$R_c=0.2982\ Q_{RE}\ (\%CO_2=\%CO)+2.088\ Q_{RA} - 0.0994\ Q_{RE}\ [\%CO/2+\%CO_2+\%O_2]\ \text{(Metric Units) or}$$

$$R_c=0.0186\ Q_{RE}\ (\%CO_2+\%CO)+0.1303\ Q_{RA} - 0.0062\ Q_{RE}\ [\%CO/2+\%CO_2+\%O_2]\ \text{(English Units)}$$

where:

R_c is the coke burn-off rate, kg/hr (English units: lb/hr)

0.2982 is the metric units material balance factor divided by 100, kg-min/hr-m^3

0.0186 is the English units material balance factor divided by 100, lb-min/hr-ft^3

Q_{RE} is the fluid catalytic cracking unit catalyst regenerator exhaust gas flow rate before entering the emission control system, as determined by Method 2, dscm/min (English units: dscf/min)

$\%CO_2$ is the percent carbon dioxide by volume, dry basis, as determined by Method 3

%CO is the percent carbon monoxide by volume, dry basis, as determined by Method 3

$\%O_2$ is the percent oxygen by volume, dry basis, as determined by Method 3

2.088 is the metric units material balance factor divided by 100, kg-min/hr-m^3

0.1303 is the English units material balance factor divided by 100, lb-min/hr-ft^3

Q_{RA} is the air rate to fluid catalytic cracking unit catalyst regenerator, as determined from fluid catalytic cracking unit control room instrumentation, dscm/min (English units: dscf/min)

0.0994 is the metric units material balance factor divided by 100, kg-min/hr-m^3

0.0062 is the English units material balance factor divided by 100, lb-min/hr-ft^3

5. Particulate emissions shall be determined by the following equation:

$$R_E=(60\times10^{-6})Q_{RV}C_s \text{ (Metric Units)}$$

or

$$R_E=(8.57\times10^{-3})Q_{RV}C_s \text{ (English Units)}$$

where:

R_E is the particulate emission rate, kg/hr (English units: lb/hr)

60×10^{-6} is the metric units conversion factor, min-kg/hr-mg

8.57×10^{-3} is the English units conversion factor, min-lb/hr-gr

Q_{RV} is the volumetric flow rate of gases discharged into the atmosphere from the fluid catalytic cracking unit catalyst regenerator following the emission control system, as determined by Method 2, dscm/min (English units: dscf/min)

C_s is the particulate emission concentration discharged into the atmosphere, as determined by Method 5, mg/dscm (English units: gr/dscf)

6. For each run, emissions expressed in kg/1000 kg (English units: lb/1000 lb) of coke burn-off in the catalyst regenerator shall be determined by the following equation:

$R_s = 1000\ (R_E/R_c)$ (Metric or English Units)

where:

R_s is the particulate emission rate, kg/1000 kg (English units: lb/1000 lb) of coke burn-off in the fluid catalytic cracking unit catalyst regenerator

1000 is the conversion factor, kg to 1000 kg (English units: lb to 1000 lb)

R_E is the particulate emission rate, kg/hr (English units: lb/hr)

R_c is the coke burn-off rate, kg/hr (English units: lb/hr)

7. In those instances in which auxiliary liquid or solid fossil fuels are burned in an incinerator-waste heat boiler, the rate of particulate matter emissions permitted under sub. (3)(b) shall be determined. Auxiliary fuel heat input, expressed in millions of cal/hr (English units: millions of Btu/hr) shall be calculated for each run by fuel flow rate measurement and analysis of the liquid or solid auxiliary fossil fuels. For each run, the rate of particulate emissions permitted under sub. (3)(b) shall be calculated from the following equation:

$R_s = 1.0 + (0.18\ H/R_c)$ (Metric Units)

or

$R_s = 1.0 + (0.10\ H/R_c)$ (English Units)

where:

R_s is the allowable particulate emission rate, kg/1000 kg (English units: lb/1000 lb) of coke burn-off in the fluid catalytic cracking unit catalyst regenerator

1.0 is the emission standard, 1.0 kg/1000 kg (English units: 1.0 lb/1000 lb) of coke burn-off in the fluid catalytic cracking unit catalyst regenerator

0.18 is the metric units maximum allowable incremental rate of particulate emissions, g/million cal

0.10 is the English units maximum allowable incremental rate of particulate emissions, lb/million Btu

H is the heat input from solid or liquid fossil fuel, million cal/hr (English units: million Btu/hr)

R_c is the coke burn-off rate, kg/hr (English units: lb/hr)

(b) For the purpose of determining compliance with sub. (4), the integrated sample technique of Method 10 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used. The sample shall be extracted at a rate proportional to the gas velocity at a sampling point near the centroid of the duct. The sampling time may not be less than 60 minutes.

(c) For the purpose of determining compliance with sub. (5)(a)1., Method 11 shall be used to determine the concentration of H_2S and Method 6 shall be used to determine the concentration of SO_2. Both methods are set out in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

1. If Method 11 is used, the gases sampled shall be introduced into the sampling train at approximately atmospheric pressure. Where refinery fuel gas lines are operating at pressures substantially above atmosphere, this may be accomplished with a flow control valve. If the line pressure is high enough to operate the sampling train without a vacuum pump, the pump may be eliminated from the sampling train. The sample shall be drawn from a point near the centroid of the fuel gas line. The minimum sampling time shall be 10 minutes and the minimum sampling volume 0.01 dscm (0.35 dscf) for each sample. The arithmetic average of 2 samples of equal sampling time shall constitute one run. Samples shall be taken at approximately one-hour intervals. For most fuel gases, sample time exceeding 20 minutes may result in depletion of the collecting solution, although fuel gases containing low concentrations of hydrogen sulfide may necessitate sampling for longer periods of time.

2. If Method 6 is used, Method 1 shall be used for velocity traverses and Method 2 for determining velocity and volumetric flow rate. The sampling site for determining SO_2 concentration by Method 6 shall be the same as for determining volumetric flow rate by Method 2. The sampling point in the duct for determining SO_2 concentration by Method 6 shall be at the centroid of the cross section if the cross sectional area is less than 5 m^2 (54 ft^2) or at a point no closer to the walls than one meter (39 inches) if the cross sectional area is 5 m^2 or more and the centroid is more than one meter from the wall. The sample shall be extracted at a rate proportional to the gas velocity at the sampling point. The minimum sampling time shall be 10 minutes and the minimum sampling volume 0.01 dscm (0.35 dscf) for each sample. The arithmetic average of 2 samples of equal sampling time shall constitute one run. Samples shall be taken at approximately one-hour intervals.

(d) For the purpose of determining compliance with sub. (5)(a)2., Method 6 shall be used to determine the concentration of SO_2 and Method 15 shall be used to determine the concentration of H_2S and reduced sulfur compounds. Both Methods are set out in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

1. If Method 6 is used, the procedure outlined in par. (c)2. shall be followed except that each run shall span a minimum of 4 consecutive hours of continuous sampling. A number of separate samples may be taken for each run, provided the total sampling time of these samples adds up to a minimum of 4 consecutive hours. Where more than one sample is used, the average SO_2 concentration for the run shall be calculated as the time weighted average of the SO_2 concentration for each sample according to the formula:

$$C_R = \sum_{i=1}^{N} C_{si} \frac{t_{si}}{T}$$

where:

C_R is the SO_2 concentration for the run

N is the number of samples

C_{si} is the SO_2 concentration for sample i

t_{si} is the continuous sampling time of sample i

T is the total continuous sampling time of all N samples

2. If Method 15 is used, each run shall consist of 16 samples taken over a minimum of 3 hours. The sampling point shall be at the centroid of the cross section of the duct if the cross sectional areas is less than 5 m^2 (54 ft^2) or at a point no closer to the walls than one meter (39 inches) if the cross sectional area is 5 m^2 or more and the centroid is more than one meter from the wall. To insure minimum residence time for the sample inside the sample lines, the sampling rate shall be at least 3 liters/minute (0.1 ft^3/min). The SO_2 equivalent for each run shall be calculated as the arithmetic average of the SO_2 equivalent of each sample during the run. Reference Method 4 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine the moisture content of the gases. The sampling point for Method 4 shall be adjacent to the sampling point for Method 15. The sample shall be extracted at a rate proportional to the gas velocity at the sampling point. Each run shall span a minimum of 4 consecutive hours of continuous sampling. A number of separate samples may be taken for each run provided the total sampling time of these samples adds up to a minimum of 4 consecutive hours. Where more than one sample is used, the average moisture content for the run shall be calculated as the time weighted average of the moisture content of each sample according to the formula:

$$B_{wo} = \sum_{v=i}^{N} B_{si} \frac{t_{si}}{T}$$

where:

B_{wo} is the proportion by volume of water vapor in the gas stream for the run

N is the number of samples

B_{si} is the proportion by volume of water vapor in the gas stream for the sample i

t_{si} is the continuous sampling time for sample i

T is the total continuous sampling time of all N samples

NR 440.27 STANDARDS OF PERFORMANCE FOR STORAGE VESSELS FOR PETROLEUM LIQUIDS CONSTRUCTED AFTER JUNE 11, 1973 AND PRIOR TO MAY 19, 1978. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in par. (b), the affected facility to which this section applies is each storage vessel for petroleum liquids which has a storage capacity of greater than 151,416 liters (40,000 gallons).

(b) This section does not apply to storage vessels for petroleum or condensate stored, processed or treated, or stored, processed and treated at a drilling and production facility prior to custody transfer.

(c) Subject to the requirements of this section is any facility under par. (a) which:

1. Has a capacity greater than 151,416 liters (40,000 gallons), but not exceeding 246,052 liters (65,000 gallons), and commences construction or modification after March 8, 1974, and prior to May 19, 1978.

2. Has a capacity greater than 246,052 liters (65,000 gallons) and commences construction or modification after June 11, 1973, and prior to May 19, 1978.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature or pressure, or both, and remains liquid at standard conditions.

(b) "Custody transfer" means the transfer of produced petroleum or condensate, or both, after processing or treating, or both, in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

(c) "Drilling and production facility" means all drilling and servicing equipment, wells, flow lines, separators, equipment, gathering lines, and auxiliary nontransportation-related equipment used in the production of petroleum but does not include natural gasoline plants.

(d) "Floating roof" means a storage vessel cover consisting of a double deck, pontoon single deck, internal floating cover or covered floating roof, which rests upon and is supported by the petroleum liquid being contained, and is equipped with a closure seal or seals to close the space between the roof edge and tank wall.

(e) "Hydrocarbon" means any organic compound consisting predominantly of carbon and hydrogen.

(f) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(g) "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Nos. 2 through 6 fuel oils as specified in ASTM D396-78, gas turbine fuel oils Nos. 2-GT through 4-GT as specified in ASTM D2880-78, or diesel fuel oils Nos. 2-D and 4-D as specified in ASTM D975-78. These 3 ASTM methods are incorporated by reference in s. NR 440.17.

(h) "Petroleum refinery" means each facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking, extracting, or reforming of unfinished petroleum derivatives.

(i) "Reid vapor pressure" is the absolute vapor pressure of volatile crude oil and volatile non-viscous petroleum liquids, except liquified petroleum gases, as determined by ASTM D323-72, incorporated by reference in s. NR 440.17.

(j) "Storage vessel" means any tank, reservoir or container used for the storage of petroleum liquids, but does not include:

1. Pressure vessels which are designed to operate in excess of 15 pounds per square inch gauge without emissions to the atmosphere except under emergency conditions.

2. Subsurface caverns or porous rock reservoirs, or

3. Underground tanks if the total volume of petroleum liquids added to and taken from a tank annually does not exceed twice the volume of the tank.

(k) "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, Evaporation Loss from Floating Roof Tanks, Second Edition, February 1980, incorporated by reference in s. NR 440.17.

(i) "Vapor recovery system" means a vapor gathering system capable of collecting all hydrocarbon vapors and gases discharged from the storage vessel and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS (VOC). (a) The owner or operator of any storage vessel to which this section applies shall store petroleum liquids as follows:

1. If the true vapor pressure of the petroleum liquid, as stored, is equal to or greater than 78 mm Hg (1.5 psia) but not greater than 570 mm Hg (11.1 psia), the storage vessel shall be equipped with a floating roof, a vapor recovery system or their equivalents.

2. If the true vapor pressure of the petroleum liquid as stored is greater than 570 mm Hg (11.1 psia), the storage vessel shall be equipped with a vapor recovery system or its equivalent.

(b) [Reserved]

(4) MONITORING OF OPERATIONS. (a) Except as provided in par. (d), the owner or operator subject to this section shall maintain a record of the petroleum liquid stored, the period of storage, and the maximum true vapor pressure of that liquid during the respective storage period.

(b) Available data on the typical Reid vapor pressure and the maximum expected storage temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Bulletin 2517, incorporated by reference in s. NR 440.17, unless the department specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from one or more samples.

(c) The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa (2.0 psia) or whose physical properties preclude determination by the recommended method is to be determined from available data and recorded if the estimated true vapor pressure is greater than 6.9 kPa (1.0 psia).

(d) The following are exempt from the requirements of this subsection:

1. Each owner or operator of each affected facility which stores petroleum liquids with a Reid vapor pressure of less than 6.9 kPa (1.0 psia) provided the maximum true vapor pressure does not exceed 6.9 kPa (1.0 psia).

2. Each owner or operator of each affected facility equipped with a vapor recovery and return or disposal system in accordance with the requirements of sub. (3).

NR 440.28 STANDARDS OF PERFORMANCE FOR STORAGE VESSELS FOR PETROLEUM LIQUIDS CONSTRUCTED AFTER MAY 18, 1978. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in par. (b), the affected facility to which this section applies is each storage vessel for petroleum liquids which has a storage capacity greater than 151,416 liters (40,000 gallons) and for which construction is commenced after May 18, 1978.

(b) Each petroleum liquid storage vessel with a capacity of less than 1,589,873 liters (420,000 gallons) used for petroleum or condensate stored, processed, or treated prior to custody transfer is not an affected facility and, therefore, is exempt from the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meanings given them in s. NR 440.02.

(a) "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature or pressure, or both, and remains liquid at standard conditions.

(b) "Custody transfer" means the transfer of produced petroleum or condensate, or both, after processing or treating, or both, in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

(c) "Liquid-mounted seal" means a foam or liquid-filled primary seal mounted in contact with the liquid between the tank wall and the floating roof continuously around the circumference of the tank.

(d) "Metallic shoe seal" includes but is not limited to a metal sheet held vertically against the tank wall by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.

(e) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(f) "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Nos. 2 through 6 fuel oils as specified in ASTM D396-78, gas turbine fuel oils Nos. 2-GT through 4-GT as specified in ASTM D2880-78, or diesel fuel oils Nos. 2-D and 4-D as specified in ASTM D975-78. These 3 ASTM methods are incorporated by reference in s. NR 440.17.

(g) "Petroleum refinery" means each facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking, extracting or reforming of unfinished petroleum derivatives.

(h) "Reid vapor pressure" is the absolute vapor pressure of volatile crude oil and volatile non-viscous petroleum liquids, except liquified petroleum gases, as determined by ASTM D323-72, incorporated by reference in s. NR 440.17.

(i) "Storage vessel" means each tank, reservoir or container used for the storage of petroleum liquids, but does not include:

1. Pressure vessels which are designed to operate in excess of 204.9 kPa (15 psig) without emissions to the atmosphere except under emergency conditions.

2. Subsurface caverns or porous rock reservoirs, or

3. Underground tanks if the total volume of petroleum liquids added to and taken from the tank annually does not exceed twice the volume of the tank.

(j) "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid such as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, Evaporation Loss from Floating Roof Tanks, Second Edition, February 1980, incorporated by reference in s. NR 440.17.

(k) "Vapor-mounted seal" means a foam-filled primary seal mounted continuously around the circumference of the tank so there is an annular vapor space underneath the seal. The annular vapor space is bounded by the bottom of the primary seal, the tank wall, the liquid surface, and the floating roof.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS (VOC). (a) The owner or operator of each storage vessel to which this section applies which contains a petroleum liquid which, as stored, has a true vapor pressure equal to or greater than 10.3 kPa (1.5 psia) but not greater than 76.6 kPa (11.1 psia) shall equip the storage vessel with one of the following:

1. An external floating roof, consisting of a pontoon-type or double-deck-type cover that rests on the surface of the liquid contents and is equipped with a closure device between the tank wall and the roof edge. Except as provided in subpar. b.4), the closure device shall consist of 2 seals, one above the other. The lower seal is referred to as the primary seal and the upper seal is referred to as the secondary seal. The roof shall be floating on the liquid at all times (i.e., off the roof leg supports) except during initial fill and when the tank is completely emptied and subsequently refilled. The process of emptying and refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.

a. The primary seal shall be either a metallic shoe seal, a liquid-mounted seal, or a vapor-mounted seal. Each seal shall meet the following requirements:

1) The accumulated area of gaps between the tank wall and the metallic shoe seal or the liquid-mounted seal may not exceed 212 cm^2 per meter of tank diameter (10.0 in^2 per ft of tank diameter) and the width of any portion of any gap may not exceed 3.81 cm (1 1/2 in.).

2) The accumulated area of gaps between the tank wall and the vapor-mounted seal may not exceed 21.1 cm^2 per meter of tank diameter (1.0 in^2 per ft of tank diameter) and the width of any portion of any gap may not exceed 1.27 cm (1/2 in).

3) One end of the metallic shoe shall extend into the stored liquid and the other end shall extend a minimum vertical distance of 61 cm (24 in) above the stored liquid surface.

4) There may be no holes, tears or other openings in the shoe, seal fabric or seal envelope.

b. The secondary seal shall meet the following requirements:

1) The secondary seal shall be installed above the primary seal so that it completely covers the space between the roof edge and the tank wall except as provided in subpar. b.2).

2) The accumulated area of gaps between the tank wall and the secondary seal used in combination with a metallic shoe or liquid-mounted primary seal may not exceed 21.1 cm^2 per meter of tank diameter (1.0 in^2 per ft. of tank diameter) and the width of any portion of any gap may not exceed 1.27 cm (1/2 in). There may be no gaps between the tank wall and the secondary seal used in combination with a vapor-mounted primary seal.

3) There may be no holes, tears or other openings in the seal or seal fabric.

4) The owner or operator is exempted from the requirements for secondary seals and the secondary seal gap criteria when performing gap measurements or inspections of the primary seal.

c. Each opening in the roof except for automatic bleeder vents and rim space vents shall provide a projection below the liquid surface. Each opening in the roof except for automatic bleeder vents, rim space vents and leg sleeves shall be equipped with a cover, seal or lid which shall be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use or as described in subpar. d. Automatic bleeder vents shall be closed at all times when the roof is being floated off or is being landed on the roof leg supports. Rim vents shall be set to open when the roof is being floated off the roof legs supports or at the manufacturer's recommended setting.

d. Each emergency roof drain shall be provided with a slotted membrane fabric cover that covers at least 90% of the area of the opening.

2. A fixed roof with an internal floating type cover equipped with a continuous closure device between the tank wall and the cover edge. The cover shall be floating at all times (i.e., off the leg supports), except during initial fill and when the tank is completely emptied and subsequently refilled. The process of emptying and refilling when the cover is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible. Each opening in the cover except for automatic bleeder vents and the rim space vents shall provide a projection below the liquid surface. Each opening in the cover except for automatic bleeder vents, rim space vents, stub drains and leg sleeves shall be equipped with a cover, seal or lid which shall be maintained in a closed

position at all times (i.e., no visible gap) except when the device is in actual use. Automatic bleeder vents shall be closed at all times when the cover is floating except when the cover is being floated off or is being landed on the leg supports. Rim vents shall be set to open only when the cover is being floated off the leg supports or at the manufacturer's recommended setting.

3. A vapor recovery system which collects all VOC vapors and gases discharged from the storage vessel, and a vapor return or disposal system which is designed to process such VOC vapors and gases so as to reduce their emission to the atmosphere by at least 95% by weight.

4. A system equivalent to those described in subd. 1., 2. or 3. as provided in sub. (5).

(b) The owner or operator of each storage vessel to which this section applies which contains a petroleum liquid which, as stored, has a true vapor pressure greater than 76.6 kPa (11.1 psia), shall equip the storage vessel with a vapor recovery system which collects all VOC vapors and gases discharged from the storage vessel, and a vapor return or disposal system which is designed to process such VOC vapors and gases so as to reduce their emission to the atmosphere by at least 95% by weight.

(4) TESTING AND PROCEDURES. (a) Except as provided in s. NR 440.08(2), compliance with the standard prescribed in sub. (3) shall be determined as follows or in accordance with an equivalent procedure as provided in sub. (5).

1. The owner or operator of each storage vessel to which this section applies which has an external floating roof shall meet the following requirements:

a. Determine the gap areas and maximum gap widths between the primary seal and the tank wall, and the secondary seal and the tank wall according to the following frequency and furnish the department with a written report of the results within 60 days of performance of gas measurements:

1) For primary seals, gas measurements shall be performed within 60 days of the initial fill with petroleum liquid and at least once every 5 years thereafter. All primary seal inspections or gap measurements which require the removal or dislodging of the secondary seal shall be accomplished as rapidly as possible and the secondary seal shall be replaced as soon as possible.

2) For secondary seals, gap measurements shall be performed within 60 days of the initial fill with petroleum liquid and at least once every year thereafter.

3) If any storage vessel is out of service for a period of one year or more, subsequent refilling with petroleum liquid shall be considered initial fill for the purposes of subpar. a.1) and 2).

b. Determine gap widths in the primary and secondary seals individually by the following procedures:

1) Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports.

2) Measure seal gaps around the entire circumference of the tank in each place where a 1/8" diameter uniform probe passes freely (without forcing or binding against seal) between the seal and the tank wall and measure the circumferential distance of each such location.

3) The total surface area of each gap described in subpar. b.2) shall be determined by using probes of various widths to accurately measure the actual distance from the tank wall to the seal and multiplying each such width by its respective circumferential distance.

c. Add the gap surface area of each gap location for the primary seal and the secondary seal individually. Divide the sum for each seal by the nominal diameter of the tank and compare each ratio to the appropriate ratio in the standard in sub. (3)(a)1.a. and b.

d. Provide the department 30 days prior notice of the gap measurement to afford it the opportunity to have an observer present.

2. The owner or operator of each storage vessel to which this section applies which has a vapor recovery and return or disposal system shall provide the following information to the department on or before the date on which construction of the storage vessel commences:

a. Emission data, if available, for a similar vapor recovery and return or disposal system used on the same type of storage vessel, which can be used to determine the efficiency of the system. A complete description of the emission measurement method used shall be included.

b. The manufacturer's design specifications and estimated emission reduction capability of the system.

c. The operation and maintenance plan for the system.

d. Any other information which will be useful to the department in evaluating the effectiveness of the system in reducing VOC emissions.

(b) [Reserved]

(5) EQUIVALENT EQUIPMENT AND PROCEDURES. (a) Upon written application from an owner or operator and after notice and opportunity for public hearing, the department may approve the use of equipment or procedures, or both, which have been demonstrated to its satisfaction to be equivalent in terms of reduced VOC emissions to the atmosphere to the degree prescribed for compliance with specific paragraphs of this section.

(b) The owner or operator shall provide the following information in the application for determination of equivalency:

1. Emission data, if available, which can be used to determine the effectiveness of the equipment or procedures in reducing VOC emissions from the storage vessel. A complete description of the emission measurement method used shall be included.

2. The manufacturer's design specifications and estimated emission reduction capability of the equipment.

3. The operation and maintenance plan for the equipment.

4. Any other information which will be useful to the department in evaluating the effectiveness of the equipment or procedures in reducing VOC emissions.

(c) The primary vapor-mounted seal in the "Volume-Maximizing Seal" manufactured by R.F.I. Services Corporation is approved as equivalent to the vapor-mounted seal required by sub. (3)(a)1.a. and shall meet the gap criteria specified in sub. (3)(a)1.a.2). There may be no gaps between the tank wall and any secondary seal used in conjunction with the primary seal in the "Volume-Maximizing Seal."

(6) MONITORING OF OPERATIONS. (a) Except as provided in par. (d), the owner or operator subject to this section shall maintain a record of the petroleum liquid stored, the period of storage, and the maximum true vapor pressure of that liquid during the respective storage period.

(b) Available data on the typical Reid vapor pressure and the maximum expected storage temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Bulletin 2517, incorporated by reference in s. NR 440.17, unless the department specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from samples.

(c) The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa (2.0 psia) or whose physical properties preclude determination by the recommended method shall be determined from available data and recorded if the estimated true vapor pressure is greater than 6.9 kPa (1.0 psia).

(d) The following are exempt from the requirements of this subsection:

1. Each owner or operator of each storage vessel storing a petroleum liquid with a Reid vapor pressure of less than 6.9 kPa (1.0 psia) provided the maximum true vapor pressure does not exceed 6.9 kPa (1.0 psia).

2. Each owner or operator of each storage vessel equipped with a vapor recovery and return or disposal system in accordance with the requirements of sub. (3)(a)3. and (b).

<u>NR 440.29 STANDARDS OF PERFORMANCE FOR SECONDARY LEAD SMELTERS.</u> (1) APPLICABILITY AND DESIGNATIONS OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in secondary lead smelters: pot furnaces of more than 250 kg (550 lb) charging capacity, blast (cupola) furnaces and reverberatory furnaces.

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Lead" means elemental lead or alloys in which the predominant component is lead.

(b) "Reverberatory furnace" includes the following types of reverberatory furnaces: stationary, rotating, rocking and tilting.

(c) "Secondary lead smelter" means any facility producing lead from a leadbearing scrap material by smelting to the metallic form.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from a blast (cupola) or reverberatory furnace any gases which:

1. Contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

2. Exhibit 20% opacity or greater.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any pot furnace any gases which exhibit 10% opacity or greater.

(4) TEST METHODS AND PROCEDURES. (a) The reference methods of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in sub. (3) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.9 dscm/hr (0.53 dscf/min) except that shorter sampling times, when necesitated by process variables or other factors, may be approved by the department. Particulate sampling shall be conducted during representative periods of furnace operation, including charging and tapping.

NR 440.30 STANDARDS OF PERFORMANCE FOR SECONDARY BRASS AND BRONZE INGOT PRODUCTION PLANTS.

(1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in secondary brass or bronze ingot production plants: reverberatory and electric furnaces of 1,000 kg (2,205 lb) or greater production capacity and blast (cupola) furnaces of 250 kg/hr (550 lb/hr) or greater production capacity.

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Blast furnace" means any furnace used to recover metal from slag.

(b) "Brass or bronze" means any metal alloy containing copper as its predominant constituent, and lesser amounts of zinc, tin, lead or other metals.

(c) "Electric furnace" means any furnace which uses electricity to produce over 50% of the heat required in the production of refined brass or bronze.

(d) "Reverberatory furnace" includes the following types of reverberatory furnaces: stationary, rotating, rocking and tilting.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from a reverberatory furnace any gases which:

1. Contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

2. Exhibit 20% opacity or greater.

(b) On and after the date on which the performance test required to be conducted by s. NR. 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any blast (cupola) or electric furnace any gases which exhibit 10% opacity or greater.

(4) TEST METHODS AND PROCEDURES. (a) The reference methods of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in sub. (3) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 120 minutes and the sampling rate shall be at least 0.9 dscm/hr (0.53 dscf/min) except that shorter sampling times, when necessitated by process variables or other factors, may be approved by the department. Particulate matter sampling shall be conducted during representative periods of charging and refining, but not during pouring of the heat.

<u>NR 440.31 STANDARDS OF PERFORMANCE FOR IRON AND STEEL PLANTS.</u> (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each basic oxygen process furnace.

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "'Basic oxygen process furnace' or 'BOPF'" means any furnace producing steel by charging scrap steel, hot metal and flux materials into a vessel and introducing a high volume of an oxygen-rich gas.

(b) "Startup" means the setting into operation for the first steel production cycle of a relined BOPF or a BOPF which has been out of production for a minimum continuous time period of 8 hours, notwithstanding s. NR 440.02(33).

(c) "Steel production cycle" means the operations required to produce each batch of steel and includes the following major functions: scrap charging, preheating (when used), hot metal charging, primary oxygen blowing, additional oxygen blowing (when used) and tapping.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any affected facility any gases which:

1. Contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

2. Exit from a control device and exhibit 10% opacity or greater, except that an opacity of greater than 10% but less than 20% may occur once per steel production cycle.

(b) [Reserved]

(4) MONITORING OF OPERATIONS. (a) The owner or operator of an affected facility shall maintain a single time-measuring instrument which shall be used in recording daily the time and duration of each steel production cycle, and the time and duration of any diversion of exhaust gases from the main stack servicing the BOPF.

(b) The owner or operator of any affected facility that uses venturi scrubber emission control equipment shall install, calibrate, maintain, and continuously operate monitoring devices as follows:

1. A monitoring device for the continuous measurement of the pressure loss through the venturi constriction of the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within plus or minus 250 Pa (plus or minus 1 inch water).

2. A monitoring device for the continuous measurement of the water supply pressure to the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within plus or minus 5% of the design water supply pressure. The monitoring device's pressure sensor or pressure tap shall be located close to the water discharge point. The department may approve alternative locations for the pressure sensor or tap.

3. All monitoring devices shall be synchronized each day with the time-measuring instrument used under par. (a). The chart recorder error directly after synchronization may not exceed 0.08 cm (1/32 inch).

4. All monitoring devices shall use chart recorders which are operated at a minimum chart speed of 3.8 cm/hr (1.5 in/hr).

5. All monitoring devices shall be recalibrated annually, and at other times as the department may require, in accordance with the procedures under s. NR 440.13(2)(c).

(c) Any owner or operator subject to requirements under par. (b) shall report for each calendar quarter all measurements over any 3-hour period that average more than 10% below the average levels maintained during the most recent performance test conducted under s. NR 440.08 in which the affected facility demonstrated compliance with the standard under sub. (3)(a)1. The accuracy of the respective measurements, not to exceed the values specified in par. (b)1. and 2., may be taken into consideration when determining the measurement results that must be reported.

(5) TEST METHODS AND PROCEDURES. (a) The reference methods of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in sub. (3) as follows:

1. Method 5 for concentration of particulate matter and associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for volumetric flow rate, and

4. Method 3 for gas analysis.

5. Method 9 for visible emissions. For the purpose of this section, opacity observations taken at 15-second intervals immediately before and after a diversion of exhaust gases from the stack may be considered to be consecutive for the purpose of computing an average opacity for a 6-minute period. Observations taken during a diversion may not be used in determining compliance with the opacity standard.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling for each run shall continue for an integral number of cycles with total duration of at least 60 minutes. The sampling rate shall be at least 0.9 dscm/hr (0.53 dscf/min) except that shorter sampling times, when necessitated by process variables or other factors, may be approved by the department. A cycle shall start at the beginning of either the scrap preheat or the oxygen blow and shall terminate immediately prior to tapping.

(c) Sampling of flue gases during each steel production cycle shall be discontinued whenever all flue gases are diverted from the stack and shall be resumed after each diversion period.

NR 440.32 STANDARDS OF PERFORMANCE FOR SEWAGE TREATMENT PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility is each incinerator that combusts wastes containing more than 10% sewage sludge (dry basis) produced by municipal sewage treatment plants, or each incinerator that charges more than 1000 kg (2205 lb) per day municipal sewage sludge (dry basis).

(b) Any facility under par. (a) that commences construction or modification after June 11, 1973, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms have the meaning given them in s. NR 440.02.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator of any sewage sludge incinerator subject to the provisions of this section may discharge or cause the discharge into the atmosphere of:

1. Particulate matter at a rate in excess of 0.65 g/kr dry sludge input (1.30 lb/ton dry sludge input).

2. Any gases which exhibit 20% opacity or greater.

(b) [Reserved]

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any sludge incinerator subject to the provisions of this section shall:

1. Install, calibrate, maintain and operate a flow measuring device which can be used to determine either the mass or volume of sludge charged to the incinerator. The flow measuring device shall have an accuracy of plus or minus 5% over its operating range.

2. Provide access to the sludge charged so that a well-mixed representative grab sample of the sludge can be obtained.

3. Install, calibrate, maintain and operate a weighing device for determining the mass of any municipal solid waste charged to the incinerator when sewage sludge and municipal solid waste are incinerated together. The weighing device shall have an accuracy of plus or minus 5% over its operating range.

(b) [Reserved]

(5) TEST METHOD AND PROCEDURES. (a) The reference methods of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in sub. (3) as follows:

1. Method 5 for concentration of particulate matter and associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.015 dscm/min (0.53 dscf/min), except that shorter sampling times, when necessitated by process variables or other factors may be approved by the department.

(c) Dry sludge charging rate shall be determined as follows:

1. Determine the mass (S_m) or volume (S_V) of sludge charged to the incinerator during each run using a flow measuring device meeting the requirements of sub. (4)(a)1. If total input during a run is measured by a flow measuring device, such readings shall be used. Otherwise, record the flow measuring device readings at 5-minute intervals during a run. Determine the quantity charged during each interval by averaging the flow rates at the beginning and end of the interval and then multiplying the average for each interval by the time of each interval. Then add the quantity for each interval to determine the total quantity charged during the entire run, (S_m) or (S_V).

2. Collect samples of the sludge charged to the incinerator in nonporous collecting jars at the beginning of each run and at approximately 1-hour intervals thereafter until the test ends, and determine for each sample the dry sludge content (total solids residue) in accordance with "224 G. Method for Solid and Semisolid Samples," incorporated by reference in s. NR 440.17 published in Standard Methods for the Examination of Water and Wastewater, Thirteenth Edition, American Public Health Association, Inc., New York, N.Y., 1971, pp. 539-41, except that:

a. Evaporating dishes shall be ignited to at least 103°C rather than the 550°C specified in step 3(a)(1).

b. Determination of volatile residue, step 3(b), may be deleted.

c. The quantity of dry sludge per unit sludge charged shall be determined in terms of either R_{DV} (metric units: mg dry sludge/liter sludge charged or English units: lb/ft^3) or R_{DM} (metric units: mg dry sludge/mg sludge charged or English units: lb/lb).

3. Determine the quantity of dry sludge per unit sludge charged in terms of either R_{DV} or R_{DM}.

a. If the volume of sludge charged is used:

$$S_D=(60\times 10^{-3})(R_{DV}S_V/T)\text{(Metric Units) or}$$

$$S_D=(8.021)(R_{DV}S_V/T)\text{(English Units)}$$

where:

S_D is the average dry sludge charging rate during the run, kg/hr (English units: lb/hr)

R_{DV} is the average quantity of dry sludge per unit volume of sludge charged to the incinerator, mg/l (English units: lb/ft^3)

S_V is the sludge charged to the incinerator during the run, m^3 (English units: gal)

T is the duration of run, min (English units: min)

$60x10^{-3}$ is the metric units conversion factor, $l\text{-}kg\text{-}min/m^3\text{-}min\text{-}hr$

8.021 is the English units conversion factor, ft^3-min/gal-hr

b. If the mass of sludge charged is used:

$$S_D=(60)(R_{DM}S_M/T)\text{(Metric or English Units)}$$

where:

S_D is the average dry sludge charging rate during the run, kg/hr (English units: lb/hr)

R_{DM} is the average ratio of quantity of dry sludge to quantity of sludge charged to the incinerator, mg/mg (English unit: lb/lb)

S_M is the sludge charged during the run, kg (English units: lb)

T is the duration of run, min (Metric or English units)

60 is the conversion factor, min/hr (Metric or English units)

(d) Particulate emission rate shall be determined by:

$$C_{aw}=C_sQ_s \text{ (Metric or English Units)}$$

where:

C_{aw} is the particulate matter mass emissions, mg/hr (English units: lb/hr)

C_s is the particulate matter concentration, mg/m^3 (English units: lb/dscf)

Q_s is the volumetric stack gas flow rate, dscm/hr (English units: dscf/hr). Q_s and C_s shall be determined using Methods 2 and 5, respectively.

(e) Compliance with sub. (3)(a) shall be determined as follows:

$C_{ds}=(10^{-3})(C_{aw}/S_D)$(Metric Units) or
$C_{ds}=(2000)(C_{aw}/S_D)$(English Units)

where:

C_{ds} is the particulate emission discharge, g/kg dry sludge (English units: lb/ton dry sludge)

10^{-3} is the Metric conversion factor, g/mg

2000 is the English conversion factor, lb/ton.

NR 440.33 STANDARDS OF PERFORMANCE FOR PRIMARY COPPER SMELTERS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in primary copper smelters: dryer, roaster, smelting furnace, and copper converter.

(b) Any facility under par. (a) that commences construction or modifications after October 16, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Calcine" means the solid materials produced by a roaster.

(b) "Copper converter" means any vessel to which copper matte is charged and oxidized to copper.

(c) "Dryer" means any facility in which a copper sulfide ore concentrate charge is heated in the presence of air to eliminate a portion of the moisture from the charge, provided less than 5% of the sulfur contained in the charge is eliminated in the facility.

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

(e) "High level of volatile impurities" means a total smelter charge containing more than 0.2 weight percent arsenic, 0.1 weight percent antimony, 4.5 weight percent lead or 5.5 weight percent zinc, on a dry basis.

(f) "Primary copper smelter" means any installation or any intermediate process engaged in the production of copper from copper sulfide ore concentrates through the use of pyrometallurgical techniques.

(g) "Reverberatory smelting furnace" means any vessel in which the smelting of copper sulfide ore concentrates or calcines is performed and in which the heat necessary for smelting is provided primarily by combustion of fossil fuel.

(h) "Roaster" means any facility in which a copper sulfide ore concentrate charge is heated in the presence of air to eliminate a significant portion (5% or more) of the sulfur contained in the charge.

(i) "Smelting" means processing techniques for the melting of a copper sulfide ore concentrate or calcine charge leading to the formation of separate layers of molten slag, molten copper, or copper matte, or all 3.

(j) "Smelting furnace" means any vessel in which the smelting of copper sulfide ore concentrate or calcines is performed and in which the heat necessary for smelting is provided by an electric current, rapid oxidation of a portion of the sulfur contained in the concentrate as it passes through an oxidizing atmosphere, or the combustion of a fossil fuel.

(k) "Sulfuric acid plant" means any facility producing sulfuric acid by the contact process.

(l) "Total smelter charge" means the weight (dry basis) of all copper sulfide ore concentrates processed at a primary copper smelter, plus the weight of all other solid materials introduced into the roasters and smelting furnaces at a primary copper smelter, except calcine, over a one-month period.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any dryer any gases which contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

(b) [Reserved]

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any roaster, smelting furnace or copper converter any gases which contain sulfur dioxide in excess of 0.065% by volume, except as provided in pars. (b) and (c).

(b) Reverberatory smelting furnaces are exempt from par. (a) during periods when the total smelter charge at the primary copper smelter contains a high level of volatile impurities.

(c) A change in the fuel combusted in a reverberatory smelting furnace may not be considered a modification under this chapter.

(5) STANDARD FOR VISIBLE EMISSIONS. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any dryer any visible emissions which exhibit greater than 20% opacity.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility that uses a sulfuric acid plant to comply with the standard set forth in sub. (4), any visible emissions which exhibit greater than 20% opacity.

(6) MONITORING OF OPERATIONS. (a) The owner or operator of any primary copper smelter subject to sub. (4)(b) shall keep a monthly record of the total smelter charge and the weight percent (dry basis) of arsenic, antimony, lead and zinc contained in this charge. The analytical methods and procedures employed to determine the weight of the total smelter charge and the weight percent of arsenic, antimony, lead and zinc shall be approved by the department and shall be accurate to within plus or minus 10%.

(b) The owner or operator of any primary copper smelter subject to the provisions of this section shall install and operate:

1. A continuous monitoring system to monitor and record the opacity of gases discharged into the atmosphere from any dryer. The span of this system shall be set at 80 to 100 percent opacity.

2. A continuous monitoring system to monitor and record sulfur dioxide emissions discharged into the atmosphere from any roaster, smelting furnace or copper converter subject to sub. (4)(a). The span of this system shall be set at a sulfur dioxide concentration of 0.20% by volume.

a. The continuous monitoring system performance evaluation required under s. NR 440.13(3) shall be completed prior to the initial performance test required under s. NR 440.08. During the performance evaluation, the span of the continuous monitoring system may be set at a sulfur dioxide concentration of 0.15% by volume if necessary to maintain the system output between 20% and 90% of full scale. Upon completion of the continuous monitoring system performance evaluation, the span of the continuous monitoring system shall be set at a sulfur dioxide concentration of 0.20% by volume.

b. For the purpose of the continuous monitoring system performance evaluation required under s. NR 440.13(3), the reference method referred to under the Field Test for Accuracy (Relative) in Performance Specification 2 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17 shall be Reference Method 6 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference - in s. NR 440.17. For the performance evaluation, each concentration measurement shall be of one hour duration. The pollutant gas used to prepare the calibration gas mixtures required under Performance Specification 2 of Appendix B and for calibration checks under s. NR 440.13(4) shall be sulfur dioxide.

(c) Six-hour average sulfur dioxide concentrations shall be calculated and recorded daily for the 4 consecutive 6-hour periods of each operating day. Each 6-hour average shall be determined as the arithmetic mean of the appropriate 6 contiguous one-hour average sulfur dioxide concentrations provided by the continuous monitoring system installed under par. (b).

(d) For the purpose of reports required under s. NR 440.07(3), periods of excess emissions that shall be reported are defined as follows:

1. 'Opacity'. Any 6-minute period during which the average opacity, as measured by the continuous monitoring system installed under par. (b), exceeds the standard under sub. (5)(a).

2. 'Sulfur dioxide'. All 6-hour periods during which the average emissions of sulfur dioxide, as measured by the continuous monitoring system installed under sub. (4), exceed the level of the standard. The department shall not consider emissions in excess of the level of the standard for less than or equal to 1.5% of the 6-hour periods during the quarter as indicative of a potential

violation of s. NR 440.11(4), provided the affected facility, including air pollution control equipment, is maintained and operated in a manner consistent with good air pollution control practice for minimizing emissions during these periods. Emissions in excess of the level of the standard during periods of startup, shutdown and malfunction may not to be included within the 1.5%.

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in subs. (3), (4) and (5) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content.

2. Sulfur dioxide concentrations shall be determined using the continuous monitoring system installed in accordance with sub. (6)(b). One 6-hour average period shall constitute one run. The monitoring system drift during any run may not exceed 2% of span.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, Method 1 shall be used for selecting the sampling site and the number of traverse points, Method 2 for determine velocity and volumetric flow rate and Method 3 for determining the gas analysis. 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 times or volumes, when necessitated by process variables or other factors, may be approved by the department.

<u>NR 440.34 STANDARDS OF PERFORMANCE FOR PRIMARY ZINC SMELTERS.</u> (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in primary zinc smelters: roaster and sintering machine.

(b) Any facility under par. (a) that commences construction or modification after October 16, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Primary zinc smelter" means any installation engaged in the production, or any intermediate process in the production, of zinc or zinc oxide from zinc sulfide ore concentrates through the use of pyrometallurgical techniques.

(b) "Roaster" means any facility in which a zinc sulfide ore concentrate charge is heated in the presence of air to eliminate a significant portion (more than 10%) of the sulfur contained in the charge.

(c) "Sintering machine" means any furnace in which calcines are heated in the presence of air to agglomerate the calcines into a hard porous mass called "sinter."

(d) "Sulfuric acid plant" means any facility producing sulfuric acid by the contact process.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any sintering machine any gases which contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

(b) [Reserved]

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any roaster any gases which contain sulfur dioxide in excess of 0.065% by volume.

(b) Any sintering machine which eliminates more than 10% of the sulfur initially contained in the zinc sulfide ore concentrates will be considered as a roaster under par. (a).

(4) STANDARD FOR VISIBLE EMISSIONS. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any sintering machine any visible emissions which exhibit greater than 20% opacity.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility that uses a sulfuric acid plant to comply with the standard set forth in sub. (4), any visible emissions which exhibit greater than 20% opacity.

(6) MONITORING OF OPERATIONS. (a) The owner or operator of any primary zinc smelter subject to the provisions of this section shall install and operate:

1. A continuous monitoring system to monitor and record the opacity of gases discharged into the atmosphere from any sintering machine. The span of this system shall be set at 80 to 100 percent opacity.

2. A continuous monitoring system to monitor and record sulfur dioxide emissions discharged into the atmosphere from any roaster subject to sub. (4). The span of this system shall be set at a sulfur dioxide concentration of 0.20% by volume.

a. The continuous monitoring system performance evaluation required under s. NR 440.13(3) shall be completed prior to the initial performance test required under s. NR 440.08. During the performance evaluation, the span of the continuous monitoring system may be set at a sulfur dioxide concentration of 0.15% by volume if necessary to maintain the system output between 20% and 90% of full scale. Upon completion of the continuous monitoring system performance evaluation, the span of the continuous monitoring system shall be set at a sulfur dioxide concentration of 0.20% by volume.

(b) For the purpose of the continuous monitoring system performance evaluation required under s. NR 440.13(3), the reference method referred to under the Field Test for Accuracy (Relative) in Performance Specification 2 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17, shall be Reference Method 6 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17. For the performance evaluation, each concentration measurement shall be of one hour duration. The pollutant gas used to prepare the calibration gas mixtures required under Performance Specification 2 of Appendix B and for calibration checks under s. NR 440.13(4) shall be sulfur dioxide.

(b) Two-hour average sulfur dioxide concentrations shall be calculated and recorded daily for the 12 consecutive 2-hour periods of each operating day. Each 2-hour average shall be determined as the arithmetic mean of the appropriate 2 contiguous one-hour average sulfur dioxide concentrations provided by the continuous monitoring system installed under par. (a).

(c) For the purpose of reports required under s. NR 440.07(3), periods of excess emissions that shall be reported are defined as follows:

1. 'Opacity'. Any 6-minute period during which the average opacity, as measured by the continuous monitoring system installed under par. (a) exceeds the standard under sub. (5).

2. 'Sulfur dioxide'. Any 2-hour period, as described in par. (b), during which the average emission of sulfur dioxide, as measured by continuous monitoring system installed under par. (a) exceeds the standard under sub. (4).

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in subs. (3), (4) and (5) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content.

2. Sulfur dioxide concentrations shall be determined using the continuous monitoring system installed in accordance with sub. (6)(a). One 2-hour average period shall constitute one run.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, Method 1 shall be used for selecting the sampling site and the number of traverse points, Method 2 for determining velocity and volumetric flow rate and Method 3 for determining the gas analysis. 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 times or volumes, when necessitated by process variables or other factors, may be approved by the department.

NR 440.35 STANDARDS OF PERFORMANCE FOR PRIMARY LEAD SMELTERS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in primary lead smelters: sintering machine, sintering machine discharge end, blast furnace, dross reverberatory furnace, electric smelting furnace and converter.

(b) Any facility under par. (a) that commences construction or modification after October 16, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Blast furnace" means any reduction furnace to which sinter is charged and which forms separate layers of molten slag and lead bullion.

(b) "Converter" means any vessel which lead concentrate or bullion is charged and refined.

(c) "Dross reverberatory furnace" means any furnace used for the removal or refining of impurities from lead bullion.

(d) "Electric smelting furnace" means any furnace in which the heat necessary for smelting of the lead sulfide ore concentrate charge is generated by passing an electric current through a portion of the molten mass in the furnace.

(e) "Primary lead smelter" means any installation or any intermediate process engaged in the production of lead from lead sulfide ore concentrates through the use of pyrometallurgical techniques.

(f) "Sinter bed" means the lead sulfide ore concentrate charge within a sintering machine.

(g) "Sintering machine" means any furnace in which a lead sulfide ore concentrate charge is heated in the presence of air to eliminate sulfur contained in the charge and to agglomerate the charge into a hard porous mass called "sinter."

(h) "Sintering machine discharge end" means any apparatus which receives sinter as it is discharged from the conveying grate of a sintering machine.

(i) "Sulfuric acid plant" means any facility producing sulfuric acid by the contact process.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any blast furnace, dross reverberatory furnace or sintering machine discharge end any gases which contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf).

(b) [Reserved]

(4) STANDARD FOR SULFUR DIOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any sintering machine, electric smelting furnace, or converter gases which contain sulfur dioxide in excess of 0.065% by volume.

(b) [Reserved]

(5) STANDARD FOR VISIBLE EMISSIONS. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any blast furnace, dross reverberatory furnace, or sintering machine discharge end any visible emissions which exhibit greater than 20% opacity.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility that uses a sulfuric acid plant to comply with the standard set forth in sub. (4), any visible emissions which exhibit greater than 20% opacity.

(6) MONITORING OF OPERATIONS. (a) The owner or operator of any primary lead smelter subject to the provisions of this section shall install and operate:

1. A continuous monitoring system to monitor and record the opacity of gases discharged into the atmosphere from any blast furnace, dross reverberatory furnace, or sintering machine discharge end. The span of this system shall be set at 80 to 100 percent opacity.

2. A continuous monitoring system to monitor and record sulfur dioxide emissions discharged into the atmosphere from any sintering machine, electric furnace or converter subject to sub. (4). The span of this system shall be set at a sulfur dioxide concentration of 0.20% by volume.

a. The continuous monitoring system performance evaluation required under s. NR 440.13(3) shall be completed prior to the initial performance test required under s. NR 440.08. During the performance evaluation, the span of the continuous monitoring system may be set at a sulfur dioxide concentration of 0.15% by volume if necessary to maintain the system output between 20% and 90% of full scale. Upon completion of the continuous monitoring system performance evaluation, the span of the continuous monitoring system shall be set at a sulfur dioxide concentration of 0.20% by volume.

b. For the purpose of the continuous monitoring system performance evaluation required under s. NR 440.13(3), the reference method referred to under the Field Test for Accuracy (Relative) in Performance Specification 2 of 40 C.F.R. pt. 60, Appendix B, incorporated by reference in s. NR 440.17 shall be Reference Method 6 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference - in s. NR 440.17. For the performance evaluation, each concentration measurement shall be of one hour duration. The pollutant gases used to prepare the calibration gas mixtures required under Performance Specification 2 of Appendix B, and for calibration checks under s. NR 440.13(4), shall be sulfur dioxide.

(b) Two-hour average sulfur dioxide concentrations shall be calculated and recorded daily for the 12 consecutive 2-hour periods of each operating day. Each 2-hour average shall be determined as the arithmetic mean of the appropriate 2 contiguous one-hour average sulfur dioxide concentrations provided by the continuous monitoring system installed under par. (a).

(c) For the purpose of reports required under s. NR 440.07(3), periods of excess emissions that shall be reported are defined as follows:

1. 'Opacity'. Any 6-minute period during which the average opacity, as measured by the continuous monitoring system installed under par. (a), exceeds the standard under sub. (5)(a).

2. 'Sulfur dioxide'. Any 2-hour period, as described in par. (b), during which the average emissions of sulfur dioxide, as measured by the continuous monitoring system installed under par. (a), exceeds the standard under sub. (4).

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in subs. (3), (4) and (5) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content.

2. Sulfur dioxide concentrations shall be determined using the continuous monitoring system installed in accordance with sub. (6)(a). One 2-hour average period shall constitute one run.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, Method 1 shall be used for selecting the sampling site and the number of traverse points, Method 2 for determining velocity and volumetric flow rate and Method 3 for determining the gas analysis. 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 times or volumes, when necessitated by process variables or other factors, may be approved by the department.

NR 440.36 STANDARDS OF PERFORMANCE FOR PRIMARY ALUMINUM REDUCTION PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facilities in primary aluminum reduction plants to which this section applies are potroom groups and anode bake plants.

(b) Any facility under par. (a) that commences construction or modification after October 23, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Aluminum equivalent" means an amount of aluminum which can be produced from a Mg of anodes produced by an anode bake plant as determined by sub. (6)(g).

(b) "Anode bake plant" means a facility which produces carbon anodes for use in a primary aluminum reduction plant.

(c) "Potroom" means a building unit which houses a group of electrolytic cells in which aluminum is produced.

(d) "Potroom group" means an uncontrolled potroom, a potroom which is controlled individually, or a group of potrooms or potroom segments ducted to a common control system.

(e) "Primary aluminum reduction plant" means any facility manufacturing aluminum by electrolytic reduction.

(f) "Primary control system" means an air pollution control system designed to remove gaseous and particulate flourides from exhaust gases which are captured at the cell.

(g) "Roof monitor" means that portion of the roof of a potroom where gases not captured at the cell exit from the potroom.

(h) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (6) or by equivalent or alternative methods.

(3) STANDARDS FOR FLUORIDES. (a) On and after the date on which the initial performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases containing total fluorides, as measured according to s. NR 440.08, in excess of:

1. 1.0 kg/Mg (2.0 lb/ton) of aluminum produced for potroom groups at Soderberg plants, except that emissions between 1.0 kg/Mg and 1.3 kg/Mg (2.6 lb/ton) shall be considered in compliance if the owner or operator demonstrates that exemplary operation and maintenance procedures were used with respect to the emission control system and that proper control equipment was operating at the affected facility during the performance tests;

2. 0.95 kg/Mg (1.9 lb/ton) of aluminum produced for potroom groups at prebake plants, except that emissions between 0.95 kg/Mg and 1.25 kg/Mg (2.5 lb/ton) shall be considered in compliance if the owner or operator demonstrates that exemplary operation and maintenance procedures were used with respect to the emission control system and that proper control equipment was operating at the affected facility during the performance test; and

3. 0.05 kg/Mg (0.1 lb/ton) of aluminum equivalent for anode bake plants.

(b) Within 30 days of any performance test which reveals emissions which fall between the 1.0 kg/Mg and 1.3 kg/Mg levels in par.(a)1. or between to 0.95 kg/Mg and 1.25 kg/Mg levels in par.(a)2., the owner or operator shall submit a report to the department indicating whether all necessary control devices were on-line and operating properly during the performance test, describing the operating and maintenance procedures followed, and setting forth any explanation for the excess emissions.

(4) STANDARD FOR VISIBLE EMISSIONS. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any potroom group any gases which exhibit 10% opacity or greater, or

2. From any anode bake plant any gases which exhibit 20% opacity or greater.

(5) MONITORING OF OPERATIONS. (a) The owner or operator of any affected facility subject to the provisions of this section shall install, calibrate, maintain and operate monitoring devices which can be used to determine daily the weight of aluminum and anode produced. The weighing devices shall have an accuracy of plus or minus 5% over their operating range.

(b) The owner or operator of any affected facility shall maintain a record of daily production rates of aluminum and anodes, raw material feed rates, and cell or potline voltages.

(6) TEST METHODS AND PROCEDURES. (a) Following the initial performance test as required under s. NR 440.08(1), an owner or operator shall conduct a performance test at least once each month during the life of the affected facility, except when malfunctions prevent representative sampling, as provided under s. NR 440.08(3). The owner or operator shall give the department at least 15 days advance notice of each test. The department may require additional testing under s. NR 154.06.

(b) An owner or operator may petition the department to establish an alternate testing requirement that requires testing less frequently than once each month for a primary control system or an anode bake plant. If the owner or operator shows that emissions from the primary control system or the anode bake plant have low variability during day-to-day operations, the department may establish such an alternative testing requirement. The alternative testing requirement shall include a testing schedule and, in the case of a primary control system, the method to be used to determine primary control system emissions for the purpose of performance tests.

(c) Except as provided in s. NR 440.08(2), reference methods specified in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine compliance with the standard prescribed in sub. (3) as follows:

1. For sampling emissions from stacks:

a. Method 1 for sample and velocity traverses,

b. Method 2 for velocity and volumetric flow rate,

c. Method 3 for gas analysis, and

d. Method 13A or 13B for the concentration of total fluorides and the associated moisture content.

2. For sampling emissions from roof monitors not employing stacks or pollutant collection systems:

a. Method 1 for sample and velocity traverses,

b. Method 2 and Method 14 for velocity and volumetric flow rate,

c. Method 3 for gas analysis, and

d. Method 14 for the concentration of total fluorides and associated moisture content.

3. For sampling emissions from roof monitors not employing stacks but equipped with pollutant collection systems, the procedures under s. NR 440.08(2) shall be followed.

(d) For Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 8 hours for any potroom sample and at least 4 hours for any anode bake plant sample, and the minimum sample volume shall be 6.8 dscm (240 dscf) for any potroom sample and 3.4 dscm (120 dscf) for any anode bake plant sample except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(e) The air pollution control system for each affected facility shall be constructed so that volumetric flow rates and total fluoride emissions can be accurately determined using applicable methods specified under par. (c).

(f) The rate of aluminum production shall be determined by dividing 720 hours into the weight of aluminum tapped from the affected facility during a period of 30 days prior to and including the final run of a performance test.

(g) For anode bake plants, the aluminum equivalent for anodes produced shall be determined as follows:

1. Determine the average weight (Mg) of anode produced in anode bake plant during a representative oven cycle using a monitoring device which meets the requirements of sub. (5)(a).

2. Determine the average rate of anode production by dividing the total weight of anodes produced during the representative oven cycle by the length of the cycle in hours.

3. Calculate the aluminum equivalent for anodes produced by multiplying the average rate of anode production by 2.

Note: An owner or operator may establish a different multiplication factor by submitting production records of the Mg of aluminum produced and the concurrent Mg of anode consumed by potrooms.

(h) For each run, potroom group emissions expressed in kg/Mg of aluminum produced shall be determined using the following equation:

$$Epg = \frac{(CsQs)_1 10^{-6} + (CsQs)_2 10^{-6}}{M}$$

where:

Epg is the potroom group emissions of total fluorides in kg/Mg of aluminum produced

Cs is the concentration of total fluorides in mg/dscm as determined by Method 13A or 13B, or by Method 14 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, as applicable

Qs is the volumetric flow rate of the effluent gas stream in dscm/hr as determined by Method 2 of 40 C.F.R. pt. 60, Appendix A or Method 14, or both, as applicable

10^{-6} is the conversion factor from mg to kg

M is the rate of aluminum production in Mg/hr as determined by sub. (6)(f)

$(CsQs)_1$ is the product of Cs and Qs for measurements of primary control system effluent gas streams. Where an alternative testing requirement has been established for the primary control system, the calculated value $(CsQs)_1$ from the most recent performance test shall be used.

$(CsQs)_2$ is the product of Cs and Qs for measurements of secondary control system or roof monitor effluent gas streams

(i) For each run, as applicable, anode bake plant emisssions expressed in kg/Mg of aluminum equivalent shall be determined using the following equation:

$$Ebp = \frac{CsQs\ 10^{-6}}{Me}$$

where:

Ebp is the anode bake plant emissions of total fluorides in kg/Mg of aluminum equivalent

Cs is the concentration of total fluorides in mg/dscm as determined by Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

Qs is the volumetric flow rate of the effluent gas stream in dscm/hr as determined by Method 2 of 40 C.F.R. pt. 60, Appendix A

10^{-6} is the conversion factor from mg to kg

Me is the aluminum equivalent for anodes produced by anode bake plants in Mg/hr as determined by par. (g)

NR 440.37 STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: WET-PROCESS PHOSPHORIC ACID PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each wet-process phosphoric acid plant having a design capacity of more than 15 tons of equivalent P_2O_5 feed per calendar day. For the purpose of this section, the affected facility includes any combination of: reactors, filters, evaporators and hotwells.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Equivalent P_2O_5 feed" means the quantity of phosphorus, expressed as phosphorous pentoxide, fed to the process.

(b) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(c) "Wet-process phosphoric acid plant" means any facility manufacturing phosphoric acid by reacting phosphate rock and acid.

(3) STANDARD FOR FLUORIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 10.0 g/metric ton of equivalent P_2O_5 feed (0.020 lb/ton).

(b) [Reserved]

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any wet-process phosphoric acid plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which can be used to determine the mass flow of phosphorus-bearing feed material to the process. The monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(b) The owner or operator of any wet-process phosphoric acid plant shall maintain a daily record of equivalent P_2O_5 feed by first determining the total mass rate in metric ton/hr of phosphorus bearing feed using a monitoring device for measuring mass flowrate which meets the requirements of par. (a) and then by proceeding according to sub. (5)(d)2.

(c) The owner or operator of any wet-process phosphoric acid plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the process scrubbing system. The monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08(2), shall be used to determine compliance with the standard prescribed in sub. (3) as follows:

1. Method 13A or 13B for the concentration of total fluorides and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be 0.85 dscm (30 dscf) except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) The air pollution control system for the affected facility shall be constructed so that volumetric flow rates and total fluoride emissions can be accurately determined by appplicable test methods and procedures.

(d) Equivalent P_2O_5 feed shall be determined as follows:

1. Determine the total mass rate in metric ton/hr of phosphorus-bearing feed during each run using a flow monitoring device meeting the requirements of sub. (4)(a).

2. Calculate the equivalent P_2O_5 feed by multiplying the percentage P_2O_5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass rate of phosphorus-bearing feed. AOAC Method 9, incorporated by reference in s. NR 440.17 is published in the Official Methods of Analysis of the Association of Official Analytical Chemists, 11th edition, 1970, pp. 11-12. Other methods may be approved by the department.

(e) For each run, emissions expressed in g/metric ton of equivalent P_2O_5 feed shall be determined using the following equation:

$$E=(C_sQ_s)10^{-3}/M_{P_2O_5}$$

where:

E is the emissions of total fluorides in g/metric ton of equivalent P_2O_5 feed

C_s is the concentration of total fluorides in mg/dscm as determined by Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

Q_s is the volumetric flow rate of the effluent gas stream in dscm/hr as determined by Method 2 of 40 C.F.R. pt. 60, Appendix A

10^{-3} is the conversion factor for mg to g

$M_{P_2O_5}$ is the equivalent P_2O_5 feed in metric ton/hr as determined by par. (d)

NR 440.38 STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: SUPERPHOSPHORIC ACID PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each superphosphoric acid plant having a design capacity of more than 15 tons of equivalent P_2O_5 feed per calendar day. For the purpose of this section, the affected facility includes any combination of: evaporators, hotwells, acid sumps and cooling tanks.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Equivalent P_2O_5 feed" means the quantity of phosphorus, expressed as phosphorous pentoxide, fed to the process.

(b) "Superphosphoric acid plant" means any facility which concentrates wet-process phosphoric acid to 66% or greater P_2O_5 content by weight for eventual consumption as a fertilizer.

(c) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(3) STANDARD FOR FLUORIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 5.0 g/metric ton of equivalent P_2O_5 feed (0.010 lb/ton).

(b) [Reserved]

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any superphosphoric acid plant subject to the provisions of this section shall install, calibrate, maintain and operate a flow monitoring device which can be used to determine the mass flow of phosphorus-bearing feed material to the process. The flow monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(b) The owner or operator of any superphosphoric acid plant shall maintain a daily record of equivalent P_2O_5 feed by first determining the total mass rate in metric ton/hr of phosphorus-bearing feed using a flow monitoring device meeting the requirements of par. (a) and then proceeding according to sub. (5)(d)2.

(c) The owner or operator of any superphosphoric acid plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the process scrubbing system. The monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08(2) shall be used to determine compliance with the standard prescribed in sub. (3) as follows:

1. Method 13A or 13B for the concentration of total fluorides and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 13A and 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be at least 0.85 dscm (30 dscf) except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) The air pollution control system for the affected facility shall be constructed so that volumetric flow rates and total fluoride emissions can be accurately determined by applicable test methods and procedures.

(d) Equivalent P_2O_5 feed shall be determined as follows:

1. Determine the total mass rate in metric ton/hr of phosphorus-bearing feed during each run using a flow monitoring device meeting the requirements of sub. (4)(a).

2. Calculate the equivalent P_2O_5 feed by multiplying the percentage P_2O_5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass rate of phosphorus-bearing feed. AOAC Method 9, incorporated by reference in s. NR 440.17 is published in the Official Methods of Analysis of the Association of Official Analytical Chemists, 11th edition, 1970, pp. 11-12. Other methods may be approved by the department.

(e) For each run, emissions expressed in g/metric ton of equivalent P_2O_5 feed, shall be determined using the following equation:

$$E = (CsQs)10\text{-}3/M_{P_2O_5}$$

where:

E is the emissions of total flourides in g/metric ton of equivalent P_2O_5 feed

Cs is the concentration of total fluorides in mg/dscm as determined by Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

Qs is the volumetric flow of the effluent gas stream in dscm/hr as determined by Method 2 of 40 C.F.R. pt. 60, Appendix A

10^{-3} is the conversion factor for mg to g

$M_{P_2O_5}$ is the equivalent P_2O_5 feed in metric ton/hr as determined by par. (d).

NR 440.39 STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: DIAMMONIUM PHOSPHATE PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each granular diammonium phosphate plant having a design capacity of more than 15 tons of equivalent P_2O_5 feed per calendar day. For the purpose of this section, the affected facility includes any combination of: reactors, granulators, dryers, coolers, screens and mills.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Equivalent P_2O_5 feed" means the quantity of phosphorus, expressed as phosphorus pentoxide, fed to the process.

(b) "Granular diammonium phosphate plant" means any plant manufacturing granular diammonium phosphate by reacting phosphoric acid with ammonia.

(c) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(3) STANDARD FOR FLUORIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 30 g/metric ton of equivalent P_2O_5 feed (0.060 lb/ton).

(b) [Reserved]

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any granular diammonium phosphate plant subject to the provisions of this section shall install, calibrate, maintain and operate a flow monitoring device which can be used to determine the mass flow of phosphorus-bearing feed material to the process. The flow monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(b) The owner or operator of any granular diammonium phosphate plant shall maintain a daily record of equivalent P_2O_5 feed by first determining the total mass rate in metric ton/hr of phosphorus-bearing feed using a flow monitoring device meeting the requirements of par. (a) and then by proceeding according to sub. (5)(d)2.

(c) The owner or operator of any granular diammonium phosphate plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the scrubbing system. The monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standard prescribed in sub. (3) as follows:

1. Method 13A or 13B for the concentration of total fluorides and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be at least 0.85 dscm (30 dscf) except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) The air pollution control system for the affected facility shall be constructed so that volumetric flow rates and total fluoride emissions can be accurately determined by applicable test methods and procedures.

(d) Equivalent P_2O_5 feed shall be determined as follows:

1. Determine the total mass rate in metric ton/hr of phosphorus-bearing feed during each run using a flow monitoring device meeting the requirements of sub. (4)(a).

2. Calculate the equivalent P_2O_5 feed by multiplying the percentage P_2O_5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass rate of phosphorus-bearing feed. AOAC Method 9, incorporated by reference in s. NR 440.17, is published in the Official Methods of Analysis of the Association of Official Analytical Chemists, 11th edition, 1970, pp. 11-12. Other methods may be approved by the department.

(e) For each run, emissions expressed in g/metric ton of equivalent P_2O_5 feed shall be determined using the following equation:

$$E=(C_sQ_s)10^{-3}/M_{P_2O_5}$$

where:

E is the emissions of total fluorides in g/metric ton of equivalent P_2O_5 feed

C_s is the concentration of total fluorides in mg/dscm as determined by Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

Q_s is the volumetric flow rate of the effluent gas stream in dscm/hr as determined by Method 2 of 40 C.F.R. pt. 60, Appendix A

10^{-3} is the conversion factor for mg to g

$M_{P_2O_5}$ is the equivalent P_2O_5 feed in metric ton/hr as determined by par. (d)

NR 440.40 STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: TRIPLE SUPERPHOSPHATE PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each triple superphosphate plant having a design capacity of more than 15 tons of equivalent P_2O_5 feed per calendar day. For the purpose of this section, the affected facility includes any combination of: mixers, curing belts or dens, reactors, granulators, dryers, cookers, screens, mills and facilities which store run-of-pile triple superphosphate.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this subsection, all terms not defined in this section have the meaning given them in s. NR 440.02.

(a) "Equivalent P_2O_5 feed" means the quantity of phosphorus, expresed as phosphorus pentoxide, fed to the process.

(b) "Run-of-pile triple superphosphate" means any triple superphosphate that has not been processed in a granulator and is composed of particles at least 25% by weight of which when not caked will pass through a 16 mesh screen.

(c) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(d) "Triple superphosphate plant" means any facility manufacturing triple superphosphate by reacting phosphate rock with phosphoric acid. A run-of-pile triple superphosphate plant includes curing and storing.

(3) STANDARD FOR FLUORIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 100 g/metric ton of equivalent P_2O_5 feed (0.20 lb/ton).

(b) [Reserved]

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any triple superphosphate plant subject to the provisions of this section shall install, calibrate, maintain and operate a flow monitoring device which can be used to determine the mass flow of phosphorus-bearing feed material to the process. The flow monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(b) The owner or operator of any triple superphosphate plant shall maintain a daily record of equivalent P_2O_5 feed by first determining the total mass rate in metric ton/hr of phosphorus-bearing feed using a flow monitoring device meeting the requirements of par. (a) and then by proceeding according to sub. (5)(d)2.

(c) The owner or operator of any triple superphosphate plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the process scrubbing system. The monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(5) TEST METHODS AND PROCEUDRES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standard prescribed in sub. (3) as follows:

1. Method 13A or 13B for the concentration of total fluorides and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be at least 0.85 dscm (30 dscf) except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) The air pollution control system for the affected facility shall be constructed so that volumetric flow rates and total fluoride emissions can be accurately determined by applicable test methods and procedures.

(d) Equivalent P_2O_5 feed shall be determined as follows:

1. Determine the total mass rate in metric ton/hr of phosphorus-bearing feed during each run using a flow monitoring device meeting the requirements of sub. (4)(a).

2. Calculate the equivalent P_2O_5 feed by multiplying the percentage P_2O_5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass rate of phosphorus-bearing feed. AOAC Method 9, incorporated by reference in s. NR 440.17 is published in the Official Methods of Analysis of the Association of Official Analytical Chemists, 11th edition, 1970, pp. 11-12. Other methods may be approved by the department.

(e) For each run, emissions expressed in g/metric ton of equivalent P_2O_5 feed shall be determined using the following equation:

$$E = (C_s Q_s) 10^{-3} / M_{P_2O_5}$$

where:

E is the emissions of total fluorides in g/metric ton of equivalent P_2O_5 feed

C_s is the concentration of total fluorides in mg/dscm as determined by Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

Q_s is the volumetric flow rate of the effluent gas stream in dscm/hr as determined by Method 2 of 40 C.F.R. pt. 60, Appendix A

10^{-3} is the conversion factor for mg to g

$M_{P_2O_5}$ is the equivalent P_2O_5 feed in metric ton/hr as determined by par. (d)

NR 440.41 STANDARDS OF PERFORMANCE FOR THE PHOSPHATE FERTILIZER INDUSTRY: GRANULAR TRIPLE SUPERPHOSPHATE STORAGE FACILITIES. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each granular triple superphosphate storage facility. For the purpose of this section, the affected facility includes any combination of: storage or curing piles, conveyors, elevators, screens and mills.

(b) Any facility under par. (a) that commences construction or modification after October 22, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Equivalent P_2O_5 stored" means the quantity of phosphorus, expressed as phosphorus pentoxide, being cured or stored in the affected facility.

(b) "Fresh granular triple superphosphate" means granular triple superphosphate produced no more than 10 days prior to the date of the performance test.

(c) "Granular triple superphosphate storage facility" means any facility curing or storing granular triple superphosphate.

(d) "Total fluorides" means elemental fluorine and all fluoride compounds as measured by reference methods specified in sub. (5), or equivalent or alternative methods.

(3) STANDARD FOR FLUORIDES. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility any gases which contain total fluorides in excess of 0.25 g/hr/metric ton of equivalent P_2O_5 stored (5.0×10^{-4} lb/hr/ton of equivalent P_2O_5 stored).

(b) [Reserved]

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any granular triple superphosphate storage facility subject to the provisions of this section shall maintain an accurate account of triple superphosphate in storage to permit the determination of the amount of equivalent P_2O_5 stored.

(b) The owner or operator of any granular triple superphosphate storage facility shall maintain a daily record of total equivalent P_2O_5 stored by multiplying the percentage P_2O_5 content, as determined by sub. (5)(f)2., times the total mass of granular triple superphosphate stored.

(c) The owner or operator of any granular triple superphosphate storage facility subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the process scrubbing system. The monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided for in s. NR 440.08(2), shall be used to determine compliance with the standard prescribed in sub. (3) as follows:

1. Method 13A or 13B for the concentration of total fluorides and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be at least 0.85 dscm (30 dscf) except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) The air pollution control system for the affected facility shall be constructed so that volumetric flow rates and total fluorides emissions can be accurately determined by applicable test methods and procedures.

(d) Except as provided under par. (e), all performance tests on granular triple superphosphate storage facilities shall be conducted only when the following quantities of product are being cured or stored in the facility:

1. Total granular triple superphosphate - at least 10% of the building capacity.

2. Fresh granular triple superphosphate - at least 20% of the amount of triple superphosphate in the building.

(e) If the provisions set forth in par. (d)2. exceed production capabilities for fresh granular triple superphosphate, the owner or operator shall have at least 5 days maximum production of fresh granular triple superphosphate in the building during a performance test.

(f) Equivalent P_2O_5 stored shall be determined as follows:

1. Determine the total mass stored during each run using an accountability system meeting the requirements of sub. (4)(a).

2. Calculate the equivalent P_2O_5 stored by multiplying the percentage P_2O_5 content, as measured by the spectrophotometric molybdovanadophosphate method (AOAC Method 9), times the total mass stored. AOAC Method 9, incorporated by reference in s. NR 440.17, is published in the Official Methods of Analysis of the Association of Official Analytical Chemists, 11th edition, 1970, pp. 11-12. Other methods may be approved by the department.

(g) For each run, emissions expressed in g/hr/metric ton of equivalent P_2O_5 stored shall be determined using the following equation:

$$E=(C_sQ_s)10^{-3}/M_{P_2O_5}$$

where:

E is the emissions of total fluorides in g/hr/metric ton of equivalent P_2O_5 stored

C_s is the concentration of total fluorides in mg/dscm as determined by Method 13A or 13B of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

Q_s is the volumetric flow rate of the effluent gas stream in dscm/hr as determined by Method 2 of 40 C.F.R. pt. 60, Appendix A

10^{-3} is the conversion factor for mg to g

$M_{P_2O_5}$ is the equivalent P_2O_5 stored in metric tons as measured by par. (d)

NR 440.42 STANDARDS OF PERFORMANCE FOR COAL PREPARATION PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to any of the following affected facilities in coal preparation plants which process more than 200 tons per day: thermal dryers, pneumatic coal-cleaning equipment (air tables), coal processing and conveying equipment (including breakers and crushers), coal storage systems and coal transfer and loading systems.

(b) Any facility under par. (a) that commences construction or modification after October 24, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Bituminous coal" means solid fossil fuel classified as bituminous coal by ASTM Designation D388-77 incorporated by reference in s. NR 440.17.

(b) "Coal" means all solid fossil fuels classified as anthracite, bituminous, subbituminous or lignite by ASTM Designation D388-77, incorporated by reference in s. NR 440.17.

(c) "Coal preparation plant" means any facility, excluding underground mining operations, which prepares coal by one or more of the following processes: breaking, crushing, screening, wet or dry cleaning and thermal drying.

(d) "Coal processing and conveying equipment" means any machinery used to reduce the size of coal or to separate coal from refuse, and the equipment used to convey coal to or remove coal and refuse from the machinery. This includes, but is not limited to, breakers, crushers, screens and conveyor belts.

(e) "Coal storage system" means any facility used to store coal except for open storage piles.

(f) "Cyclonic flow" means a spiraling movement of exhaust gases within a duct or stack.

(g) "Pneumatic coal-cleaning equipment" means any facility which classifies bituminous coal by size or separates bituminous coal from refuse by application of one or more air streams.

(h) "Thermal dryer" means any facility in which the moisture content of bituminous coal is reduced by contact with a heated gas stream which is exhausted to the atmosphere.

(i) "Transfer and loading system" means any facility used to transfer and load coal for shipment.

(3) STANDARDS FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, an owner or operator subject to the provisions of this section may not cause to be discharged into the atmosphere from any thermal dryer gases which:

1. Contain particulate matter in excess of 0.070 g/dscm (0.031 gr/dscf).

2. Exhibit 20% opacity or greater.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, an owner or operator subject to the provisions of this section may not cause to be discharged into the atmosphere from any pneumatic coal cleaning equipment gases which:

1. Contain particulate matter in excess of 0.040 g/dscm (0.018 gr/dscf).

2. Exhibit 10% opacity of greater.

(c) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, an owner or operator subject to the provisions of this section may not cause to be discharged into the atmosphere from any coal processing and conveying equipment, coal storage system, or coal transfer and loading system processing coal gases which exhibit 20% opacity or greater.

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any thermal dryer shall install, calibrate, maintain and continuously operate monitoring devices as follows:

1. A monitoring device for the measurement of the temperature of the gas stream at the exit of the thermal dryer on a continuous basis. The monitoring device shall be certified by the manufacturer to be accurate within plus or minus 3° F.

2. For affected facilities that use venturi scrubber emission control equipment:

a. A monitoring device for the continuous measurement of the pressure loss through the venturi constriction of the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within plus or minus one inch water gauge.

b. A monitoring device for the continuous measurement of the water supply pressure to the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within plus or minus 5% of design water supply pressure. The pressure sensor or tap shall be located close to the water discharge point. The department may approve alternative locations.

(b) All monitoring devices under par. (a) shall be recalibrated annually in accordance with procedures under s. NR 440.13(2)(c).

(5) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in sub. (3) as follows:

1. Method 5 for the concentration of particulate matter and associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be 0.85 dscm (30 dscf) except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department. Sampling may not be started until 30 minutes after startup and shall be terminated before shutdown procedures commence. The owner or operator of the affected facility shall eliminate cyclonic flow during performance tests in a manner acceptable to the department.

(c) The owner or operator shall construct the facility so that particulate emissions from thermal dryers or pneumatic coal cleaning equipment can be accurately determined by applicable test methods and procedures under par. (a).

NR 440.43 STANDARDS OF PERFORMANCE FOR FERROALLOY PRODUCTION FACILITIES. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities: electric submerged arc furnaces which produce silicon metal, ferrosilicon, calcium silicon, silicomanganese zirconium, ferrochrome silicon, silvery iron, high-carbon ferrochrome, charge chrome, standard ferromanganese, silicomanganese, ferromanganese silicon or calcium carbide; and dust-handling equipment.

(b) Any facility under par. (a) that commences construction or modification after October 21, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Blowing tap" means any tap in which an evolution of gas forces or projects jets of flame or metal sparks beyond the ladle, runner or collection hood.

(b) "Calcium carbide" means material containing 70 to 85 percent calcium carbide by weight.

(c) "Calcium silicon" means that alloy as defined by ASTM Designation A495-76, incorporated by reference in s. NR 440.17.

(d) "Capture system" means the equipment (including hoods, ducts, fans, dampers, etc.) used to capture or transport particulate matter generated by an affected electric submerged arc furnace to the control device.

(e) "Charge chrome" means that alloy containing 52 to 70 percent by weight chromium, 5 to 8 percent by weight carbon, and 3 to 6 percent by weight silicon.

(f) "Control device" means the air pollution control equipment used to remove particulate matter generated by an electric submerged arc furnace from an effluent gas stream.

(g) "Dust-handling equipment" means any equipment used to handle particulate matter collected by the air pollution control device (and located at or near such device) serving any electric submerged arc furnace subject to this section.

(h) "Electric submerged arc furnace" means any furnace wherein electrical energy is converted to heat energy by transmission of current between electrodes partially submerged in the furnace charge.

(i) "Ferrochrome silicon" means that alloy as defined by ASTM Designation A482-76, incorporated by reference in s. NR 440.17.

(j) "Ferromanganese silicon" means that alloy containing 63 to 66 percent by weight manganese, 28 to 32 percent by weight silicon, and a maximum of 0.08% by weight carbon.

(k) "Ferrosilicon" means that alloy as defined by ASTM Designation A100-69 (Reapproved 1974), incorporated by reference in s. NR 440.17, grades A, B, C, D and E which contains 50 or more percent by weight silicon.

(l) "Furnace charge" means any material introduced into the electric submerged arc furnace, and may consist of, but is not limited to, ores, slag, carbonaceous material and limestone.

(m) "Furnace cycle" means the time period from completion of a furnace product tap to the completion of the next consecutive product tap.

(n) "Furnace power input" means the resistive electrical power consumption of an electric submerged arc furnace as measured in kilowatts.

(o) "High-carbon ferrochrome" means that alloy as defined by ASTM Designation A101-73, incorporated by reference in s. NR 440.17 grades HC1 through HC6.

(p) "Product change" means any change in the composition of the furnace charge that would cause the electric submerged arc furnace to become subject to a different mass standard applicable under this section.

(q) "Silicomanganese" means that alloy as defined by ASTM Designation A483-64 (Reapproved 1974), incorporated by reference in s. NR 440.17.

(r) "Silicomanganese zirconium" means that alloy containing 60 to 65 percent by weight silicon, 1.5 to 2.5 percent by weight calcium, 5 to 7 percent by weight zirconium, 0.75 to 1.25 percent by weight aluminum, 5 to 7 percent by weight manganese, and 2 to 3 percent by weight barium.

(s) "Silicon metal" means any silicon alloy containing more than 96% silicon by weight.

(t) "Silvery iron" means any ferrosilicon, as defined by ASTM Designation A100-69 (Reapproved 1974) incorporated by reference in s. NR 440.17, which contains less than 30% silicon.

(u) "Slag" means the more or less completely fused and vitrified matter separated during the reduction of a metal from its ore.

(v) "Standard ferromanganese" means that alloy as defined by ASTM Designation A99-76, incorporated by reference in s. NR 440.17.

(w) "Tapping" means the removal of slag or product from the electric submerged arc furnace under normal operating conditions such as removal of metal under normal pressure and movement by gravity down the spout into the ladle.

(x) "Tapping period" means the time duration from initiation of the process of opening the tap hole until plugging of the tap hole is complete.

(y) "Tapping station" means that general area where molten product or slag is removed from the electric submerged arc furnace.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any electric submerged arc furnace any gases which:

1. Exit from a control device and contain particulate matter in excess of 0.45 kg/MW-hr (0.99 lb/MW-hr) while silicon metal, ferrosilicon, calcium silicon or silicomanganese zirconium is being produced.

2. Exit from a control device and contain particulate matter in excess of 0.23 kg/MW-hr (0.51 lb/MW-hr) while highcarbon ferrochrome, charge chrome, standard ferromanganese, silicomanganese, calcium carbide, ferrochrome silicon, ferromanganese silicon or silvery iron is being produced.

3. Exit from a control device and exhibit 15% opacity or greater.

4. Exit from an electric submerged arc furnace and escape the capture system and are visible without the aid of instruments. The requirements of this subdivision apply only during periods when flow rates are being established under sub. (6)(d).

5. Escape the capture system at the tapping station and are visible without the aid of instruments for more than 40% of each tapping period. There are no limitations on visible emissions under this subdivision when a blowing tap occurs. The requirements of this subdivision apply only during periods when flow rates are being established under sub. (6)(d).

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any dust-handling equipment any gases which exhibit 10% opacity or greater.

(4) STANDARD FOR CARBON MONOXIDE. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any electric submerged arc furnace any gases which contain, on a dry basis, 20 or greater volume percent of carbon monoxide. Combustion of such gases under conditions acceptable to the department constitutes compliance with this subsection. Acceptable conditions include, but are not limited to, flaring of gases or use of gases as fuel for other processes.

(b) [Reserved]

(5) EMISSION MONITORING. (a) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a continuous monitoring system for measurement of the opacity of emissions discharged into the atmosphere from control devices.

(b) For the purpose of reports required under s. NR 440.07(3), the owner or operator shall report as excess emissions all 6-minute periods in which the average opacity is 15% or greater.

(c) The owner or operator subject to the provisions of this section shall submit a written report of any product change to the department. Reports of product changes shall be postmarked not later than 30 days after implementation of the product change.

(6) MONITORING OF OPERATIONS. (a) The owner or operator of any electric submerged arc furnace subject to the provisions of this section shall maintain daily records of the following information:

1. Product being produced.

2. Description of constituents of furnace charge, including the quantity, by weight.

3. Time and duration of each tapping period and the identification of material tapped (slag or product).

4. All furnace power input data obtained under par. (b).

5. All flow rate data obtained under par. (c) or all fan motor power consumption and pressure drop data obtained under par. (e).

(b) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a device to measure and continuously record the furnace power input. The furnace power input may be measured at the output or input side of the transformer. The device must have an accuracy of plus or minus 5% over its operating range.

(c) The owner or operator subject to the provisions of this section shall install, calibrate and maintain a monitoring device that continuously measures and records the volumetric flow rate through each separately ducted hood of the capture system, except as provided under par. (e). The owner or operator of an electric submerged arc furnace that is equipped with a water cooled cover which is designed to contain and prevent escape of the generated gas and particulate matter shall monitor only the volumetric flow rate through the capture system for control of emissions from the tapping station. The owner or operator may install monitoring devices in any appropriate location in the exhaust duct such that reproducible flow rate monitoring will result. The flow rate monitoring device shall have an accuracy of plus or minus 10% over its normal operating range and shall be calibrated according to the manufacturer's instructions. The department may require the owner or operator to demonstrate the accuracy of the monitoring device relative to Methods 1 and 2 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

(d) When performance tests are conducted under the provisions of s. NR 440.08 to demonstrate compliance with the standards under sub. (3)(a)4. and 5., the volumetric flow rate through each separately ducted hood of the capture system shall be determined using the monitoring device required under par. (c). The volumetric flow rates shall be determined for furnace power input levels at 50 and 100 percent of the nominal rated capacity of the electric submerged arc furnace. At all times the electric submerged arc furnace is operated, the owner or operator shall maintain the volumetric flow rate at or above the appropriate levels for that furnace power input level determined during the most recent performance test. If emissions due to tapping are captured and ducted separately from emissions of the electric submerged arc furnace, during each tapping period the owner or operator shall maintain the exhaust flow rates through the capture system over the tapping station at or above the levels established during the most recent performance test. Operation at lower flow rates may be considered by the department to be unacceptable operation and maintenance of the affected facility. The owner or operator may request that these flow rates be reestablished by conducting new performance tests under s. NR 440.08.

(e) The owner or operator may as an alternative to par. (c) determine the volumetric flow rate through each fan of the capture system from the fan power consumption, pressure drop across the fan and the fan performance curve. Only data specific to the operation of the affected electric submerged arc furnace shall be acceptable for demonstration of compliance with the requirements of this paragraph. The owner or operator shall maintain on file a permanent record of the fan performance curve (prepared for a specific temperature) and shall:

1. Install, calibrate, maintain and operate a device to continuously measure and record the power consumption of the fan motor (measured in kilowatts), and

2. Install, calibrate, maintain and operate a device to continuously measure and record the pressure drop across the fan. The fan power consumption and pressure drop measurements shall be synchronized to allow real-time comparisons of the data. The monitoring devices shall have an accuracy of plus or minus 5% over their normal operating ranges.

(f) The volumetric flow rate through each fan of the capture system shall be determined from the fan power consumption, fan pressure drop, and fan performance curve specified under par. (e), during any performance test required under s. NR 440.08 to demonstrate compliance with the standards under sub. (3)(a)4. and 5. The owner or operator shall determine the volumetric flow rate at a representative temperature for furnace power input levels of 50 and 100 percent of the nominal rated capacity of the electric submerged arc furnace. At all times the electric submerged arc furnace is operated, the owner or operator shall maintain the fan power consumption and fan pressure drop at levels such that the volumetric flow rate is at or above the levels established during the most recent performance test for that furnace power input level. If emissions due to tapping are captured and ducted separately from emissions of the electric submerged arc furnace, during each tapping period the owner or operator shall maintain the fan power consumption and fan pressure drop at levels such that the volumetric flow rate is at or above the levels established during the most recent performance test. Operation at lower flow rates may be considered by the department to be unacceptable operation and maintenance of the affected facility. The owner or operator may request that these flow rates be reestablished by conducting new performance tests under s. NR 440.08. The department may require the owner or operator to verify the fan performance curve by monitoring necessary fan operating parameters and determining the gas volume moved relative to Methods 1 and 2 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

(g) All monitoring devices required under pars. (c) and (e) shall be checked for calibration annually in accordance with the procedures under s. NR 440.13(2).

(7) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in subs. (3) and (4) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content except that the heating systems specified in paragraphs 2.1.2 and 2.1.4 of Method 5 may not be used when the carbon monoxide content of the gas stream exceeds 10% by volume, dry basis,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis, including carbon monoxide.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall include an integral number of furnace cycles. The sampling time for each run shall be at least 60 minutes and the minimum sample volume shall be 1.8 dscm (64 dscf) when sampling emissions from open electric submerged arc furnaces with wet scrubber control devices, sealed electric submerged arc furnaces, or semi-enclosed electric submerged arc furnaces. When sampling emissions from other types of installations, the sampling time for each run shall be at least 200 minutes and the minimum sample volume shall be 5.7 dscm (200 dscf). Shorter sampling times or smaller sampling volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) During the performance test, the owner or operator shall record the maximum open hood area (in hoods with segmented or otherwise moveable sides) under which the process is expected to be operated and remain in compliance with all standards. Any future operation of the hooding system with open areas in excess of the maximum is not permitted.

(d) The owner or operator shall construct the control device so that volumetric flow rates and particulate matter emissions can be accurately determined by applicable test methods and procedures.

(e) During any performance test required under s. NR 440.08, the owner or operator may not allow gaseous diluents to be added to the effluent gas stream after the fabric in an open pressurized fabric filter collector unless the total gas volume flow from the collector is accurately determined and considered in the determination of emissions.

(f) When compliance with sub. (4) is to be attained by combusting the gas stream in a flare, the location of the sampling site for particulate matter shall be upstream of the flare.

(g) For each run, particulate matter emissions, expressed in kg/hr (lb/hr), shall be determined for each exhaust stream at which emissions are quantified using the following equation:

$$E_n = C_s Q_s$$

where:

E_n is the emissions of particulate matter in kg/hr (lb/hr)

C_s is the concentration of particulate matter in kg/dscm (lb/dscf) as determined by Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

Q_s is the volumetric flow rate of the effluent gas stream in dscm/hr (dscf/hr) as determined by Method 2 of 40 C.F.R. pt. 60, Appendix A.

(h) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, particulate matter emissions from the affected facility, expressed in kg/MW-hr (lb/MW-hr) shall be determined for each run using the following equation:

$$E = \frac{\sum_{n=2}^{N} E_n}{p}$$

where:

E is the emissions of particulate from the affected facility, in kg/MW-hr (lb/MW-hr)

N is the total number of exhaust streams at which emissions are quantified

E_n is the emissions of particulate matter from each exhaust stream in kg/hr (lb/hr), as determined in par. (g)

p is the average furnace power input during the sampling period, in megawatts as determined according to sub. (6)(b)

NR 440.44 STANDARDS OF PERFORMANCE FOR STEEL PLANTS: ELECTRIC ARC FURNACES. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in steel plants: electric arc furnaces and dust-handling equipment.

(b) Any facility under par. (a) that commences construction or modification after October 21, 1974, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Capture system" means the equipment (including ducts, hoods, fans, dampers, etc.) used to capture or transport particulate matter generated by an EAF to the air pollution control device.

(b) "Charge" means the addition of iron and steel scrap or other materials into the top of an electric arc furnace.

(c) "Charging period" means the time period commencing at the moment an EAF starts to open and ending either 3 minutes after the EAF roof is returned to its closed position or 6 minutes after commencement of opening of the roof, whichever is longer.

(d) "Control device" means the air pollution control equipment used to remove particulate matter generated by one or more EAFs from the effluent gas stream.

(e) "Direct shell evacuation system" means any system that maintains a negative pressure within the EAF above the slag or metal and ducts these emissions to the control device.

(f) "Dust-handling equipment" means any equipment used to handle particulate matter collected by the control device and located at or near the control device for an EAF subject to this section.

(g) "'Electric arc furnace' or 'EAF'" means any furnace that produces molten steel and heats the charge materials with electric arcs from carbon electrodes. Furnaces from which the molten steel is cast into the shape of finished products, such as in a foundary, and furnaces which, as the primary source of iron, continuously feed prereduced ore pellets are not affected facilities within the scope of this definition.

(h) "Heat time" means the period commencing when scrap is charged to an empty EAF and terminating when the EAF tap is completed.

(i) "Meltdown and refining" means that phase of the steel production cycle when charge material is melted and undesirable elements are removed from the metal.

(j) "Meltdown and refining period" means the time period commencing at the termination of the initial charging period and ending at the initiation of the tapping period, excluding any intermediate charging periods.

(k) "Shop" means the building which houses one or more EAFs.

(l) "Shop opacity" means the arithemetic average of 24 or more opacity observations of emissions from the shop taken in accordance with Method 9 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, for the applicable time periods.

(m) "Tap" means the pouring of molten steel from an EAF.

(n) "Tapping period" means the time period commencing at the moment an EAF begins to tilt to pour and ending either 3 minutes after an EAF returns to an upright position or 6 minutes after commencing to tilt, whichever is longer.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from an electric arc furnace any gases which:

1. Exit from a control device and contain particulate matter in excess of 12 mg/dscm (0.0052 gr/dscf).

2. Exit from a control device and exhibit 3% opacity or greater.

3. Exit from a shop and, due solely to operations of any EAFs, exhibit greater than zero percent shop opacity except:

a. Shop opacity greater than zero percent, but less than 20% may occur during charging periods.

b. Shop opacity greater than zero percent, but less than 40% may occur during tapping periods.

c. Opacity standards of this subdivision apply only during periods when flow rates and pressures are being established under sub. (5)(c) and (f).

d. Where the capture system is operated such that the roof of the shop is closed during the charge and the tap, and emissions to the atmosphere are prevented until the roof is opened after completion of the charge or tap, the shop opacity standards of this subdivision apply when the roof is opened and continue to apply for the length of time defined by the charging or tapping periods, or both.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from dust-handling equipment any gases which exhibit 10% opacity or greater.

(4) EMISSION MONITORING. (a) A continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from control devices shall be installed, calibrated, maintained and operated by the owner or operator subject to the provisions of this section.

(b) For the purpose of reports under s. NR 440.07(3), periods of excess emissions that shall be reported are defined as all 6-minute periods during which the average opacity is 3% or greater.

(5) MONITORING OF OPERATIONS. (a) The owner or operator subject to the provisions of this section shall maintain records daily of the following information:

1. Time and duration of each charge;

2. Time and duration of each tap;

3. All flow rate data obtained under par. (b), or equivalent obtained under par. (d); and

4. All pressure data obtained under par. (e).

(b) Except as provided under par. (d), the owner or operator subject to the provisions of this section shall install, calibrate and maintain a monitoring device that continuously records the volumetric flow rate through each separately ducted hood. The monitoring devices may be installed in any appropriate location in the exhaust duct such that reproducible flow rate monitoring will result. Flow rate monitoring devices shall have an accuracy of plus or minus 10% over their normal operating range and shall be calibrated according to the manufacturer's instructions. The department may require the owner or operator to demonstrate the accuracy of the monitoring devices relative to Methods 1 and 2 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

(c) When the owner or operator of an EAF is required to demonstrate compliance with the standard under sub. (3)(a)3., and at any other time the department may require, the volumetric flow rate through each separately ducted hood shall be determined during all periods in which the hood is operated for the purpose of capturing emissions from the EAF using the monitoring device under par. (b). The owner or operator may petition the department for reestablishment of these flow rates whenever the owner or operator can demonstrate to the department's satisfaction that the EAF operating conditions upon which the flow rates were previously established are no longer applicable. The flow rates determined during the most recent demonstration of compliance shall be maintained (or may be exceeded) at the appropriate level for each applicable period. Operation at lower flow rates may be considered by the department to be unacceptable operation and maintenance of the affected facility.

(d) The owner or operator may petition the department to approve any alternative method that will provide a continuous record of operation of each emission capture system.

(e) Where emissions during any phase of the heat time are controlled by use of a direct shell evacuation system, the owner or operator shall install, calibrate and maintain a monitoring device that continuously records the pressure in the free space inside the EAF. The pressure shall be recorded as 15-minute integrated averages. The monitoring device may be installed in any appropriate location in the EAF such that reproducible results will be obtained. The pressure monitoring device shall have an accuracy of plus or minus 5 mm of water gauge over its normal operating range and shall be calibrated according to the manufacturer's instructions.

(f) When the owner or operator of an EAF is required to demonstrate compliance with the standard under sub. (3)(a)3. and at any other time the department may require, the pressure in the free space inside the furnace shall be determined during the meltdown and refining periods using the monitoring device under par. (e). The owner or operator may petition the department for reestablishment of the 15-minute integrated average pressure whenever the owner or operator can demonstrate to the department's satisfaction that the EAF operating conditions upon which the pressures were previously established are no longer applicable. The pressure determined during the most recent demonstration of compliance shall be maintained at all times the EAF is operating in a meltdown and refining period. Operation at higher pressures may be considered by the department to be unacceptable operation and maintenance of the affected facility.

(g) Where the capture system is designed and operated such that all emissions are captured and ducted to a control device, the owner or operator will not be subject to the requirements of this subsection.

(6) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used to determine compliance with the standards prescribed under sub. (3) as follows:

1. Method 5 for concentration of particulate matter and associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 4 hours. When a single EAF is sampled, the sampling time for each run shall also include an integral number of heats. Shorter sampling times, when necessitated by process variables or other factors, may be approved by the department. The minimum sample volume shall be 4.5 dscm (160 dscf).

(c) For the purpose of this section, the owner or operator shall conduct the demonstration of compliance with sub. (3)(a)3. and furnish the department a written report of the results of the test.

(d) During any performance test required under s. NR 440.08, no gaseous diluents may be added to the effluent gas stream after the fabric in any pressurized fabric filter collector unless the amount of dilution is separately determined and considered in the determination of emissions.

(e) When more than one control device serves the EAF being tested, the concentration of particulate matter shall be determined using the following equation:

$$C_s = \frac{\sum_{n=1}^{N} (C_s\ Q_s)_n}{\sum_{n=1}^{N} (Q_s)_n}$$

where:

C_s is the concentration of particulate matter in mg/dscm (gr/dscf) as determined by Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

N is the total number of control devices tested

Q_s is the volumetric flow rate of the effluent gas stream in dscm/hr (dscf/hr) as determined by Method 2 of Appendix A

$(C_sQ_s)_n$ or $(Q_s)_n$ is the value of the applicable parameter for each control device tested

(f) Any control device subject to the provisions of this section shall be designed and constructed to allow measurement of emissions using applicable test methods and procedures.

(g) Where emissions from any EAFs are combined with emissions from facilities not subject to the provisions of this section but controlled by a common capture system and control device, the owner or operator may use any of the following procedures during a performance test:

1. Base compliance on control of the combined emissions.

2. Utilize a method acceptable to the department which compensates for the emissions from the facilities not subject to the provisions of this section.

3. Any combination of the criteria of subds. 1. and 2.

(h) Where emissions from any EAFs are combined with emissions from facilities not subject to the provisions of this section, the owner or operator may use any of the following procedures for demonstrating compliance with sub. (3)(a)3.:

1. Base compliance on control of the combined emissions.

2. Shut down operation of facilities not subject to the provisions of this section.

3. Any combination of the criteria of subds. 1. and 2.

NR 440.45 STANDARDS OF PERFORMANCE FOR KRAFT PULP MILLS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in kraft pulp mills: digester system, brown stock washer system, multiple-effect evaporator system, black liquor oxidation system, recovery furnace, smelt dissolving tank, lime kiln and condensate stripper system. In pulp mills where kraft pulping is combined with neutral sulfite semichemical pulping, the provisions of this section are applicable when any portion of the material charged to an affected facility is produced by the kraft pulping operation.

(b) Any facility under par. (a) that commences construction or modification after September 24, 1976, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Black liquor oxidation system" means the vessels used to oxidize, with air or oxygen, the black liquor, and associated storage tanks.

(b) "Black liquor solids" means the dry weight of the solids which enter the recovery furnace in the black liquor.

(c) "Brown stock washer system" means brown stock washers and associated knotters, vacuum pumps and filtrate tanks used to wash the pulp following the digester system.

(d) "Condensate stripper system" means a column and associated condensers used to strip, with air or steam, TRS compounds from condensate streams from various processes within a kraft pulp mill.

(e) "Cross recovery furnace" means a furnace used to recover chemicals consisting primarily of sodium and sulfur compounds by burning black liquor which on a quarterly basis contains more than 7 weight percent of the total pulp solids from the neutral sulfite semichemical process and has a green liquor sulfidity of more than 28%.

(f) "Digester system" means each continuous digester or each batch digester used for the cooking of wood in white liquor, and associated flash tanks, below tanks, chip steamers and condensers.

(g) "Green liquor sulfidity" means the sulfidity of the liquor which leaves the smelt dissolving tank.

(h) "Kraft pulp mill" means any stationary source which produces pulp from wood by cooking or digesting wood chips in a water solution of sodium hydroxide and sodium sulfide (white liquor) at high temperature and pressure. Regeneration of the cooking chemicals through a recovery process is also considered part of the kraft pulp mill.

(i) "Lime kiln" means a unit used to calcine lime mud, which consists primarily of calcium carbonate, into quicklime, which is calcium oxide.

(j) "Multiple-effect evaporator system" means the multiple-effect evaporators and associated condensers and hotwells used to concentrate the spent cooking liquid that is separated from the pulp (black liquor).

(k) "Neutral sulfite semichemical pulping operation" means any operation in which pulp is produced from wood by cooking or digesting wood chips in a solution of sodium sulfite and sodium bicarbonate, followed by mechanical defibrating (grinding).

(l) "Recovery furnace" means either a straight kraft recovery furnace or a cross recovery furnace, and includes the direct-contact evaporator for a direct-contact furnace.

(m) "Smelt dissolving tank" means a vessel used for dissolving the smelt collected from the recovery furnace.

(n) "Straight kraft recovery furnace" means a furnace used to recover chemicals consisting primarily of sodium and sulfur compounds by burning black liquor which on a quarterly basis contains 7 weight percent or less of the total pulp solids from the neutral sulfite semichemical process or has green liquor sulfidity of 28% or less.

(o) "'Total reduced sulfur' or 'TRS'" means the sum of the sulfur compounds hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide that are released during the kraft pulping operation and measured by Reference Method 16 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any recovery furnace any gases which:

a. Contain particulate matter in excess of 0.10 g/dscm (0.044 gr/dscf) corrected to 8% oxygen.

b. Exhibit 35% opacity or greater.

2. From any smelt dissolving tank any gases which contain particulate matter in excess of 0.1 g/kg black liquor solids, dry weight (0.2 lb/ton black liquor solids, dry weight).

3. From any lime kiln any gases which contain particulate matter in excess of:

a. 0.15 g/dscm (0.067 gr/dscf) corrected to 10% oxygen, when gaseous fossil fuel is burned.

b. 0.30 g/dscm (0.13 fr/dscf) corrected to 10% oxygen, when liquid fossil fuel is burned.

(b) [Reserved]

(4) STANDARD FOR TOTAL REDUCED SULFUR (TRS). (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any digester system, brown stock washer system, multiple-effect evaporator system, black liquor oxidation system or condensate stripper system any gases which contain TRS in excess of 5 ppm by volume on a dry basis, corrected to 10% oxygen, unless the following conditions are met:

a. The gases are combusted in a lime kiln subject to the provisions of subd. 5.; or

b. The gases are combusted in a recovery furnace subject to the provisions of subd. 2. or 3.; or

c. The gases are combusted with other waste gases in an incinerator or other device, or combusted in a lime kiln or recovery furnace not subject to the provisions of this section, and are subjected to a minimum temperature of 1200° F. for at least 0.5 second; or

d. It has been demonstrated to the department's satisfaction by the owner or operator that incinerating the exhaust gases from a new, modified or reconstructed black liquor oxidation system or brown stock washer system in an existing facility is technologically or economically not feasible. Any exempt system shall become subject to the provisions of this section if the facility is changed so that the gases can be incinerated.

e. The gases from the digester system, brown stock washer system, condensate stripper system or black liquor oxidation system are controlled by a means other than combustion. In this case, these systems may not discharge any gases to the atmosphere which contain TRS in excess of 5 ppm by volume on a dry basis, corrected to the actual oxygen content of the untreated gas stream.

2. From any straight kraft recovery furnace any gases which contain TRS in excess of 5 ppm by volume on a dry basis, corrected to 8% oxygen.

3. From any cross recovery furnace any gases which contain TRS in excess of 25 ppm by volume on a dry basis, corrected to 8% oxygen.

4. From any smelt dissolving tank any gases which contain TRS in excess of 0.0084 g/kg black liquor solids, dry weight (0.0168 lb/ton black liquor solids, dry weight).

5. From any lime kiln any gases which contain TRS in excess of 8 ppm by volume on a dry basis, corrected to 10% oxygen.

(5) MONITORING OF EMISSIONS AND OPERATIONS. (a) Any owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate the following continuous monitoring systems:

1. A continuous monitoring system to monitor and record the opacity of the gases discharged into the atmosphere from any recovery furnace. The span of this system shall be set at 70% opacity.

2. Continuous monitoring systems to monitor and record the concentration of TRS emissions on a dry basis and the percent of oxygen by volume on a dry basis in the gases discharged into the atmosphere from any lime kiln, recovery furnace, digester system, brown stock washer system, multiple-effect evaporator system, black liquor oxidation system or condensate-stripper system, except where the provisions of sub. (4)(a)1.c. or d. apply. These systems shall be located downstream of any control device and the spans of these continuous monitoring systems shall be set:

a. At a TRS concentration of 30 ppm for the TRS continuous monitoring system, except that for any cross recovery furnace the span shall be set at 50 ppm.

b. At 20% oxygen for the continuous oxygen monitoring system.

(b) Any owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate the following continuous monitoring devices:

1. A monitoring device which measures the combustion temperature at the point of incineration of effluent gases which are emitted from any digester system, brown stock washer system,

multiple-effect evaporator system, black liquor oxidation system or condensate stripper system where the provisions of sub. (4)(a)1.c. apply. The monitoring device shall be certified by the manufacturer to be accurate within plus or minus one percent of the temperature being measured.

2. For any lime kiln or smelt dissolving tank using a scrubber emission control device:

a. A monitoring device for the continuous measurement of the pressure loss of the gas stream through the control equipment. The monitoring device shall be certified by the manufacturer to be accurate to within a gauge pressure of plus or minus 500 pascals (ca. plus or minus 2 inches water gauge pressure).

b. A monitoring device for the continuous measurement of the scrubbing liquid supply pressure to the control equipment. The monitoring device shall be certified by the manufacturer to be accurate within plus or minus 15% of design scrubbing liquid supply pressure. The pressure sensor or tap shall be located close to the scrubber liquid discharge point. The department may approve alternative locations.

(c) Any owner or operator subject to the provisions of this section shall, except where the provisions of sub. (4)(a)1.d. or 4. apply:

1. Calculate and record on a daily basis 12-hour average TRS concentrations for the 2 consecutive periods of each operating day. Each 12-hour average shall be determined as the arithmetic mean of the appropriate 12 contiguous one-hour average total reduced sulfur concentrations provided by each continuous monitoring system installed under par. (a)2.

2. Calculate and record on a daily basis 12-hour average oxygen concentrations for the 2 consecutive periods of each operating day for the recovery furnace and lime kiln. These 12-hour averages shall correspond to the 12-hour average TRS concentrations under subd. 1. and shall be determined as an arithmetic mean of the appropriate 12 contiguous one-hour average oxygen concentrations provided by each continuous monitoring system installed under par. (a)2.

3. Correct all 12-hour average TRS concentrations to 10 volume percent oxygen, except that all

12-hour average TRS concentration from a recovery furnace shall be corrected to 8 volume percent using the following equation:

$$C_{corr}=C_{meas} \times (21-X/21-Y)$$

where:

C_{corr} is the concentration corrected for oxygen

C_{meas} is the concentration uncorrected for oxygen

X is the volumetric oxygen concentration in percentage to be corrected to (8% for recovery furnaces and 10% for lime kilns, incinerators, or other devices)

Y is the measured 12-hour average volumetric oxygen concentration

(d) For the purpose of reports required under s. NR 440.07(3), any owner or operator subject to the provisions of this section shall report periods of excess emissions as follows:

1. For emission from any recovery furnace periods of excess emissions are:

a. All 12-hour averages of TRS concentrations above 5 ppm by volume for straight kraft recovery furnaces and above 25 ppm by volume for cross recovery furnaces.

b. All 6-minute average opacities that exceed 35%.

2. For emissions from any lime kiln, periods of excess emissions are all 12-hour average TRS concentration above 8 ppm by volume.

3. For emissions from any digester system, brown stock washer system, multiple-effect evaporator system, black liquor oxidation system or condensate stripper system periods of excess emissions are:

a. All 12-hour average TRS concentrations above 5 ppm by volume unless the provisions of sub. (4)(a)1.a., b. or d. apply; or

b. All periods in excess of 5 minutes and their duration during which the combustion temperature at the point of incineration is less than 1200° F. where the provisions of sub. (4)(a)1.b. apply.

(e) The department may not consider periods of excess emissions reported under par. (d) to be indicative of a violation of s. NR 440.11(4), provided that:

1. The percent of the total number of possible contiguous periods of excess emissions in a quarter (excluding periods of startup, shutdown, or malfunction and periods when the facility is not operating) during which excess emissions occur does not exceed:

a. One percent for TRS emissions from recovery furnaces.

b. Six percent for average opacities from recovery furnaces.

2. The department determines that the affected facility, including air pollution control equipment, is maintained and operated in a manner which is consistent with good air pollution control practice for minimizing emissions during periods of excess emissions.

(6) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used to determine compliance with sub. (3)(a) as follows:

1. Method 5 for the concentration of particulate matter and the associated moisture content,

2. Method 1 for sample and velocity traverses,

3. When determining compliance with sub. (3)(a)2., Method 2 for velocity and volumetric flow rate,

4. Method 3 for gas analysis, and

5. Method 9 for visible emissions.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.85 dscm/hr (0.53 dscf/min) except that shorter sampling times, when necessitated by process variables or other factors, may be approved by the department. Water shall be used as the cleanup solvent instead of acetone in the sample recovery procedure outlined in Method 5.

(c) Method 17 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17 (in-stack filtration) may be used as an alternate method for Method 5 of Appendix A for determining compliance with sub. (3)(a)1.a. provided that a constant value of 0.009 g/dscm (0.004 gr/dscf) is added to the results of Method 17 of Appendix A and the stack temperature is no greater than 205°

C (ca. 400° F). Water shall be used as the cleanup solvent instead of acetone in the sample recovery procedure outlined in Method 17.

(d) For the purpose of determining compliance with sub. (4)(a)1. through 5., the following reference methods of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17 shall be used:

1. Method 16 for the concentration of TRS,

2. Method 3 for gas analysis, and

3. When determining compliance with sub. (4)(a)4., use the results of Method 2, Method 16 and the black liquor solids feed rate in the following equation to determine the TRS emission rate.

$$E = (C_{H_2S}F_{H_2S} + C_{MeSH}\,F_{MeSH} + C_{DMS}F_{dms} + C_{DMDS}F_{DMDS})\ (Q_{Sd})/BLS$$

where:

E is the mass of TRS emitted per unit of black liquor solids (g/kg)(lb/ton)

C_{H_2S} is the average concentration of hydrogen sulfide (H_2S) during the test period, PPM

C_{MeSH} is the average concentration of methyl mercaptan (MeSH) during the test period, PPM

C_{DMS} is the average concentration of dimethyl sulfide (DMS) during the test period, PPM

C_{DMDS} is the average concentration of dimethyl disulfide (DMDS) during the test period, PPM

F_{H_2S} is 0.001417 g/m^3 PPM for metric units and is 0.08844 lb/ft^3 PPM for English units

F_{MeSH} is 0.00200 g/m^3 PPM for metric units and is 0.1248 lb/ft^3 PPM for English units

F_{dms} is 0.002583 g/m^3 PPM for metric units and is 0.1612 lb/ft^3 PPM for English units

F_{DMDS} is 0.003917 g/m^3 PPM for metric units and is 0.2445 lb/ft^3 PPM for English units

Q_{Sd} is the dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr (dscf/hr)

BLS is the black liquor solids feed rate, kg/hr (lb/hr)

4. When determining whether a furnace is straight kraft recovery furnace or a cross recovery furnace, TAPPI Method T.624, incorporated by reference in s. NR 440.17 shall be used to determine

sodium sulfide, sodium hydroxide and sodium carbonate. These determinations shall be made 3 times daily from the green liquor and the daily average values shall be converted to sodium oxide (Na_2O) and substituted into the following equation to determine the green liquor sulfidity:

$$GLS = 100\ C_{Na2}s / C_{Na2}s + C_{Na}{}^{OH} + C_{Na_2}{}^{CO_3}$$

where:

GLS is the percent green liquor sulfidity

$C_{Na2}s$ is the average concentration of Na_{2s} expressed as Na_2O (mg/l)

$C_{Na}OH$ is the average concentration of NaOH expressed as Na_2O (mg/l)

$C_{Na2}CO_3$ is the average concentration of Na_2CO_3 expressed as Na_2O (mg/l)

(e) All concentrations of particulate matter and TRS required to be measured by this subsection from lime kilns or incinerators shall be corrected to 10 volume percent oxygen and those concentrations from recovery furnaces shall be corrected to 8 volume percent oxygen. These corrections shall be made in the manner specified in sub. (5)(c)3.

<u>NR 440.46 STANDARDS OF PERFORMANCE FOR GLASS MANUFACTURING PLANTS.</u> (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Each glass melting furnace is an affected facility to which the provisions of this section apply.

(b) Any facility under par. (a) that commences construction or modification after June 15, 1979, is subject to the requirements of this section.

(c) This section does not apply to hand glass melting furnaces, glass melting furnaces designed to produce less than 4,550 kilograms of glass per day and all-electric melters.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02, unless otherwise required by the context.

(a) "All-electric melter" means a glass melting furnace in which all the heat required for melting is provided by electric current from electrodes submerged in the molten glass, although some fossil fuel may be charged to the furnace as raw material only.

(b) "Borosilicate recipe" means raw material formulation of the following approximate weight proportions: 72% silica; 7% nepheline syenite; 13% anhydrous borax; 8% boric acid; and 0.1% miscellaneous materials.

(c) "Container glass" means glass made of soda-lime recipe, clear or colored, which is pressed or blown, or both, into bottles, jars, ampoules and other products listed in Standard Industrial Classification 3221, incorporated by reference in s. NR 440.17.

(d) "Flat glass" means glass made of soda-lime recipe and produced into continuous flat sheets and other products listed in Standard Industrial Classification 3211 incorporated by reference in s. NR 440.17.

(e) "Glass melting furnace" means a unit comprising a refractory vessel in which raw materials are charged, melted at high temperature, refined and conditioned to produce molten glass. The unit includes foundations, superstructure and retaining walls, raw material charger systems, heat exchangers, melter cooling system, exhaust system, refractory brick work, fuel supply and electrical boosting equipment, integral control systems and instrumentation, and appendages for conditioning and distributing molten glass to forming apparatuses. The forming apparatuses, including the float bath used in flat glass manufacturing, are not considered part of the glass melting furnace.

(f) "Glass produced" means the weight of the glass pulled from the glass melting furnace.

(g) "Hand glass melting furnace" means a glass furnace where the molten glass is removed from the furnace by a glassworker using a blowpipe or a pontil.

(h) "Lead recipe" means raw material formulation of the following approximate weight proportions: 56% silica; 8% potassium carbonate; and 36% red lead.

(i) "Pressed and blown glass" means glass which is pressed, blown, or both, including textile fiberglass, noncontinuous flat glass, noncontainer glass and other products listed in Standard

Industrial Classification 3229, incorporated by reference in s. NR 440.17. It is separated into glass of borosilicate recipe, glass of soda-lime and lead recipes, glass of opal, fluoride and other recipes.

(j) "Rebricking" means cold replacement of damaged or worn refractory parts of the glass melting furnace. Rebricking includes replacement of the refractories comprising the bottom, sidewalls or roof of the melting vessel; replacement of refractory work in the heat exchanger; and replacement of refractory portions of the glass conditioning and distribution system.

(k) "Soda-lime recipe" means raw material formulation of the following approximate weight proportions: 72% silica; 15% soda; 10% lime and magnesia; 2% alumina; and 1% miscellaneous materials (including sodium sulfate).

(l) "Wool fiberglass" means fibrous glass of random texture, including fiberglass insulation, and other products listed in Standard Industrial Classification 3296, incorporated by reference in s. NR 440.17.

(3) STANDARDS FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator of a glass melting furnace subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any glass melting furnace fired exclusively with either a gaseous fuel or a liquid fuel, particulate matter at emission rates exceeding those specified in Table CC-II, Column 2 and Column 3, respectively, or

2. From any glass melting furnace, fired simultaneously with gaseous and liquid fuels, particulate matter at emission rates exceeding STD as specified by the following equation:

$$STD=X[1.3(Y)+(Z)]$$

where:

STD is the particulate matter emission limit, g of particulate/kg of glass produced

X is the emission rate specified in Table CC-II for furnaces fired with gaseous fuel (Column 2)

Y is the decimal percent of liquid fuel heating value to total (gaseous and liquid) fuel heating value fired in the glass melting furnaces as determined in sub. (7)(f) (Joules/Joules)

Z is equal to (1-Y).

(b) Conversion of a glass melting furnace to the use of liquid fuel may not be considered a modification for the purposes of s. NR 440.14.

(c) Rebricking and the cost of rebricking may not be considered a reconstruction for the purposes of s. NR 440.15.

Table CC-II -- Emission Rates

[g of particulate/kg of glass produced]

Col. I -- Glass manufacturing plant industry segment	Col. 2-- Furnace fired with gaseous fuel	Col. 3-- Furnace fired with liquid fuel
Container glass	0.1	0.13
Pressed and blown glass		
(a) Borosilicate Recipes	0.5	0.65
(b) Soda-Lime and Lead Recipes	0.1	0.13
(c) Other-Than Borosilicate, Soda-Lime, and Lead Recipes (including opal, fluoride and other recipes)	0.25	0.325
Wool fiberglass	0.25	0.325
Flat glass	0.225	0.225

(4) [Reserved]

(5) [Reserved]

(6) [Reserved]

(7) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used to determine compliance with sub. (3) as follows:

1. Method 1 for sample and velocity traverses,

2. Method 2 for velocity and volumetric flow rate,

3. Method 3 for gas analysis, and

4. Method 5 for the concentration of particulate matter and the associated moisture content.

(b) For Method 5, of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the probe and filter holder heating system in the sampling train shall be set to provide a gas temperature no greater than 177°C. The sampling time for each run shall be at least 60 minutes and the collected particulate shall weigh at least 50 mg.

(c) The particulate emissions rate, E, shall be computed as follows:

$$E=QXC$$

where:

E is the particulate emission rate (g/hr)

Q is the average volumetric flow rate (dscm/hr) as found from Method 2 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

C is the average concentration (g/dscm) of particulate matter as found from the modified Method 5 of Appendix A

(d) The rate of glass produced, P (kg/hr), shall be determined by dividing the weight of glass pulled in kilograms (kg) from the affected facility during the performance test by the number of hours (hr) taken to perform the performance test. The glass pulled, in kilograms, shall be determined by direct measurement or computed from materials balance by good engineering practice.

(e) For the purposes of these standards the furnace emission rate shall be computed as follows:

$$R=E-A\div P$$

where:

R is the furnace emisson rate (g/kg)

E is the particulate emission rate (g/hr) from par. (c)

A is the zero production rate correction, i.e., A is 227 g/hr for container glass, pressed and blown (soda-lime and lead) glass, and pressed and blown (other-than borosilicate, soda-lime lead) glass and A is 454 g/hr for pressed and blown (borosilicate) glass, wool fiberglass and flat glass

P is the rate of glass production (kg/hr) from par. (d).

(f) When gaseous and liquid fuels are fired simultaneously in a glass melting furnace, the heat input of each fuel, expressed in joules, shall be determined during each testing period by multiplying the gross calorific value of each fuel fired (in joules/kilogram) by the rate of each fuel fired (in kilograms/second) to the glass melting furnaces. The decimal percent of liquid fuel heating value to total fuel heating value shall be determined by dividing the heat input of the liquid fuels by the sum of the heat input for the liquid fuels and the gaseous fuels. Gross calorific values shall be determined in accordance with American Society of Testing and Materials (ASTM) Method D240-76 (liquid fuels) and D1826-77 (gaseous fuels), as applicable. These 2 ASTM methods are incorporated by reference in s. NR 440.17. The owner or operator shall determine the rate of fuels burned during each testing period by suitable methods and shall confirm the rate by a material balance over the glass melting system.

NR 440.47 STANDARDS OF PERFORMANCE FOR GRAIN ELEVATORS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to each affected facility at any grain terminal elevator or any grain storage elevator, except as provided under sub. (5)(b). The affected facilities are each truck unloading station, truck loading station, barge and ship unloading station, barge and ship loading station, railcar loading station, railcar unloading station, grain dryer and all grain handling operations.

(b) Any facility under par. (a) which commences construction, modification or reconstruction after August 3, 1978 is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Capture system" means the equipment such as sheds, hoods, ducts, fans, dampers, etc. used to collect particulate matter generated by an affected facility at a grain elevator.

(b) "Column dryer" means any equipment used to reduce the moisture content of grain in which the grain flows from the top to the bottom in one or more continuous packed columns between 2 perforated metal sheets.

(c) "Fugitive emission" means the particulate matter which is not collected by a capture system and is released directly into the atmosphere from an affected facility at a grain elevator.

(d) "Grain" means corn, wheat, sorghum, rice, rye, oats, barley and soybeans.

(e) "Grain elevator" means any plant or installation at which grain is unloaded, handled, cleaned, dried, stored or loaded.

(f) "Grain handling operations" include bucket elevators or legs (excluding legs used to unload barges or ships), scale hoppers and surge bins (garners), turn heads, scalpers, cleaners, trippers, and the headhouse and other such structures.

(g) "Grain loading station" means that portion of a grain elevator where the grain is transferred from the elevator to a truck, railcar, barge or ship.

(h) "Grain storage elevator" means any grain elevator located at any wheat flour mill, wet corn mill, dry corn mill (human consumption), rice mill or soybean oil extraction plant which has a permanent grain storage capacity of 35,200 m^3 (ca. 1 million bushels).

(i) "Grain terminal elevator" means any grain elevator which has a permanent storage capacity of more than 88,100 m^3 (ca. 2.5 million U.S. bushels), except those located at animal food manufacturers, pet food manufacturers, cereal manufacturers, breweries and livestock feedlots.

(j) "Grain unloading station" means that portion of a grain elevator where the grain is transferred from a truck, railcar, barge or ship to a receiving hopper.

(k) "Permanent storage capacity" means grain storage capacity which is inside a building, bin or silo.

(l) "Process emission" means the particulate matter which is collected by a capture system.

(m) "Rack dryer" means any equipment used to reduce the moisture content of grain in which the grain flows from the top to the bottom in a cascading flow around rows of baffles or racks.

(n) "Railcar" means railroad hopper car or boxcar.

(o) "Unloading leg" means a device which includes a bucket-type elevator which is used to remove grain from a barge or ship.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the 60th day of achieving the maximum production rate at which the affected facility will be operated, but no later than 180 days after initial startup, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere any gases which exhibit greater than zero percent opacity from any:

1. Column dryer with column plate perforation exceeding 2.4 mm diameter (ca. 0.094 inch).

2. Rack dryer in which exhaust gases pass through a screen filter coarser than 50 mesh.

(b) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility except a grain dryer any process emission which:

1. Contains particulate matter in excess of 0.023 g/dscm (ca. 0.01 gr/dscf).

2. Exhibits greater than zero percent opacity.

(c) On and after the 60th day of achieving the maximum production rate at which the affected facility will be operated, but no later than 180 days after initial startup, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere any fugitive emission from:

1. Any individual truck unloading station, railcar unloading station, or railcar loading station, which exhibits greater than 5% opacity.

2. Any grain handling operation which exhibits greater than zero percent opacity.

3. Any truck loading station which exhibits greater than 10% opacity.

4. Any barge or ship loading station which exhibits greater than 20% opacity.

(d) The owner or operator of any barge or ship unloading station shall operate as follows:

1. The unloading leg shall be enclosed from the top (including the receiving hopper) to the center line of the bottom pulley and ventilation to a control device shall be maintained on both sides of the leg and the grain receiving hopper.

2. The total rate of air ventilated shall be at least 32.1 actual cubic meters per cubic meter of grain handling capacity (ca. 40 ft^3/bu).

3. Rather than meet the requirements of subds. 1. and 2., the owner or operator may use other methods of emission control if it is demonstrated to the department's satisfaction that they would reduce emissions of particulate matter to the same level or less.

(4) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used to determine compliance with the standards prescribed under sub. (3) as follows:

1. Method 5 or Method 17 for concentration of particulate matter and associated moisture content,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate,

4. Method 3 for gas analysis, and

5. Method 9 for visible emissions.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling probe and filter holder shall be operated without heaters. The sampling time for each run, using Method 5 or Method 17 of Appendix A, shall be at least 60 minutes. The minimum sample volume shall be 1.7 dscm (ca. 60 dscf).

(5) MODIFICATIONS. (a) The factor 6.5 shall be used in place of "annual asset guidelines repair allowance percentage," to determine whether a capital expenditure as defined by in s. NR 440.02 has been made to an existing facility.

(b) For purposes of this chapter, the following physical changes or changes in the method of operation may not by themselves be considered a modification of any existing facility described under sub. (1)(a):

1. The addition of gravity loadout spouts to existing grain storage or grain transfer bins.

2. The installation of automatic grain weighing scales.

3. Replacement of motor and drive units driving existing grain handling equipment.

4. The installation of permanent storge capacity with no increase in hourly grain handling capacity.

NR 440.48 STANDARDS OF PERFORMANCE FOR SURFACE COATING OF METAL FURNITURE. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each metal furniture surface coating operation in which organic coatings are applied.

(b) This section applies to each affected facility identified in par. (a) on which construction, modification or reconstruction is commenced after November 28, 1980.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, all terms not defined in this paragraph have the meaning given them in s. NR 440.02.

1. "Bake oven" means a device which uses heat to dry or cure coatings.

2. "Dip coating" means a method of applying coatings in which the part is submerged in a tank filled with the coatings.

3. "'Electrodeposition' or 'EDP'" means a method of applying coatings in which the part is submerged in a tank filled with the coatings and in which an electrical potential is used to enhance deposition of the coatings on the part.

4. "Electrostatic spray application" means a spray application method that uses an electrical potential to increase the transfer efficiency of the coatings.

5. "Flash-off area" means the portion of a surface coating operation between the coating application area and bake oven.

6. "Flow coating" means a method of applying coatings in which the part is carried through a chamber containing numerous nozzles which direct unatomized streams of coatings from many different angles onto the surface of the part.

7. "Organic coating" means any coating used in a surface coating operation, including dilution solvents, from which volatile organic compound emissions occur during the application or the curing process. For the purpose of this section, powder coatings are not included in this definition.

8. "Powder coating" means any surface coating which is applied as a dry powder and is fused into a continuous coating film through the use of heat.

9. "Spray application" means a method of applying coatings by atomizing and directing the atomized spray toward the part to be coated.

10. "Surface coating operation" means the system on a metal furniture surface coating line used to apply and dry or cure an organic coating on the surface of the metal furniture part or product. The surface coating operation may be a prime coat or a top coat operation and includes the coating application station or stations, flash-off area and curing oven.

11. "Transfer efficiency" means the ratio of the amount of coating solids deposited onto the surface of a part or product to the total amount of coating solids used.

12. "VOC content" means the proportion of a coating that is volatile organic compounds (VOC's), expressed as kilograms of VOC's per liter of coating solids.

13. "VOC emissions" means the mass of volatile organic compounds (VOC's), expressed as kilograms of VOC's per liter of applied coating solids, emitted from a metal furniture surface coating operation.

(b) As used in this section, all symbols not defined in this paragraph have the meaning given them in s. NR 440.03.

1. C_s=the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million by volume, as carbon).

2. C_b=the VOC concentration in each gas stream entering the control device (parts per million by volume, as carbon).

3. C_f=the VOC concentration in each gas stream emitted directly to the atmosphere (parts per million by volume, as carbon).

4. D_c=density of each coating, as received (kilograms per liter).

5. D_d=density of each diluent VOC solvent (kilograms per liter).

6. D_r=density of VOC solvent recovered by an emission control device (kilograms per liter).

7. E=VOC destruction efficiency of the control device (fraction).

8. F=the proportion of total VOC's emitted by an affected facility that enters the control device (fraction).

9. G=the volume-weighted average mass of VOC's in coatings consumed in a calendar month per unit volume of coating solids applied (kilograms per liter).

10. L_c=the volume of each coating consumed, as received (liters).

11. L_d=the volume of each diluent VOC solvent added to coatings (liters).

12. L_r=the volume of VOC solvent recovered by an emission control device (liters).

13. L_o=the volume of coating solids consumed (liters).

14. M_d=the mass of diluent VOC solvent consumed (kilograms).

15. M_o=the mass of VOC's in coatings consumed as received (kilograms).

16. M_f=the mass of VOC's recovered by an emission control device (kilograms).

17. N=the volume-weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter).

18. Q_s=the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour).

19. Q_b=the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour).

20. Q_f=the volumetric flow rate of each gas stream emitted directly to the atmosphere (dry standard cubic meters per hour).

21. R=the overall VOC emission reduction achieved for an affected facility (fraction).

22. T=the transfer efficiency (fraction).

23. V_s=the proportion of solids in each coating (or input stream) as received (fraction by volume).

24. W_o=the proportion of VOC's in each coating (or input stream) as received (fraction by weight).

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS (VOC). (a) On and after the date on which the initial performance test required to be conducted by s. NR 440.08(1) is completed, no owner or operator subject to the provisions of this section may cause the discharge into the atmosphere of VOC emissions from any metal furniture surface coating operation in excess of 0.90 kilogram of VOC per liter of coating solids applied.

(b) [Reserved]

(4) PERFORMANCE TESTS AND COMPLIANCE PROVISIONS. (a) Section NR 440.08(4) and (6) do not apply to the performance test procedures required by this section.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under s. NR 440.08(1) and thereafter a performance test each calendar month for each affected facility according to the procedures in this subsection.

(c) The owner or operator shall use the following procedures for determining monthly volume-weighted average emissions of VOC's in kilograms per liter of coating solids applied (G).

1. An owner or operator shall use the following procedures for any affected facility which does not use a capture system and control device to comply with the emissions limit specified under sub. (3). The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or by an analysis of each coating, as received, using Reference Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17. The department may require the owner or operator who uses formulation data supplied by the manufacturer of the coating to determine the VOC content of coating using Reference Method 24. The owner or operator shall determine the volume of coating and the mass of VOC solvent used for thinning purposes from company records on a monthly basis. If a common coating distribution system serves more than one affected facility or serves both affected and existing facilities, the owner or operator shall estimate the volume of coating used at each facility by using the average dry weight of coating and the surface area coated by each affected and existing facility or by other procedures acceptable to the department.

a. Calculate the volume-weighted average of the total mass of VOC's consumed per unit volume of coating solids applied (G) during each calendar month for each affected facility, except as provided under subds. 2. and 3. Each monthly calculation shall be considered a performance test. Except as provided in subpar. d., the volume-weight average of the total mass of VOC's consumed per unit volume of coating solids applied (G) each calendar month shall be determined by the following procedures.

1) Calculate the mass of VOC's used (M_o+M_d) during each calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci}\, D_{ci}\, W_o + \sum_{j=1}^{m} L_{dj}\, D_{dj}$$

($L_{dj}D_{dj}$ will be zero if no VOC solvent is added to the coatings, as received.)

where:

n is the number of different coatings used during the calendar month

m is the number of different diluent VOC solvents used during the calendar month

2) Calculate the total volume of coating solids used (L_s) in each calendar month for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci} V_{si}$$

where:

n is the number of different coatings used during the calendar month.

Select the appropriate transfer efficiency from Table I. If the owner or operator can demonstrate to the satisfaction of the department that other transfer efficiencies other than those shown are appropriate, the department shall approve their use on a case-by-case basis. Transfer efficiency values for application methods not listed below shall be determined by the department on a case-by-case basis. An owner or operator shall submit sufficient data for the department to judge the accuracy of the transfer efficiency claims.

Table I -- Transfer Efficiencies

Application methods	Transfer efficiency (T)
Air atomized spray	0.25
Airless spray	.25
Manual electrostatic spray	.60
Nonrotational automatic electrostatic spray	.70
Rotating head electrostatic spray (manual and automatic)	.80
Dip coat and flow coat	.90
Electrodeposition	.95

Where more than one application method is used within a single surface coating operation the owner or operator shall determine the composition and volume of each coating applied by each method through a means acceptable to the department and compute the weighted average transfer efficiency by the following equation:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{p} L_{cik} V_{sik} T_{k}}{L_s}$$

where:

n is the number of coatings used

p is the number of application methods used

3) Calcuate the volume-weighted average mass of VOC's consumed per unit volume of coating solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s T}$$

b. Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N=G$$

c. Where the volume-weighted average mass of VOC discharged to the atmosphere per unit volume of coating solids applied (N) is less than or equal to 0.90 kilogram per liter, the affected facility is in compliance.

d. If each individual coating used by an affected facility has a VOC content, as received, which when divided by the lowest transfer efficiency at which the coating is applied, results in a value equal to or less than 0.90 kilogram per liter, the affected facility is in compliance provided no VOC's are added to the coatings during distribution or application.

2. An owner or operator shall use the following procedures for any affected facility that uses a capture system and a control device that destroys VOC's (e.g., incinerator) to comply with the emission limit specified under sub. (3).

a. Determine the overall reduction efficiency (R) for the capture system and control device. For the initial performance test the overall reduction efficiency (R) shall be determined as prescribed in 1), 2) and 3) of this subparagraph. In subsequent months, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test providing control device and capture system operating conditions have not changed. The procedure in 1), 2) and 3) of this subparagraph shall be repeated when directed by the department or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

1) Determine the fraction (F) of total VOC's emitted by an affected facility that enters the control device using the following equation:

$$F = \frac{\sum_{i=1}^{n} C_{bi} \quad Q_{bi}}{\sum_{i=1}^{n} C_{bi} \quad Q_{bi} + \sum_{j=1}^{m} C_{fj} \quad Q_{fj}}$$

where:

n is the number of gas streams entering the control device

m is the number of gas streams emitted directly to the atmosphere

2) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E = \frac{\sum_{i=1}^{n} Q_{bi} \quad C_{bi} - \sum_{j=1}^{M} C_{aj} \quad Q_{aj}}{\sum_{i=1}^{n} Q_{bi} \; C_{bi}}$$

where:

n is the number of gas streams entering the control device

m is the number of gas streams leaving the control device and entering the atmosphere

3) Determine overall reduction efficiency (R) using the following equation:

$$R=EF$$

b. Calculate the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in subd. 1.a.1), 2) and 3).

c. Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

$$N=G(1-R)$$

d. If the volume weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.90 kilogram per liter of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

3. An owner or operator shall use the following procedure for any affected facility which uses a control device that recovers the VOC's (e.g., carbon adsorber) to comply with the applicable emission limit specified under sub. (3).

a. Calculate the total mass of VOC's consumed (M_o+M_d) and the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in subd. 1.a.1), 2) and 3).

b. Calculate the total mass of VOC's recovered (M_r) during each calendar month using the following equation:

$$M_r=L_rD_r$$

c. Calculate overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R=\frac{M_r}{M_o+M_d}$$

d. Calculate the volume-weighted average mass of VOC's emitted to the atmosphere (N) for each calendar month for each affected facility using equation in subd. 2.c.

e. If the weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.90 kilogram per liter of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

(5) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator of an affected facility which uses a capture system and an incinerator to comply with the emission limits specified under sub. (3) shall install, calibrate, maintain and operate temperature measurement devices according to the following procedures:

1. Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

2. Each temperature measurement device shall be installed, calibrated and maintained according to the manufacturer's specifications. The device shall have an accuracy of the greater of 0.75% of the temperature being measured expressed in degrees Celsius or plus or minus 2.5°C.

3. Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(b) The owner or operator of an affected facility which uses a capture system and a solvent recovery system to comply with the emission limits specified under sub. (3) shall install the equipment necessary to determine the total volume of VOC solvent recovered daily.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The reporting requirements of s. NR 440.08(1) apply only to the initial performance test. Each owner or operator subject to the provisions of this section shall include the following data in the report of the initial performance test required under s. NR 440.08(1):

1. Except as provided in subd. 2., the volume-weighted average mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) for a period of one calendar month from each affected facility.

2. For each affected facility where compliance is determined under the provisions of sub. (4)(c)1.d., a list of the coatings used during a period of one calendar month, the VOC content of each coating calculated from data determined using Reference Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, or supplied by the manufacturer of the coating, and the minimum transfer efficiency of any coating application equipment used during the month.

3. For each affected facility where compliance is achieved through the use of an incineration system, the following additional information shall be reported:

a. The proportion of total VOC's emitted that enters the control device (F).

b. The VOC reduction efficiency of the control device (E).

c. The average combustion temperature or the average temperature upstream and downstream of the catalyst bed, and

d. A description of the method used to establish the amount of VOC's captured and sent to the incinerator.

4. For each affected facility where compliance is achieved through the use of a solvent recovery system, the following additional information shall be reported:

a. The volume of VOC solvent recovered (L_r), and

b. The overall VOC emission reduction achieved (R).

(b) Following the initial performance test, the owner or operator of an affected facility shall identify and record:

1. Each instance in which the volume-weighted average of the total mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) is greater than the limit specified under sub. (3).

2. Where compliance with sub. (3) is achieved through the use of thermal incineration, each 3-hour period when metal furniture is being coated during which the average temperature of the device was more than 28°C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under sub. (4).

3. Where compliance with sub. (3) is achieved through the use of catalytic incineration, each 3-hour period when metal furniture is being coated during which the average temperature of the device immediately before the catalyst bed is more than 28°C below the average temperature of the device immediately before the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under sub. (4). Additionally, when metal furniture is being coated, all 3-hour periods during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference across the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under sub. (4) shall be recorded.

(c) Each owner or operator subject to the provisions of this section shall maintain at the source, for a period of at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility. Where compliance is achieved through the use of thermal incineration each owner or operator shall maintain at the source daily records of the incinerator combustion chamber temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed. Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall maintain at the source daily records of the amount of solvent recovered by the system for each affected facility.

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2) shall be used to determine compliance with sub. (3) as follows:

1. Method 24, or coating manufacturer's formulation data for use in the determination of VOC content of each batch of coating as applied to the surface of the metal parts but in case of an inconsistency between the Method 24 results and the formulation data, the Method 24 results will govern,

2. Method 25 for the measurement of VOC concentration,

3. Method 1 for sample and velocity traverses,

4. Method 2 for velocity and volumetric flow rate,

5. Method 3 for gas analysis, and

6. Method 4 for stack gas moisture.

(b) For Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the coating sample shall be at least a one liter sample in a one liter container taken at a point where the sample will be representative of the coating material as applied to the surface of the metal part.

(c) For Method 25 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the minimum sampling time for each of 3 runs shall be 60 minutes and the minimum sample volume shall be 0.003 dry standard cubic meters except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(d) The department shall approve testing of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the department that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

NR 440.49 [Reserved]

NR 440.50 STANDARDS OF PERFORMANCE FOR STATIONARY GAS TURBINES. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. The provisions of this section are applicable to the following affected facilities: all stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour, based on the lower heating value of the fuel fired.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Base load" means the load level at which a gas turbine is normally operated.

(b) "Combined cycle gas turbine" means any stationary gas turbine which recovers heat from the gas turbine exhaust gases to heat water or generate steam.

(c) "Efficiency" means the gas turbine manufacturer's rated heat rate at peak load in terms of heat input per unit of power output based on the lower heating value of the fuel.

(d) "Electric utility stationary gas turbine" means any stationary gas turbine constructed for the purpose of supplying more than one-third of its potential electric output capacity to any utility power distribution system for sale.

(e) "Emergency fuel" is a fuel fired by a gas turbine only during circumstances, such as natural gas supply curtailment or breakdown of delivery system, that make it impossible to fire natural gas in the gas turbine.

(f) "Emergency gas turbine" means any stationary gas turbine which operates as a mechanical or electrical power source only when the primary power source for a facility has been rendered inoperable by an emergency situation.

(g) "Fire-fighting turbine" means any stationary gas turbine that is used solely to pump water for extinguishing fires.

(h) "Garrison facility" means any permanent military installation.

(i) "Gas turbine model" means a group of gas turbines having the same nominal air flow, combuster inlet pressure, combuster inlet temperature, firing temperature, turbine inlet temperature and turbine inlet pressure.

(j) "ISO standard day conditions" means 288 degrees Kelvin, 60% relative humidity and 101.3 kilopascals pressure.

(k) "Ice fog" means an atmospheric suspension of highly reflective ice crystals.

(l) [Reserved]

(m) "Offshore platform gas turbines" means any stationary gas turbine located on a platform in an ocean.

(n) "Peak load" means 100% of the manufacturer's design capacity of the gas turbine at ISO standard day conditions.

(o) "Regenerative cycle gas turbine" means any stationary gas turbine which recovers heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine.

(p) "Regenerative cycle gas turbine" means any stationary gas turbine that recovers thermal energy from the exhaust gases and utilizes the thermal energy to preheat air prior to entering the combustor.

(q) "Simple cycle gas turbine" means any stationary gas turbine which does not recover heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine, or which does not recover heat from the gas turbine exhaust gases to heat water or generate steam.

(r) "Stationary gas turbine" means any simple cycle gas turbine, regenerative cycle gas turbine or any gas turbine portion of a combined cycle steam/electric generating system that is not self-propelled. It may, however, be mounted on a vehicle for portability.

(s) "Turbines employed in oil or gas production or oil or gas transportation" means any stationary gas turbine used to provide power to extract crude oil or natural gas, or both, from the earth or to move crude oil or natural gas, or both, or products refined from these substances through pipelines.

(3) STANDARD FOR NITROGEN OXIDES. (a) On and after the date on which the performance test required by s. NR 440.08 is completed, every owner or operator subject to the provisions of this section, as specified in pars. (b), (c) and (d), shall comply with one of the following, except as provided in pars. (e) through (l).

1. No owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of:

$$STD + 0.0075 \frac{(14.4)}{Y} + F$$

where:

STD is the allowable NO_x emissions (percent by volume at 15% oxygen and on a dry basis)

Y is the manufacturer's rated heat rate at manufacturer's rated load (kilojoules per watt hour), or actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility (the value of Y may not exceed 14.4 kilojoules per watt hour)

F is the NO_x emission allowance for fuel-bound nitrogen as defined in subd. 3.

2. No owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of:

$$STD = 0.0150 \left(\frac{14.4}{Y}\right) + F$$

where:

STD is the allowable NO_x emissions (percent by volume at 15% oxygen and on a dry basis)

Y is the manufacturer's rated heat rate at manufacturer's rated peak load (kilojoules per watt hour), or actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility (the value of Y may not exceed 14.4 kilojoules per watt hour)

F is the NO_x emission allowance for fuel-bound nitrogen as defined in subd. 3.

3. F shall be defined according to the nitrogen content of the fuel as follows:

Fuel-Bound Nitrogen (percent by weight)	F (NO_x percent by volume)
$N \leq 0.015$	0
$0.015 \leq N \leq 0.1$	$0.04(N)$
$0.01 < N \leq 0.25$	$0.004 + 0.0067(N-0.1)$
$N > 0.25$	0.005

where N is the the nitrogen content of the fuel (percent by weight), or manufacturers may develop custom fuel-bound nitrogen allowances for each gas turbine model they manufacture. These fuel-bound nitrogen allowances shall be substantiated with data and must be approved for use by the department before the initial performance test required by s. NR 440.08.

(b) Electric utility stationary gas turbines with a heat input at peak load greater than 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired except as provided in par. (d) shall comply with the provisions of par. (a)1.

(c) Stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 million Btu/hour) but less than or equal to 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired shall comply with the provisions of par. (a)2.

(d) Electric utility stationary gas turbines with a heat input at peak load greater than 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired shall comply with the provisions of par. (a)1.

(e) Stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 million Btu/hour) but less than or equal to 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired and that have commenced construction prior to October 3, 1982 are exempt from par. (a).

(f) Stationary gas turbines using water or steam injection for control of NO_x emissions are exempt from par. (a) when ice fog is deemed a traffic hazard by the owner or operator of the gas turbine.

(g) Emergency gas turbines, military gas turbines for use in other than a garrison facility, military gas turbines installed for use as military training facilities and fire fighting gas turbines are exempt from par. (a).

(h) Stationary gas turbines engaged by manufacturers in research and development of equipment for both gas turbine emission control techniques and gas turbine efficiency improvements may be exempted from par. (a) on a case-by-case basis by the department.

(i) Exemptions from the requirements of par. (a) may be granted on a case-by-case basis as determined by the department in specific geographical areas where mandatory water restrictions are required by governmental agencies because of drought conditions. These exemptions may be allowed only while the mandatory water restrictions are in effect.

(j) Stationary gas turbines with a heat input at peak load greater than 107.2 gigajoules per hour that commenced construction, modification or reconstruction between the dates of October 3, 1977, and January 27, 1982, and were required in 44 Fed. Reg. 52792 (Sep. 10, 1979) to comply with 40 C.F.R. s. 60.332(a)(1), except electric utility stationary gas turbines, are exempt from par. (a).

(k) Stationary gas turbines with a heat input greater than or equal to 10.7 gigajoules per hour (10 million Btu/hour) when fired with natural gas are exempt from par. (a)2. when being fired with an emergency fuel.

(l) Regenerative cycle gas turbines with a heat input less than or equal to 107.2 gigajoules per hour (100 million Btu/hour) are exempt from par. (a).

(4) STANDARD FOR SULFUR DIOXIDE. On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, every owner or operator subject to the provisions of this section shall comply with one or the other of the following conditions:

(a) No owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any stationary gas turbine any gases which contain sulfur dioxide in excess of 0.015% by volume at 15% oxygen and on a dry basis.

(b) No owner or operator subject to the provisions of this section may burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8% by weight.

(5) MONITORING OF OPERATIONS. (a) The owner or operator of any stationary gas turbine subject to the provisions of this section and using water injection to control NO_x emissions shall install and operate a continuous monitoring system to monitor and record the fuel consumption and ratio of water to fuel being fired in the turbine. This system shall be accurate to within plus or minus 5.0% and must be approved by the department.

(b) The owner or operator of any stationary gas turbine subject to the provisions of this section shall monitor sulfur content and nitrogen content of the fuel being fired in the turbine. The frequency of determination of these values shall be as follows:

1. If the turbine is supplied its fuel from a bulk storage tank, the values shall be determined on each occasion that fuel is transferred to the storage tank from any other source.

2. If the turbine is supplied its fuel without intermediate bulk storage the values shall be determined and recorded daily. Owners, operators or fuel vendors may develop custom schedules for determination of the values based on the design and operation of the affected facility and the characteristics of the fuel supply. These custom schedules shall be substantiated with data and must be approved by the department before they can be used to comply with this paragraph.

(c) For the purpose of reports required under s. NR 440.07(3), periods of excess emissions that shall be reported are defined as follows:

1. 'Nitrogen oxides'. Any one-hour period during which the average water-to-fuel ratio, as measured by the continuous monitoring system, falls below the water-to-fuel ratio determined to demonstrate compliance with sub. (3) by the performance test required in s. NR 440.08 or any period during which the fuel-bound nitrogen of the fuel is greater than the maximum nitrogen content

allowed by the fuel-bound nitrogen allowance used during the performance test required in s. NR 440.08. Each report shall include the average water-to-fuel ratio, average fuel consumption, ambient conditions, gas turbine load and nitrogen content of the fuel during the period of excess emissions, and the graphs or figures developed under sub. (6)(a).

2. 'Sulfur dioxide'. Any daily period during which the sulfur content of the fuel being fired in the gas turbine exceeds 0.8%.

3. 'Ice fog'. Each period during which an exemption provided in sub. (3)(g) is in effect shall be reported in writing to the department quarterly. For each period the ambient conditions existing during the period, the date and time the air pollution control system was deactivated and the date and time the air pollution control system was reactivated shall be reported. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

4. 'Emergency fuel'. Each period during which an exemption provided in sub. (3)(k) is in effect shall be included in the report required in s. NR 440.07(3). For each period, the type, reasons, and duration of the firing of the emergency fuel shall be reported.

(6) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in sub. (3) as follows:

1. Reference Method 20 for the concentration of nitrogen oxides and oxygen. The span value shall be 300 parts per million of nitrogen oxides.

a. The nitrogen oxides emission level measured by Reference Method 20 shall be adjusted to ISO standard day conditions by the following ambient condition correction factor:

$$NO_x = \left(NO_{x_{obs}}\right)\left(\frac{P_{ref}}{P_{obs}}\right)^{0.5} e^{19(H_{obs}-0.00633)}\left(\frac{T_{AMB}}{288^{o}K}\right)^{1.53}$$

where:

NO_x is the emissions of NO_x at 15% oxygen and ISO standard day conditions

NO_x is the measured NO_x emissions at 15% oxygen, ppmv

P_{ref} is the reference combuster inlet absolute pressure at 101.3 kilopascals ambient pressure

P_{obs} is the measured combustor inlet absolute pressure at test ambient pressure

H_{obs} is the specific humidity of ambient air at test

e is the transcendental constant (2.718)

T_{AMB} is the temperature of ambient air at test

The adjusted NO_x emission level shall be used to determine compliance with sub. (3).

b. Manufacturers may develop custom ambient condition correction factors for each gas turbine model they manufacture in terms of combustor inlet pressure, ambient air pressure, ambient air humidity and ambient air temperature to adjust the nitrogen oxides emission level measured by the performance test as provided for in s. NR 440.08 to ISO standard day conditions. These ambient condition correction factors shall be substantiated with data and must be approved for use by the department before the initial performance test required by s. NR 440.08.

c. The water-to-fuel ratio necessary to comply with sub. (3) shall be determined during the initial performance test by measuring NO_x emissions using Reference Method 20 and the water-to-fuel ratio necessary to comply with sub. (3) at 30, 50, 75 and 100 percent of peak load or at 4 points in the normal operating range of the gas turbine, including the minimum point in the range and peak load. All loads shall be corrected to ISO standard day conditions using the appropriate equations supplied by the manufacturer.

2. The analytical methods and procedures employed to determine the nitrogen content of the fuel being fired shall be approved by the department and shall be accurate to within plus or minus 5%.

(b) The method for determining compliance with sub. (4), except as provided in s. NR 440.08(2), shall be as follows:

1. Reference Method 20 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, for the concentration of sulfur dioxide and oxygen or

2. ASTM D2880-78 for the sulfur content of liquid fuels and ASTM D1072-56 (Reapproved 1975) for the sulfur content of gaseous fuels. These 2 ASTM methods are incorporated by reference in s. NR 440.17. These methods shall also be used to comply with sub. (5)(b).

(c) Analysis for the purpose of determining the sulfur content and the nitrogen content of the fuel as required by sub. (5)(b) may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor or any other qualified agency provided that the analytical methods employed by these agencies comply with the applicable paragraphs of this subsection.

NR 440.51 STANDARDS OF PERFORMANCE FOR LIME MANUFACTURING PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities used in the manufacture of lime: rotary lime kilns and lime hydrators.

(b) The provisions of this section are not applicable to facilities used in the manufacture of lime at kraft pulp mills.

(c) Any facility under par. (a) that commences construction or modification after May 3, 1977, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Lime hydrator" means a unit used to produce hydrated lime product.

(b) "Lime manufacturing plant" includes any plant which produces a lime product from limestone by calcination. Hydration of the lime product shall be considered to be part of the source.

(c) "Lime product" means the product of the calcination process including, but not limited to, calcitic lime, dolomitic lime and dead-burned dolomite.

(d) "Rotary lime kiln" means a unit with an inclined rotating drum which is used to produce a lime product from limestone by calcination.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any rotary lime kiln any gases which:

a. Contain particulate matter in excess of 0.15 kilogram per megagram of limestone feed (0.30 lb/ton).

b. Exhibit 10% opacity or greater.

2. From any lime hydrator any gases which contain particulate matter in excess of 0.075 kilogram per megagram of lime feed (0.15 lb/ton).

(b) [Reserved]

(4) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a continuous monitoring system, except as provided in par. (b) to monitor and record the opacity of a representative portion of the gases discharged into the atmosphere from any rotary lime kiln. The span of this system shall be set at 40% opacity.

(b) The owner or operator of any rotary lime kiln using a wet scrubbing emission control device subject to the provisions of this section may not be required to monitor the opacity of the gases discharged as required in par. (a), but shall install, calibrate, maintain and operate the following continuous monitoring devices:

1. A monitoring device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device shall be accurate within plus or minus 250 pascals (one inch of water).

2. A monitoring device for continuous measurement of the scrubbing liquid supply pressure to the control device. The monitoring device shall be accurate within plus or minus 5% of the design scrubbing liquid supply pressure.

(c) The owner or operator of any lime hydrator using a wet scrubbing emission control device subject to the provisions of this section shall install, calibrate, maintain and operate the following continuous monitoring devices:

1. A monitoring device for the continuous measuring of the scrubbing liquid flow rate. The monitoring device shall be accurate within plus or minus 5% of design scrubbing liquid flow rate.

2. A monitoring device for the continuous measurement of the electric current, in amperes, used by the scrubber. The monitoring device shall be accurate within plus or minus 10% over its normal operating range.

(d) For the purpose of conducting a performance test under s. NR 440.08, the owner or operator of any lime manufacturing plant subject to the provisions of this section shall install, calibrate, maintain and operate a device for measuring the mass rate of limestone feed to any affected rotary lime kiln and the mass rate of lime feed to any affected lime hydrator. The measuring device used shall be accurate within plus or minus 5% of the mass rate over its operating range.

(e) For the purpose of reports required under s. NR 440.07(3), periods of excess emissions that shall be reported are defined as all 6-minute periods during which the average opacity of the plume from any lime kiln subject to par. (a) is 10% or greater.

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used to determine compliance with sub. (3)(a) as follows:

1. Method 5 for the measurement of particulate matter,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate,

4. Method 3 for gas analysis,

5. Method 4 for stack gas moisture, and

6. Method 9 for visible emissions.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.85 std m^3/h, dry basis (0.53 dscf/min), except that shorter sampling times when necessitated by process variables or other factors may be approved by the department.

(c) Because of the high moisture content (40 to 85 percent by volume) of the exhaust gases from hydrators, the Method 5 sample train may be modified to include a calibrated orifice immediately following the sample nozzle when testing lime hydrators. In this configuration, the sampling rate necessary for maintaining isokinetic conditions can be directly related to exhaust gas velocity without a correction for moisture content. Extra care shall be exercised when cleaning the sample train with the orifice in this position following the test runs.

NR 440.52 STANDARDS OF PERFORMANCE FOR LEAD-ACID BATTERY MANUFACTURING PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the affected facilities listed in par. (b) at any lead-acid battery manufacturing plant that produces or has the design capacity to produce in one day (24 hours) batteries containing an amount of lead equal to or greater than 5.9 Mg (6.5 tons).

(b) The provisions of this section are applicable to the following affected facilities used in the manufacture of lead-acid storage batteries:

1. Grid casting facility.
2. Paste mixing facility.
3. Three-process operation facility.
4. Lead oxide manufacturing facility.
5. Lead reclamation facility.
6. Other lead-emitting operations.

(c) Any facility under par. (b) that commences construction or modification after January 14, 1980, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Grid casting facility" means the facility which includes all lead melting pots and machines used for casting the grid used in battery manufacturing.

(b) "Lead-acid battery manufacturing plant" means any plant that produces a storage battery using lead and lead compounds for the plates and sulfuric acid for the electrolyte.

(c) "Lead oxide manufacturing facility" means a facility that produces lead oxide from lead, including product recovery.

(d) "Lead reclamation facility" means the facility that remelts lead scrap and casts it into lead ingots for use in the battery manufacturing process, and which is not a furnace affected under s. NR 440.29.

(e) "Other lead-emitting operation" means any lead-acid battery manufacturing plant operation from which lead emissions are collected and ducted to the atmosphere and which is not part of a grid casting, lead oxide manufacturing, lead reclamation, paste mixing, 3-process operation facility or a furnace affected under s. NR 440.29.

(f) "Paste mixing facility" means the facility including lead oxide storage, conveying, weighing, metering and charging operations; paste blending, handling and cooling operations; and plate pasting, takeoff, cooling and drying operations.

(g) "Three-process operation facility" means the facility including those processes involved with plate stacking, burning or strap casting, and assembly of elements into the battery case.

(3) STANDARDS FOR LEAD. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any grid casting facility any gases that contain lead in excess of 0.40 milligram of lead per dry standard cubic meter of exhaust (0.000176 gr/dscf).

2. From any paste mixing facility any gases that contain in excess of 1.00 milligram of lead per dry standard cubic meter of exhaust (0.00044 gr/dscf).

3. From any 3-process operation facility any gases that contain in excess of 1.00 milligram of lead per dry standard cubic meter of exhaust (0.00044 gr/dscf).

4. From any lead oxide manufacturing facility any gases that contain in excess of 5.0 milligrams of lead per kilogram of lead feed (0.010 lb/ton).

5. From any lead reclamation facility any gases that contain in excess of 4.50 milligrams of lead per dry standard cubic meter of exhaust (0.00198 gr/dscf).

6. From any other lead-emitting operation any gases that contain in excess of 1.00 milligram per dry standard cubic meter of exhaust (0.00044 gr/dscf).

7. From any affected facility other than a lead reclamation facility any gases with greater than zero percent opacity measured according to Method 9 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, and rounded to the nearest whole percentage.

(8) From any lead reclamation facility any gases with greater than 5% opacity, measured according to Method 9 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, and rounded to the nearest whole percentage.

(b) When 2 or more facilities at the same plant (except the lead oxide manufacturing facility) are ducted to a common control device, an equivalent standard for the total exhaust from the commonly controlled facilities shall be determined as follows:

$$S_e = \sum_{a=1}^{N} S_a \quad (Q_{sd_a} / Q_{sd_T})$$

where:

S_e is the equivalent standard for the total exhaust stream

S_a is the actual standard for each exhaust stream ducted to the control device

N is the total number of exhaust streams ducted to the control device

Q_{sd} is the dry standard volumetric flow rate of the effluent gas stream from each facility ducted to the control device

Q_{sd_T} is the total dry standard volumetric flow rate of all effluent gas streams ducted to the control device

(4) MONITORING OF EMISSIONS AND OPERATIONS. The owner or operator of any lead-acid battery manufacturing facility subject to the provisions of this section and controlled by scrubbing systems shall install, calibrate, maintain and operate a monitoring device or devices that measure and record the pressure drop across the scrubbing systems at least once every 15 minutes. The monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used to determine compliance according to s. NR 440.08 as follows:

1. Method 12 for the measurement of lead concentrations,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 4 for stack gas moisture.

(b) For Method 12 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.85 dscm/h (0.53 dscf/min), except that shorter sampling times when necessitated by process variables or other factors, may be approved by the department.

(c) When different operations in a 3-process operation facility are ducted to separate control devices, the lead emission concentration from the facility shall be determined using the equation:

$$C_{Pb_T} = \sum_{a=1}^{N} (C_{Pb_a} Q_{sd_a} / Q_{sd_T})$$

where:

C_{Pb_T} is the facility emission concentration for the entire facility

N is the number of control devices to which separate operations in the facility are ducted

C_{Pb_a} is the emission concentration from each control device

Q_{sd_a} is the dry standards volumetric flow rate of the effluent gas stream from each control device

Q_{sd_T} is the total dry standard volumetric flow rate from all of the control devices.

(d) For lead oxide manufacturing facilities, the average lead feed rate to a facility, expressed in kilograms per hour, shall be determined for each test run as follows:

1. Calculate the total amount of lead charged to the facility during the run by multiplying the number of lead pigs (ingots) charged during the run by the average mass of a pig in kilograms or by another suitable method.

2. Divide the total amount of lead charged to the facility during the run by the duration of the run in hours.

(e) Lead emissions from lead oxide manufacturing facilities, expressed in milligrams per kilogram of lead charged, shall be determined using the following equation:

$$E_{Pb}=C_{Pb}Q_{sd}/F$$

where:

E_{Pb} is the lead emission rate from the facility in milligrams per kilogram of lead charged

C_{Pb} is the concentration of lead in the exhaust stream in milligrams per dry standard cubic meter as determined according to par. (a)1.

Q_{sd} is the dry standard volumetric flow rate in dry standard cubic meters per hour as determined according to par. (a)3.

F is the lead feed rate to the facility in kilograms per hour as determined according to par. (d)

NR 440.53 STANDARDS OF PERFORMANCE FOR AUTOMOBILE AND LIGHT DUTY TRUCK SURFACE COATING OPERATIONS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to the following affected facilities in an automobile or light-duty truck assembly plant: each prime coat operation, each guide coat operation and each topcoat operation.

(b) Exempt from the provisions of this section are operations used to coat plastic body components or all-plastic automobile or light-duty truck bodies on separate coating lines. The attachment of plastic body parts to a metal body before the body is coated does not cause the metal body coating operation to be exempt.

(c) Any facility under par. (a) that commences construction, reconstruction or modification after October 5, 1979 is subject to the requirements of this section.

(2) DEFINITIONS. (a) As used in this section, all terms not defined in this paragraph have the meaning given them in s. NR 440.02.

1. "Applied coating solids" means the volume of dried or cured coating solids which is deposited and remains on the surface of the automobile or light-duty truck body.

2. "Automobile" means a motor vehicle capable of carrying no more than 12 passengers.

3. "Automobile and light-duty truck body" means the exterior surface of an automobile or light-duty truck including hoods, fenders, cargo boxes, doors and grill opening panels.

4. "Bake oven" means a device that uses heat to dry or cure coatings.

5. "'Electrodeposition' or 'EDP'" means a method of applying a prime coat by which the automobile or light-duty truck body is submerged in a tank filled with coating material and an electrical field is used to effect the deposition of the coating material on the body.

6. "Electrostatic spray application" means a spray application method that uses an electrical potential to increase the transfer efficiency of the coating solids. Electrostatic spray application can be used for prime coat, guide coat or topcoat operations.

7. "Plastic body component" means any component of an automobile or light-duty truck exterior surface constructed of synthetic organic material.

8. "Prime coat operation" means the prime coat spray booth or dip tank, flash-off area and bake oven or ovens which are used to apply and dry or cure the initial coating on components of automobile or light-duty truck bodies.

9. "'Purge' or 'line purge'" means the coating material expelled from the spray system when clearing it.

10. "Solvent-borne" means a coating which contains 5% or less water by weight in its volatile fraction.

11. "Spray application" means a method of applying coatings by atomizing the coating material and directing the atomized material toward the part to be coated. Spray applications can be used for prime coat, guide coat and topcoat operations.

12. "Spray booth" means a structure housing automatic or manual spray application equipment where prime coat, guide coat or topcoat is applied to components of automobile or light-duty truck bodies.

13. "Surface coating operation" means any prime coat, guide coat or topcoat operation on an automobile or light-duty truck surface coating line.

14. "Topcoat operation" means the topcoat spray booth, flash-off area and bake oven or ovens which are used to apply and dry or cure the final coating or coatings on components of automobile and light-duty truck bodies.

15. "Transfer efficiency" means the ratio of the amount of coating solids transferred onto the surface of a part or product to the total amount of coating solids used.

16. "VOC content" means all volatile organic compounds that are in a coating expressed as kilograms of VOC per liter of coating solids.

17. "'Waterborne' or 'water reducible'" means a coating which contains more than 5 weight percent water in its volatile fraction.

(b) The nomenclature used in this section has the following meanings:

1. C_{aj}=concentration of VOC (as carbon) in the effluent gas flowing through stack (j) leaving the control device (parts per million by volume).

2. C_{bi}=concentration of VOC (as carbon) in the effluent gas flowing through stack (i) entering the control device (parts per million by volume).

3. C_{fk}=concentration of VOC (as carbon) in the effluent gas flowing through exhaust stack (k) not entering the control device (parts per million by volume).

4. D_{ci}=density of each coating (i) as received (kilograms per liter)

5. D_{dj}=density of each type VOC dilution solvent (j) added to the coatings, as received (kilograms per liter).

6. D_r=density of VOC recovered from an affected facility (kilograms per liter).

7. E=VOC destruction efficiency of the control device.

8. F=fraction of total VOC which is emitted by an affected facility that enters the control device.

9. G=volume weighted average mass of VOC per volume of applied solids (kilograms per liter).

10. L_{ci}=volume of each coating (i) consumed, as received (liters).

11. L_{ci} L=volume of each coating (i) consumed by each application method (l), as received (liters).

12. L_{dj}=volume of each type VOC dilution solvent (j) added to the coatings, as received (liters).

13. L_r=volume of VOC recovered from an affected facility (liters).

14. L_s=volume of solids in coatings consumed (liters).

15. M_d=total mass of VOC in dilution solvent (kilograms).

16. M_o=total mass of VOC in coatings as received (kilograms).

17. M_r=total mass of VOC recovered from an affected facility (kilograms).

18. N=volume weighted average mass of VOC per volume of applied coating solids after the control device

$$\left(\frac{\text{Kilograms of VOC}}{\text{liter of applied solids}}\right).$$

19. Q_{aj}=volumetric flow rate of the effluent gas flowing through stack (j) leaving the control device (dry standard cubic meters per hour).

20. Q_{bi}=volumetric flow rate of the effluent gas flowing through stack (i) entering the control device (dry standard cubic meters per hour).

21. Q_{fk}=volumetric flow rate of the effluent gas flowing through exhaust stack (k) not entering the control device (dry standard cubic meters per hour).

22. T=overall transfer efficiency.

23. T_l=transfer efficiency for application method (l).

24. V_{si}=proportion of solids by volume in each coating (i) as received

$$\left(\frac{\text{liter solids}}{\text{liter coating}}\right).$$

25. W_{oi}=proportion of VOC by weight in each coating (i), as received

$$\left(\frac{\text{kilograms VOC}}{\text{kilograms coating}}\right).$$

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. On and after the date on which the initial performance test required by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge into the atmosphere from any affected facility VOC emissions in excess of:

(a) 0.16 kilograms of VOC per liter of applied coating solids from each prime coat operation.

(b) 1.40 kilograms of VOC per liter of applied coating solids from each guide coat operation.

(c) 1.47 kilograms of VOC per liter of applied coating solids from each topcoat operation.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08(4) and (6) do not apply to the performance test procedures required by this subsection.

(b) The owner or operator of an affected facility shall conduct an initial performance test in accordance with s. NR 440.08(1), and thereafter for each calendar month for each affected facility according to the procedures in this subsection.

(c) The owner or operator shall use the following procedures for determining the monthly volume weighted average mass of VOC emitted per volume of applied coating solids.

1. The owner or operator shall use the following procedures for each affected facility which does not use a capture system and a control device to comply with the applicable emission limit specified under sub. (3).

a. Calculate the volume weighted average mass of VOC per volume of applied coating solids for each calendar month for each affected facility. The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or from data determined by an analysis of each coating, as received, by Reference Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17. The department may require the owner or operator who uses formulation data supplied by the manufacturer of the coating to determine data used in the calculation of the VOC content of coatings by Reference Method 24 or an equivalent or alternative method. The owner or operator shall determine from company records on a monthly basis the volume of coating consumed, as received, and the mass of solvent used for thinning purposes. The volume weighted average of the total mass of VOC per volume of coating solids used each calendar month shall be determined by the following procedures.

1) Calculate the mass of VOC used in each calendar month for each affected facility by the following equation where "n" is the total number of coatings used and "m" is the total number of VOC solvents used:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

($L_{dj} D_{dj}$ will be zero if no VOC solvent is added to the coatings, as received.)

2) Calculate the total volume of coating solids used in each calendar month for each affected facility by the following equation where "n" is the total number of coatings used:

$$L_s = \sum_{i=1}^{n} L_{ci} V_{si}$$

3) Select the appropriate transfer efficiency (T) from the following tables for each surface coating operation:

Application method	Transfer efficiency
Air Atomized Spray (waterborne coating)	0.39
Air Atomized Spray (solvent-borne coating).	0.50
Manual Electrostatic Spray	0.75
Automatic Electrostatic Spray	0.95
Electrodeposition	1.00

The values in the table above represent an overall system efficiency which includes a total capture of purge. If a spray system uses line purging after each vehicle and does not collect any of the purge material, the following table shall be used:

Application method	Transfer efficiency
Air Atomized Spray (waterborne coating)	0.30
Air Atomized Spray (solvent-borne coating)	0.40
Manual Electrostatic Spray	0.62
Automatic Electrostatic Spray	0.75

If the owner or operator can justify to the department's satisfaction that other values for transfer efficiencies are appropriate, the department shall approve their use on a case-by-case basis.

a) When more than one application method (i) is used on an individual surface coating operation, the owner or operator shall perform an analysis to determine an average transfer efficiency by the following equation where "n" is the total number of coatings used and "p" is the total number of application methods:

$$T = \frac{\sum_{i=1}^{n} \sum_{i=1}^{p} T_i V_{si} L_{cii}}{Ls}$$

4) Calculate the volume weighted average mass of VOC per volume of applied coating solids (G) during each calendar month for each affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s T}$$

b. If the volume weighted average mass of VOC per volume of applied coating solids (G), calculated on a calendar month basis, is less than or equal to the applicable emission limit specified in sub. (3), the affected facility is in compliance. Each monthly calculation is a performance test for the purpose of this section.

2. The owner or operator shall use the following procedures for each affected facility which uses a capture system and a control device that destroys VOC (e.g., incinerator) to comply with the applicable emission limit specified under sub. (3).

a. Calculate the volume weighted average mass of VOC per volume of applied coating solids (G) during each calendar month for each affected facility as described under subd. 1.a.

b. Calculate the volume weighted average mass of VOC per volume of applied solids emitted after the control device, by the following equation:

$$N=G[1-FE]$$

1) Determine the fraction of total VOC which is emitted by an affected facility that enters the control device by using the following equation where "n" is the total number of stacks entering the control device and "p" is the total number of stacks not connected to the control device:

$$F = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi}}{\sum_{i=1}^{n} Q_{bi} C_{bi} + \sum_{k=1}^{p} Q_{fk} C_{fk}}$$

If the owner can justify to the department's satisfaction that another method will give comparable results, the department shall approve its use on a case-by-case basis.

a) In subsequent months, the owner or operator shall use the most recently determined capture fraction for the performance test.

2) Determine the destruction efficiency of the control device using values of the volumetric flow rate of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation where "n" is the total number of stacks entering the control device and "m" is the total number of stacks leaving the control device:

$$E = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi} - \sum_{j=1}^{m} Q_{aj} C_{aj}}{\sum_{i=1}^{n} Q_{bi} C_{bi}}$$

a) In subsequent months, the owner or operator shall use the most recently determined VOC destruction efficiency for the performance test.

3) If an emission control device controls the emissions from more than one affected facility, the owner or operator shall measure the VOC concentration (C_{bi}) in the effluent gas entering the control device (in parts per million by volume) and the volumetric flow rate (Q_{bi}) of the effluent gas (in dry standard cubic meters per hour) entering the device through each stack. The destruction or removal efficiency determined using these data shall be applied to each affected facility served by the control device.

c. If the volume weighted average mass of VOC per volume of applied solids emitted after the control device (N) calculated on a calendar month basis is less than or equal to the applicable emission limit specified in sub. (3), the affected facility is in compliance. Each monthly calculation is a performance test for the purposes of this section.

3. The owner or operator shall use the following procedures for each affected facility which uses a capture system and a control device that recovers the VOC (e.g., carbon adsorber) to comply with the applicable emission limit specified under sub. (3).

a. Calculate the mass of VOC (M_o+M_d) used during each calendar month for each affected facility as described under subd. l.a.

b. Calculate the total volume of coating solids (L_s) used in each calendar month for each affected facility as described under subd. l.a.

c. Calculate the mass of VOC recovered (M_r) each calendar month for each affected facility by the following equation: M_r=$L_r D_r$.

d. Calculate the volume weighted average mass of VOC per volume of applied coating solids emitted after the control device during a calendar month by the following equation:

$$N = \frac{M_o+M_d-M_r}{L_s T}$$

e. If the volume weighted average mass of VOC per volume of applied solids emitted after the control device (N) calculated on a calendar month basis is less than or equal to the applicable emission limit specified in sub. (3), the affected facility is in compliance. Each monthly calculation is a performance test for the purposes of this section.

(5) MONITORING OF EMISSIONS AND OPERATIONS. The owner or operator of an affected facility which uses an incinerator to comply with the emission limits specified under sub. (3) shall install, calibrate, maintain and operate temperature measurement devices as prescribed below:

(a) Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

(b) Each temperature measurement device shall be installed, calibrated and maintained according to accepted practice and the manufacturer's specifications. The device shall have an accuracy of the greater of plus or minus 0.75% of the temperature being measured expressed in degrees Celsius or plus or minus 2.5°C.

(c) Each temperature measurement device shall be equipped with a recording device so that a permanent record is produced.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) Each owner or operator of an affected facility shall include the data outlined in subds. 1. and 2. in the initial compliance report required by s. NR 440.08.

1. The owner or operator shall report the volume weighted average mass of VOC per volume of applied coating solids for each affected facility.

2. Where compliance is achieved through the use of incineration, the owner or operator shall include the following additional data in the control device initial performance test required by s. NR 440.08(1) or subsequent performance tests at which destruction efficiency is determined: the combustion temperature (or the gas temperature upstream and downstream of the catalyst bed), the total mass of VOC per volume of applied coating solids before and after the incinerator, capture efficiency, the destruction efficiency of the incinerator used to attain compliance with the applicable emission limit specified in sub. (3), and a description of the method used to establish the fraction of VOC captured and sent to the control device.

(b) Following the initial report, each owner or operator shall report the volume weighted average mass of VOC per volume of applied coating solids for each affected facility during each calendar month in which the affected facility is not in compliance with the applicable emission limit specified in sub. (3). This report shall be postmarked not later than 10 days after the end of the calendar month that the affected facility is not in compliance. Where compliance is achieved through the use of a capture system and control device, the volume weighted average after the control device shall be reported.

(c) Where compliance with sub. (3) is achieved through the use of incineration, the owner or operator shall continuously record the incinerator combustion temperature during coating operations for the thermal incineration or the gas temperature upstream and downstream of the incinerator catalyst bed during coating operations for catalytic incineration. The owner or operator shall report quarterly as follows:

1. For thermal incinerators, every 3-hour period shall be reported during which the average temperature measured is more than 28°C less than the average temperature during the most recent control device performance test at which the destruction efficiency was determined as specified under sub. (4).

2. For catalytic incinerators, every 3-hour period shall be reported during which the average temperature immediately before the catalyst bed, when the coating system is operational, is more than 28°C less than the average temperature immediately before the catalyst bed during the most recent control device performance test at which destruction efficiency was determined as specified under sub. (4). In addition, every 3-hour period shall be reported each quarter during which the average temperature difference across the catalyst bed when the coating system is operational is less than 80% of the average temperature difference of the device during the most recent control device performance test at which destruction efficiency was determined as specified under sub. (4).

3. For thermal and catalytic incinerators, if no such periods occur, the owner or operator shall submit a negative report.

(d) The owner or operator shall notify the department 30 days in advance of any test by Reference Method 25 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17.

(7) REFERENCE METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08 shall be used to conduct performance tests.

1. Reference Method 24 or an equivalent or alternative method approved by the department shall be used for the determination of the data used in the calculation of the VOC content of the coatings used for each affected facility. Manufacturer's formulation data is approved by the department as an alternative method to Method 24. In the event of dispute, Reference Method 24 shall be the reference method.

2. Reference Method 25 or an equivalent method approved by the department shall be used for the determination of the VOC concentration in the effluent gas entering and leaving the emission control device for each stack equipped with an emission control device and in the effluent gas leaving each stack not equipped with a control device.

3. The following methods shall be used to determine the volumetric flow rate in the effluent gas in a stack:

a. Method 1 for sample and velocity traverses,

b. Method 2 for velocity and volumetric flow rate,

c. Method 3 for gas analysis, and

d. Method 4 for stack gas moisture.

(b) For Reference Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the coating sample must be a one-liter sample taken in a one-liter container.

(c) For Reference Method 25 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each of 3 runs shall be at least one hour. The minimum sample volume shall be 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department. The department shall approve the sampling of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the department that the testing of representative stacks would yield results comparable to those that would be obtained by testing all stacks.

(8) MODIFICATIONS. For purposes of this chapter, the following physical or operational changes are not, by themselves, considered modifications of existing facilities described in sub. (1)(a):

(a) Changes as a result of model year changeovers or switches to larger cars.

(b) Changes in the application of the coatings to increase coating film thickness.

NR 440.54 STANDARDS OF PERFORMANCE FOR PHOSPHATE ROCK PLANTS. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities used in phosphate rock plants which have a maximum plant production capacity greater than 3.6 megagrams per hour (4 tons/hr): dryers, calciners, grinders, and ground rock handling and storage facilities, except those facilities producing or preparing phosphate rock solely for consumption in elemental phosphorus production.

(b) Any facility under par. (a) which commences construction, modification or reconstruction after September 21, 1979, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Beneficiation" means the process of washing the rock to remove impurities or to separate size fractions.

(b) "Calciner" means a unit in which the moisture and organic matter of phosphate rock is reduced within a combustion chamber.

(c) "Dryer" means a unit in which the moisture content of phosphate rock is reduced by contact with a heated gas stream.

(d) "Grinder" means a unit which is used to pulverize dry phosphate rock to the final product size used in the manufacture of phosphate fertilizer and does not include crushing devices used in mining.

(e) "Ground phosphate rock handling and storage system" means a system which is used for the conveyance and storage of ground phosphate rock from grinders at phosphate rock plants.

(f) "Phosphate rock feed" means all material entering the process unit including moisture and extraneous material as well as the following ore minerals: fluorapatite, hydroxylapatite, chlorapatite and carbonateapatite.

(g) "Phosphate rock plant" means any plant which produces or prepares phosphate rock product by any or all of the following processes: mining, beneficiation, crushing, screening, cleaning, drying, calcining and grinding.

(3) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere:

1. From any phosphate rock dryer any gases which:

a. Contain particulate matter in excess of 0.030 kilogram per megagram of phosphate rock feed (0.06 lb/ton), or

b. Exhibit greater than 10% opacity.

2. From any phosphate rock calciner processing unbeneficiated rock or blends of beneficiated and unbeneficiated rock, any gases which:

a. Contains particulate matter in excess of 0.12 kilogram per megagram of phosphate rock feed (0.23 lb/ton), or

b. Exhibit greater than 10% opacity.

3. From any phosphate rock calciner processing beneficiated rock any gases which:

a. Contain particulate matter in excess of 0.055 kilogram per megagram of phosphate rock feed (0.11 lb/ton), or

b. Exhibit greater than 10% opacity.

4. From any phosphate rock grinder any gases which:

a. Contain particulate matter in excess of 0.006 kilogram per megagram of phosphate rock feed (0.012 lb/ton), or

b. Exhibit greater than zero percent opacity.

5. From any ground phosphate rock handling and storage system any gases which exhibit greater than zero percent opacity.

(b) [Reserved]

(4) MONITORING OF EMISSIONS AND OPERATIONS. (a) Any owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a continuous monitoring system, except as provided in pars. (b) and (c), to monitor and record the opacity of the gases discharged into the atmosphere from any phosphate rock dryer, calciner or grinder. The span of this system shall be set at 40% opacity.

(b) For ground phosphate rock storage and handling systems, continuous monitoring systems for measuring opacity are not required.

(c) The owner or operator of any affected phosphate rock facility using a wet scrubbing emission control device will not be subject to the requirements in par. (a), but shall install, calibrate, maintain and operate the following continuous monitoring devices:

1. A monitoring device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device shall be certified by the manufacturer to be accurate within plus or minus 250 pascals (plus or minus one inch water) gauge pressure.

2. A monitoring device for the continuous measurement of the scrubbing liquid supply pressure to the control device. The monitoring device shall be accurate within plus or minus 5% of design scrubbing liquid supply pressure.

(d) For the purpose of conducting a performance test under s. NR 440.08, the owner or operator of any phosphate rock plant rock plant subject to the provisions of this section shall install, calibrate, maintain and operate a device for measuring the phosphate rock feed to any affected dryer, calciner or grinder. The measuring device used shall be accurate to within plus or minus 5% of the mass rate over its operating range.

(e) For the purpose of reports required under s. NR 440.07(3), periods of excess emissions that shall be reported are defined as all 6-minute periods during which the average opacity of the plume from any phosphate rock dryer, calciner or grinder subject to par. (a) exceeds the applicable opacity limit.

(f) Any owner or operator subject to the requirements under par. (c) shall report for each calendar quarter all measurement results that are less than 90% of the average levels maintained during the most recent performance test conducted under s. NR 440.08 in which the affected facility demonstrated compliance with the standard under sub. (3).

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used to determine compliance with sub. (3) as follows:

1. Method 5 for the measurement of particulate matter and associated moisture content,
2. Method 1 for sample and velocity traverses,
3. Method 2 for velocity and volumetric flow rates,
4. Method 3 for gas analysis, and
5. Method 9 for the measurement of the opacity of emissions.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and have a minimum sampled volume of 0.84 dscm (30 dscf). However, shorter sampling times and smaller sample volumes, when necessitated by process variables or other factors, may be approved by the department.

(c) For each run, the average phosphate rock feed rate in megagrams per hour shall be determined using a device meeting the requirements of sub. (4)(d).

(d) For each run, emissions expressed in kilograms per megagram of phosphate rock feed shall be determined using the following equation:

$$E = \frac{(CsQs)10^{-6}}{M}$$

where:

E is the emissions of particulates in kg/Mg of phosphate rock feed

Cs is the concentration of particulates in mg/dscm as measured by Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

Qs is the volumetric flow rate in dscm/hr as determined by Method 2

10^{-6} is the conversion factor for milligrams to kilograms

M is the average phosphate rock feed rate in mg/hr

NR 440.55 STANDARDS OF PERFORMANCE FOR AMMONIUM SULFATE MANUFACTURE. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each ammonium sulfate dryer within an ammonium sulfate manufacturing plant in the caprolactam by-product, synthetic and coke oven by-product sectors of the ammonium sulfate industry.

(b) Any facility under par. (a) that commences construction or modification after February 4, 1980, is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "Ammonium sulfate dryer" means a unit or vessel into which ammonium sulfate is charged for the purpose of reducing the moisture content of the product using a heated gas stream. The unit includes foundations, super-structure, material charger systems, exhaust systems and integral control systems and instrumentation.

(b) "Ammonium sulfate feed material streams" means the sulfuric acid feed stream to the reactor/crystallizer for synthetic and coke oven by-product ammonium sulfate manufacturing plants; and means the total or combined feed streams (the oximation ammonium sulfate stream and the rearrangement reaction ammonium sulfate stream) to the crystallizer stage, prior to any recycle streams.

(c) "Ammonium sulfate manufacturing plant" means any plant which produces ammonium sulfate.

(d) "Caprolactam by-product ammonium sulfate manufacturing plant" means any plant which produces ammonium sulfate as a by-product from process streams generated during caprolactam manufacture.

(e) "Coke oven by-product ammonium sulfate manufacturing plant" means any plant which produces ammonium sulfate by reacting sulfuric acid with ammonia recovered as a by-product from the manufacture of coke.

(f) "Synthetic ammonium sulfate manufacturing plant" means any plant which produces ammonium sulfate by direct combination of ammonia and sulfuric acid.

(3) STANDARDS FOR PARTICULATE MATTER. On or after the date on which the performance test required to be conducted by s. NR 440.08 is completed, no owner or operator of an ammonium sulfate dryer subject to the provisions of this section may cause to be discharged into the atmosphere, from any ammonium sulfate dryer, particulate matter at an emission rate exceeding 0.15 kilogram of particulate per megagram of ammonium sulfate produced (0.30 pound of particulate per ton of ammonium sulfate produced) and exhaust gases with greater than 15% opacity.

(4) MONITORING OF OPERATIONS. (a) The owner or operator of any ammonium sulfate manufacturing plant subject to the provisions of this section shall install, calibrate, maintain and operate flow monitoring device which can be used to determine the mass flow of ammonium sulfate feed material streams to the process. The flow monitoring device shall have an accuracy of plus or minus 5% over its range. However, if the plant uses weight scales of the same accuracy to directly measure production rate of ammonium sulfate, the use of flow monitoring devices is not required.

(b) The owner or operator of any ammonium sulfate manufacturing plant subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device which continuously measures and permanently records the total pressure drop across the emission control system. The monitoring device shall have an accuracy of plus or minus 5% over its operating range.

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08(2), shall be used to determine compliance with sub. (3) as follows:

1. Method 5 for the concentration of particulate matter,

2. Method 1 for sample and velocity traverses,

3. Method 2 for velocity and volumetric flow rate, and

4. Method 3 for gas analysis.

(b) For Method 5 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run shall be at least 60 minutes and the volume shall be at least 1.50 dscm (53 dscf).

(c) For each run, the particulate emission rate, E, shall be computed as follows:

$$\frac{E = Q_{sd} \times C_s}{1000}$$

where:

E is the particulate emission rate (kg/h)

Q_{sd} is the average volumetric flow rate (dscm/hr) as determined by Method 2 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

C_s is the average concentration (g/dscm) of particulate matter as determined by Method 5 of Appendix A.

(d) For each run, the rate of ammonium sulfate production, P (Mg/h), shall be determined by direct measurement using product weight scales or computed from a material balance. If production rate is determined by material balance, the following equations shall be used.

1. For synthetic and coke oven by-product ammonium sulfate plants, the ammonium sulfate production rate shall be determined using the following equation:

$$P = A \times B \times C \times 0.0808$$

where:

P is the ammonium sulfate production rate in megagrams per hour

A is the sulfuric acid flow rate to the reactor/crystallizer in liters per minute averaged over the time period taken to conduct the run

B is the acid density (a function of acid strength and temperature) in grams per cubic centimeter

C is the percent acid strength in decimal form

0.0808 is the physical constant for conversion of time, volume and mass units

2. For caprolactam by-product ammonium sulfate plants the ammonium sulfate production rate shall be determined using the following equation:

$$P = D \times E \times F \times (6.0 \times 10^{-5})$$

where:

P is the production rate of caprolactam by-product ammonium sulfate in megagrams per hour

D is the total combined feed stream flow rate to the ammonium sulfate crystallizer before the point where any recycle streams enter the stream, in liters per minute averaged over the time period taken to conduct the test run

E is the density of the process stream solution in grams per liter

F is the percent mass of ammonium sulfate in the process solution in decimal form

6.0×10^{-5} is the physical constant for conversion of time and mass units

(e) For each run, the dryer emission rate shall be computed as follows:

$$R = E/P$$

where:

R is the dryer emission rate (kg/Mg)

E is the particulate emission rate (ky/h) from par. (c)

P is the rate of ammonium sulfate production (Mg/h) from par. (d).

NR 440.56 STANDARDS OF PERFORMANCE FOR THE GRAPHIC ARTS INDUSTRY: PUBLICATION ROTOGRAVURE PRINTING. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in par. (b), the affected facility to which the provisions of this section apply is each publication rotogravure printing press.

(b) The provisions of this section do not apply to proof presses.

(c) Any facility under par. (a) that commences construction, modification or reconstruction after October 28, 1980 is subject to the requirements of this section.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, all terms not defined in this paragraph have the meaning given them in s. NR 440.02.

1. "Automatic temperature compensator" means a device that continuously senses the temperature of fluid flowing through a metering device and automatically adjusts the registration of the measured volume to the corrected equivalent volume at a base temperature.

2. "Base temperature" means an arbitrary reference temperature for determining liquid densities or adjusting the measured volume of a liquid quantity.

3. "Density" means the mass of a unit volume of liquid, expressed as grams per cubic centimeter, kilograms per liter or pounds per gallon, at a specified temperature.

4. "Gravure cylinder" means a printing cylinder with an intaglio image consisting of minute cells or indentations specially engraved or etched into the cylinder's surface to hold ink when continuously revolved through a fountain of ink.

5. "Performance averaging period" means 30 calendar days, one calendar month or 4 consecutive weeks as specified in subsections of this section.

6. "Proof press" means any device used only to check the quality of the image formation of newly engraved or etched gravure cylinders and which prints only nonsaleable items.

7. "Publication rotogravure printing press" means any number of rotogravure printing units capable of printing simultaneously on the same continuous web or substrate and includes any associated device for continuously cutting and folding the printed web, where the following saleable paper products are printed: catalogues, including mail order and premium; direct mail advertisements, including circulars, letters, pamphlets, cards and printed envelopes; display advertisements, including general posters, outdoor advertisements, car cards, window posters, counter and floor displays, point-of-purchase and other printed display material; magazines; miscellaneous advertisements, including brochures, pamphlets, catalogue sheets, circular folders,

announcements, package inserts, book jackets, market circulars, magazine inserts and shopping news; newspapers, magazine and comic supplements for newspapers, and preprinted newspaper inserts, including hi-fi and spectacolor rolls and sections; periodicals; and telephone and other directories, including business reference services.

8. "Raw ink" means all purchased ink.

9. "Related coatings" means all non-ink purchased liquids and liquid-solid mixtures containing VOC solvent, usually referred to as extenders or varnishes, that are used at publication rotogravure printing presses.

10. "Rotogravure printing unit" means any device designed to print one color ink on one side of a continuous web or substrate using a gravure cylinder.

11. "Solventborne ink systems" means ink and related coating mixtures whose volatile portion consists essentially of VOC solvent with not more than 5 weight percent water, as applied to the gravure cylinder.

12. "Solvent recovery system" means an air pollution control system by which VOC solvent vapors in air or other gases are captured and directed through one or more condensers or a vessel containing beds of activated carbon or other adsorbents. For the condensation method, the solvent is recovered directly from the condenser. For the adsorption method, the vapors are adsorbed, then desorbed by steam or other media, and finally condensed and recovered.

13. "VOC" means volatile organic compound.

14. "VOC solvent" means an organic liquid or liquid mixture consisting of VOC components.

15. "Waterborne ink systems" means ink and related coating mixtures whose volatile portion consists of a mixture of VOC solvent and more than 5 weight percent water, as applied to the gravure cylinder.

(b) Symbols used in this section are defined as follows:

1. D_a=the density at the base temperature of VOC solvent used or recovered during one performance averaging period.

2. D_{ci}=the density of each color of raw ink and each related coating (i) used at the subject facility, at the coating temperature when the volume of coating used is measured.

3. D_{di}=the density of each VOC solvent (i) added to the ink for dilution at the subject facility, at the solvent temperature when the volume of solvent used is measured.

4. D_{gi}=the density of each VOC solvent (i) used as a cleaning agent at the subject facility, at the solvent temperature when the volume of cleaning solvent used is measured.

5. D_{hi}=the density of each quantity of water (i) added at the subject facility, for dilution of waterborne ink systems at the water temperature when the volume of dilution water used is measured.

6. D_{mi}=the density of each quantity of VOC solvent and miscellaneous solventborne waste inks and waste VOC solvents (i) recovered from the subject facility, at the solvent temperature when the volume of solvent recovered is measured.

7. D_{oi}=the density of the VOC solvent contained in each raw ink and related coating (i) used at the subject facility, at the coating temperature when the volume of coating used is measured.

8. D_{wi}=the density of the water contained in each waterborne raw ink and related coating (i) used at the subject facility, at the coating temperature when the volume of coating used is measured.

9. L_{ci}=the measured liquid volume of each color of raw ink and each related coating (i) used at the facility of a corresponding VOC content, V_{oi} or W_{oi} with a VOC density, D_{oi}, and a coating density, D_{ci}.

10. L_{di}=the measured liquid volume of each VOC solvent (i) with corresponding density, D_{di} added to dilute the ink used at the subject facility.

11. M_{ci}=the mass, determined by direct weighing, of each color of raw ink and each related coating (i) used at the subject facility.

12. M_{d}=the mass, determined by direct weighing, of VOC solvent added to dilute the ink used at the subject facility during one performance averaging period.

13. M_g=the mass, determined by direct weighing, of VOC solvent used as a cleaning agent at the subject facility during one performance averaging period.

14. M_h=the mass, determined by direct weighing, or water added for dilution with waterborne ink systems used at the subject facility during one performance averaging period.

15. M_m=the mass, determined by direct weighing, of VOC solventborne waste inks and waste VOC solvents recovered from the subject facility during one performance averaging period.

16. M_o=the total mass of VOC solvent contained in the raw inks and related coatings used at the subject facility during one performance averaging period.

17. M_r=the total mass of VOC solvent recovered from the subject facility during one performance averaging period.

18. M_t=the total mass of VOC solvent used at the subject facility during one performance averaging period.

19. M_v=the total mass of water used with waterborne ink systems at the subject facility during one performance averaging period.

20. M_w=the total mass of water contained in the waterborne raw inks and related coatings used at the subject facility during one performance averaging period.

21. P=the average VOC emission percentage for the subject facility for one performance averaging period.

22. V_{of}=the liquid VOC content, expressed as a volume fraction of VOC volume per total volume of coating, of each color of raw ink and related coating (i) used at the subject facility.

23. V_{wi}=the water content, expressed as a volume fraction of water volume per total volume of coating, or each color of waterborne raw ink and related coating (i) used at the subject facility.

24. W_{oi}=the VOC content, expressed as a weight fraction of mass of VOC per total mass of coating, or each color of raw ink and related coating (i) used at the subject facility.

25. W_{wi}=the water content, expressed as a weight fraction of mass of water per total mass of coating, of each color of waterborne raw ink and related coating (i) used at the subject facility.

(c) The following subscripts are used in this section with the symbols in par. (b) to denote the applicable facility:

1. a=affected facility.

2. b=both affected and existing facilities controlled in common by the same air pollution control equipment.

3. e=existing facility.

4. f=all affected and existing facilities located within the same plant boundary.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. During the period of the performance test required to be conducted by s. NR 440.08 and after the date required for completion of the test, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any affected facility VOC equal to more than 16% of the total mass of VOC solvent and water used at that facility during any one performance averaging period. The water used includes only that water contained in the waterborne raw inks and related coatings and the water added for dilution with waterborne ink systems.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) The owner or operator of any affected facility shall conduct performance tests in accordance with s. NR 440.08 under the following conditions:

1. The performance averaging period for each test shall be 30 consecutive calendar days and not an average of 3 separate runs as prescribed under s. NR 440.08(6).

2. Except as provided under pars. (f) and (g), if affected facilities routinely share the same raw ink storage and handling system with existing facilities, then temporary measurement procedures for segregating the raw inks, related coatings, VOC solvent and water used at the affected facilities shall be employed during the test. For this case, an overall emission percentage for the combined facilities as well as for only the affected facilities shall be calculated during the test.

3. For the purpose of measuring bulk storage tank quantities of each color of raw ink and each related coating used, the owner or operator of any affected facility shall install, calibrate, maintain and continuously operate during the test one or more of the following:

a. Non-resettable totalizer metering devices for indicating the cumulative liquid volumes used at each affected facility; or

b. Segregated storage tanks for each affected facility to allow determination of the liquid quantities used by measuring devices other than the press meters required under subpar. a.; or

c. Storage tanks to serve more than one facility with the liquid quantities used determined by measuring devices other than press meters, if facilities are combined as described under par. (d), (f) or (g).

4. The owner or operator may choose to install an automatic temperature compensator with any liquid metering device used to measure the raw inks, related coatings, water, or VOC solvent used or VOC solvent recovered.

5. Records of the measured amounts used at the affected facility and the liquid temperature at which the amounts were measured shall be maintained for each shipment of all purchased material or on at least a weekly basis for the following:

a. The raw inks and related coatings used;

b. The VOC and water content of each raw ink and related coating used as determined according to sub. (6).

c. The VOC solvent and water added to the inks used;

d. The VOC solvent used as a cleaning agent; and

e. The VOC solvent recovered.

6. The density variations with temperature of the raw inks, related coatings, VOC solvents used, and VOC solvent recovered shall be determined by the methods stipulated in sub. (6)(d).

7. The calculated emission percentage may be reported as rounded-off to the nearest whole number.

8. Printing press startups and shutdowns may not be included in the exemption provisions under s. NR 440.08(3). Frequent periods of press startups and shutdowns are normal operations and constitute representative conditions for the purpose of a performance test.

(b) If an affected facility uses waterborne ink systems or a combination of waterborne and solventborne ink systems with a solvent recovery system, compliance shall be determined by the following procedures, except as provided in pars. (d) through (g):

1. The mass of VOC in the solventborne and waterborne raw inks and related coatings used shall be determined by the following equation:

$$(M_o)a = \sum_{i=1}^{k} (M_{ei})_a (W_{oi})_a + \sum_{i=1}^{m} (L_{ei})_a (D_{ei})_a (W_{oi})_a + \sum_{i=1}^{n} (L_{ei})_a (V_{oi})_a (D_{oi})_a$$

where:

k is the total number of raw inks and related coatings measured as used in direct mass quantities with different amounts of VOC content

m is the total number of raw inks and related coatings measured as used by volume with different amounts of VOC content or different densities

n is the total number of raw inks and related coatings measured as used by volume with different amounts of VOC content or different VOC solvent densities

2. The total mass of VOC used shall be determined by the following equation:

$$(M_t)_a = (M_o)_a + \sum_{i=1}^{m} (L_{di})_a (D_{di})_a + (M_d)_a + \sum_{i=1}^{n} (L_{gi})_a (D_{gi})_a + (M_g)_a$$

where:

m and n are the respective total numbers of VOC dilution and cleaning solvents measured as used by volume with different densities

3. The mass of water in the waterborne raw inks and related coatings used shall be determined by the following equation:

$$(M_w)_a = \sum_{i=1}^{k} (M_{ci})_a (W_{wi})_a + \overset{m}{\underset{i=1}{}} (L_{ci})_a (D_{ci})_a (W_{wi})_a + \overset{n}{\underset{i=1}{}} (L_{ci})_a (V_{wi})_a (D_{wi})_a$$

where:

k is the total number of raw inks and related coatings measured as used in direct mass quantities with different amounts of water content

m is the total number of raw inks and related coatings measured as used by volume with different amounts of water content or different densities

n is the total number of raw inks and related coatings measured as used by volume with different amounts of water content or different water densities

4. The total mass of water used shall be determined by the following equation:

$$(M_v)_a = (M_w)_a + (M_h)_a + \sum_{i=1}^{m} (L_{hi})_a (D_{hi})_a$$

where:

m is the total number of water dilution additions measured as used by volume with different densities

5. The total mass of VOC solvent recovered shall be determined by the following equation:

$$(M_r)_a = (M_m)_a + \sum_{i=1}^{k} (L_{mi})_a (D_{mi})_a$$

where:

k is the total number of VOC solvents, miscellaneous solventborne waste inks, and waste VOC solvents measured as recovered by volume with different densities

6. The average VOC emission percentage for the affected facility shall be determined by the following equation:

$$P_a = \left[\frac{(M_t)a - (M_r)a}{(M_t)a + (M_v)a}\right] \times 100$$

c. If an affected facility controlled by a solvent recovery system uses only solventborne ink systems, the owner or operator may choose to determine compliance on a direct mass or a density-corrected liquid volume basis. Except as provided in pars. (d) through (g), compliance shall be determined as follows:

1. On a direct mass basis, compliance shall be determined according to par. (b), except that the water term M_v does not apply.

2. On a density-corrected liquid volume basis, compliance shall be determined by the following procedures:

a. A base temperature corresponding to that for the largest individual amount of VOC solvent used or recovered from the affected facility, or other reference temperature, shall be chosen by the owner or operator.

b. The corrected liquid volume of VOC in the raw inks and related coatings used shall be determined by the following equation:

$$(L_o)_a = \sum_{i=1}^{k} \frac{(M_{ci})a(W_{oi})a}{D_B} + \sum_{i=1}^{m} \frac{(L_{ci})a(D_{ci})a(W_{oi})a}{D_B} + \sum_{i=1}^{n} \frac{(L_{ci})a(V_{oi})a(D_{oi})a}{D_B}$$

where:

k is the total number of raw inks and related coatings measured as used in direct mass quantities with different amounts of VOC content

m is the total number of raw inks and related coatings measured as used by volume with different amounts of VOC content or different densities

n is the total number of raw inks and related coatings measured as used by volume with different amounts of VOC content or different amounts of VOC content or different VOC solvent densities

c. The total corrected liquid volume of VOC used shall be determined by the following equation:

$$(L_t)a = (L_o)a + \sum_{i=1}^{m} \frac{(L_{di})a(D_{di})a}{D_B} + \frac{(M_d)a}{D_B} + \sum_{i=1}^{n} \frac{(L_{gi})a(D_{gi})a}{D_B} + \frac{(M_g)a}{D_B}$$

where:

m and n are the respective total numbers of VOC dilution and cleaning solvents measured as used by volume with different densities.

d. The total corrected liquid volume of VOC solvent recovered shall be determined by the following equation:

$$(L_r)a = \frac{(M_m)a}{D_B} + \sum_{i=1}^{k} \frac{(L_{mi})a(D_{mi})a}{D_B}$$

where:

k is the total number of VOC solvents, miscellaneous solventborne waste links, and waste VOC solvents measured as recovered by volume with different densities.

e. The average VOC emission percentage for the affected facility shall be determined by the following equation:

$$P_a = \left[\frac{(L_t)a - (L_r)a}{(L_t)a}\right] \times 100$$

(d) If 2 or more affected facilities are controlled by the same solvent recovery system, compliance shall be determined by the procedures specified in par. (b) or (c), whichever applies, except that $(L_t)_a$ and $(L_r)_a$ $(M_t)_a$ $(M_r)_a$ and $(M_v)_a$ are the collective amounts of VOC solvent and water corresponding to all the affected facilities controlled by that solvent recovery system. The average VOC emission percentage for each of the affected facilities controlled by that same solvent recovery system shall be assumed to be equal.

(e) Except as provided under par. (f), if an existing facility and an affected facility are controlled in common by the same solvent recovery system, the owner or operator shall determine compliance by conducting a separate emission test on the existing facility and then conducting a performance test on the combined facilities as follows:

1. Before the initial startup of the affected facility and at any other time as requested by the department, the owner or operator shall conduct an emission test on the existing facility controlled by the subject solvent recovery system. The solvent recovery system may handle VOC emissions from only the existing facility not from affected facilities, during the emission test.

2. During the emission test, the affected facility shall be subject to the standard stated in sub. (3).

3. The emission test shall be conducted over a 30 consecutive calendar day averaging period according to the conditions stipulated in par. (a)1. through 5., except that the conditions pertain to only existing facilities instead of affected facilities.

4. The owner or operator of the existing facility shall provide the department at least 30 days prior notice of the emission test to afford the department the opportunity to have an observer present.

5. The emission percentage for the existing facility during the emission test shall be determined by one of the following procedures:

a. If the existing facility uses a combination of waterborne and solventborne ink systems, the average VOC emission percentage shall be determined on a direct mass basis according to par. (b) or (d), whichever applies, with the following equation:

$$P_e = \left[\frac{(M_t)e - (M_r)e}{(M_t)e + (M_v)e}\right] \times 100$$

where the water and VOC solvent amounts pertain to only existing facilities.

b. If the existing facility uses only solventborne ink systems, the owner or operator may choose to determine the emission percentage either on a direct mass basis or a density-corrected liquid volume basis according to par. (c) or (d), whichever applies. On a direct mass basis, the average VOC emission percentage shall be determined by the equation presented in subpar. a. On a density-corrected liquid volume basis, the average VOC emission percentage shall be determined by the following equation:

$$P_e = \left[\frac{(L_t)e - (L_r)e}{(L_t)e}\right] \times 100$$

where the VOC solvent amounts pertain to only existing facilities.

6. The owner or operator of the existing facility shall furnish the department with a written report of the results of the emission test.

7. After completion of the separate emission test on the existing facility, the owner or operator shall conduct a performance test on the combined facilities with the solvent recovery system handling VOC emission from both the existing and affected facilities.

8. During performance test, the emission percentage for the existing facility, P_e, shall be assumed to be equal to that determined in the latest emission test. The department may request additional emission tests if any physical or operational changes occur to the existing facility.

9. The emission percentage for the affected facility during performance tests with both existing and affected facilities connected to the solvent recovery system shall be determined by one of the following procedures:

a. If the combined facility uses both waterborne and solventborne ink systems, the average VOC emission percentage shall be determined on a direct mass basis according to par. (b) or (d), whichever applies, with the following equation:

$$P_a = \left[\frac{(M_t)_b - (M_r)_b - \left(\frac{P_e}{100}\right)\left[(M_t)e + (M_v)e\right]}{(M_t)a + (M_v)a}\right] \times 100$$

where $(M_t)_b$ and $(M_r)_b$ are the collective VOC solvent amounts pertaining to the combined facility.

b. If the combined facility uses only solventborne ink systems, the owner or operator may choose to determine performance of the affected facility either on a direct mass basis or a density-corrected liquid volume basis according to par. (c) or (d), whichever applies. On a direct mass basis, the average VOC emission percentage shall be determined by the equation presented in subpar. a. On a density-corrected liquid volume basis, the average VOC emission percentage shall be determined by the following equation:

$$P_a = \left[\frac{(L_t)_b - (L_r)_b - (L_t)e\left(\frac{P_e}{100}\right)}{(L_t)a}\right] \times 100$$

where $(L_t)_b$ and $(L_r)_b$ are the collective VOC solvent amounts pertaining to the combined facility.

(f) The owner or operator may choose to show compliance of the combined performance of existing and affected facilities controlled in common by the same solvent recovery system. A separate emission test for existing facilities is not required for this option. The combined performance shall be determined by one of the following procedures:

1. If the combined facility uses both waterborne and solventborne ink systems, the combined average VOC emission percentage shall be determined on a direct mass basis according to par. (b) or (d), whichever applies, with the following equation:

$$P_b = \left[\frac{(M_t)b - (M_r)b}{(M_t)b + (M_v)b}\right] \times 100$$

2. If the combined facility uses only solventborne ink systems, the owner or operator may choose to determine performance either on a direct mass basis or a density-corrected liquid volume basis according to par. (c) or (d), whichever applies. On a direct mass basis, the average VOC emission percentage shall be determined by the equation presented in subd. 1. On a density-corrected liquid volume basis, the average VOC emission percentage shall be determined by the following equation:

$$P_b = \left[\frac{(L_t)b - (L_r)b}{(L_t)b}\right] \times 100$$

(g) If all existing and affected facilities located within the same plant boundary use waterborne ink systems or solventborne ink systems with solvent recovery systems, the owner or operator may choose to show compliance on a plantwide basis for all the existing and affected facilities together. No separate emission tests on existing facilities and no temporary segregated liquid measurement procedures for affected facilities are required for this option. The plantwide performance shall be determined by one of the following procedures:

1. If any of the facilities use waterborne ink systems, the total plant average VOC emission percentage shall be determined on a direct mass basis according to par. (b) with the following equation:

$$P_f = \left[\frac{(M_t)_f - (M_r)_a - (M_r)_e - (M_r)_b}{(M_t)_f + (M_v)_f}\right] \times 100$$

where $(M_t)_f$ and $(M_v)_f$ are the collective VOC solvent and water amounts used at all the plant facilities during the performance test.

2. If all of the plant facilities use only solventborne ink systems, the owner or operator may choose to determine performance either on a direct mass basis or a density-corrected liquid volume basis according to par. (c). On a direct mass basis, the total plant average VOC emission percentage shall be determined by the equation presented in subd. 1. On a density-corrected liquid volume basis, the total plant average VOC emission percentage shall be determined by the following equation:

$$\left[\frac{P_f = (L_t)_f - (L_r)_a - (L_r)_e - (L_r)_b}{(Lt)f}\right] \times 100$$

where $(L_t)_f$ is the collective VOC solvent amount used at all the plant facilities during the performance test.

(5) MONITORING OF OPERATIONS AND RECORDKEEPING. (a) After completion of the performance test required under s. NR 440.08, the owner or operator of any affected facility using waterborne ink systems or solventborne ink systems with solvent recovery systems shall record the amount of solvent and water used, solvent recovered, and estimated emission percentage for each performance averaging period and shall maintain these records for 2 years. The emission percentage shall be estimated as follows:

1. The performance averaging period for monitoring of proper operation and maintenance shall be a calendar month or 4 consecutive weeks, at the option of the owner or operator.

2. If affected facilities share the same raw ink storage and handling system with existing facilities, solvent and water used, solvent recovered, and emission percentages for the combined facilities may be documented. Separate emission percentages for only the affected facilities are not required in this case. The combined emission percentage shall be compared to the overall average for the existing and affected facilities' emission percentage determined during the most recent performance test.

3. Except as provided in subd. 4., temperatures and liquid densities determined during the most recent performance test shall be used to calculate corrected volumes and mass quantities.

4. The owner or operator may choose to measure temperatures for determination of actual liquid densities during each performance averaging period. A different base temperature may be used for each performance averaging period if desired by the owner or operator.

5. The emission percentage shall be calculated according to the procedures under sub. (4)(b) through (g), whichever applies, or by a comparable calculation which compares the total solvent recovered to the total solvent used at the affected facility.

(6) TEST METHODS AND PROCEDURES. (a) The owner or operator of any affected facility using solventborne ink systems shall determine the VOC content of the raw inks and related coatings used at the affected facility by one of the following:

1. Analysis using Reference Method 24A of 40 C.F.R. pt. 60, Appendix A, incorporated reference in s. NR 440.17 of routine weekly samples of raw ink and related coatings in each respective storage tank; or

2. Analysis using Reference Method 24A of Appendix A of samples of each shipment of all purchased raw inks and related coatings; or

3. Determination of the VOC content from the formulation data supplied by the ink manufacturer with each shipment of raw inks and related coatings used.

(b) The owner or operator of any affected facility using solventborne ink systems shall use the results of verification analyses by Reference Method 24A of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, to determine compliance when discrepancies with ink manufacturers' formulation data occur.

(c) The owner or operator of any affected facility using waterborne ink systems shall determine the VOC and water content of raw inks and related coatings used at the affected facility by either:

1. Determination of the VOC and water content from the formulation data supplied by the ink manufacturer with each shipment of purchased raw inks and related coatings used; or

2. Analysis of samples of each shipment of purchased raw inks and related coatings using a test method approved by the department in accordance with s. NR 440.08(2).

(d) The owner or operator of any affected facility shall determine the density of raw inks, related coatings and VOC solvents by either:

1. Making a total of 3 determinations for each liquid sample at specified temperatures using the procedure outlined in ASTM D1475-60 (Reapproved 1980), incorporated by reference in s. NR 440.17. The temperature and density shall be recorded as the arithmetic average of the 3 determinations; or

2. Using literature values, at specified temperatures, acceptable to the department.

(e) If compliance is determined according to sub. (4)(e), (f) or (g), the existing as well as affected facilities are subject to the requirements of pars. (a) through (d).

NR 440.57 STANDARDS OF PERFORMANCE FOR INDUSTRIAL SURFACE COATING: LARGE APPLICANCES. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to each surface coating operation in a large appliance surface coating line.

(b) Any facility under par. (a) that commences construction, modification or reconstruction after December 24, 1980, is subject to the requirements of this section.

(2) DEFINITIONS. (a) As used in this section, all terms not defined in this paragraph have the meaning given them in s. NR 440.02.

1. "Applied coating solids" means the coating solids that adhere to the surface of the large appliance part being coated.

2. "Coating application station" means that portion of the large appliance surface coating operation where a prime coat or a top coat is applied to large appliances parts or products (e.g., dip tank, spray booth or flow coating unit).

3. "Curing oven" means a device that uses heat to dry or cure the coatings applied to large appliance parts or products.

4. "'Electrodeposition' or 'EDP'" means a method of coating application in which the large appliance part or product is submerged in a tank filled with coating material suspended in water and an electrical potential is used to enhance deposition of the material on the part or product.

5. "Flashoff area" means the portion of a surface coating line between the coating application station and the curing oven.

6. "Large appliance part" means any organic surface-coated metal lid, door, casing, panel or other interior or exterior metal part or accessory that is assembled to form a large appliance product. Parts subject to in-use temperatures in excess of 250°F are not included in this definition.

7. "Large appliance product" means any organic surface-coated metal range, oven, microwave oven, refrigerator, freezer, washer, dryer, dishwasher, water heater or trash compactor manufactured for household, commercial or recreational use.

8. "Large appliance surface coating line" means that portion of a large appliance assembly plant engaged in the application and curing of organic surface coatings on large appliance parts or products.

9. "Organic coating" means any coating used in a surface coating operation, including dilution solvents, from which VOC emissions occur during the application or the curing process. For the purpose of this section, powder coatings are not included in this definition.

10. "Powder coating" means any surface coating that is applied as a dry powder and is fused into a continuous coating film through the use of heat.

11. "Spray booth" means the structure housing automatic or manual spray application equipment where a coating is applied to large appliance parts or products.

12. "Surface coating operation" means the system on a large appliance surface coating line used to apply and dry or cure an organic coating on the surface of large appliance parts or products. The surface coating operation may be a prime coat or a topcoat operation and includes the coating application station or stations, flashoff area and curing oven.

13. "Transfer efficiency" means the ratio of the amount of coating solids deposited onto the surface of a large appliance part or product to the total amount of the coating solids used.

14. "VOC content" means the proportion of a coating that is volatile organic compounds (VOC's), expressed as kilograms of VOC's per liter of coating solids.

15. "VOC emissions" means the mass of volatile organic compounds (VOC's), expresssed as kilograms of VOC's per liter of applied coating solids, emitted from a surface coating operation.

(b) As used in this section all symbols not defined in this paragraph have the meaning given them in s. NR 440.03.

1. C_a=the concentration of VOC's in a gas stream leaving a control device and entering the atmosphere (parts per million by volume, as carbon).

2. C_b=the concentration of VOC's in a gas stream entering a control device (parts per million by volume, as carbon).

3. C_f=the concentration of VOC's in a gas stream emitted directly to the atmosphere (parts per million by volume, as carbon).

4. D_c=density of coating (or input stream), as received (kilograms per liter).

5. D_d=density of a VOC solvent added to coatings (kilograms per liter).

6. D_r=density of a VOC solvent recovered by an emission control device (kilograms per liter).

7. E=the VOC destruction efficiency of a control device (fraction).

8. F=the proportion of total VOC's emitted by an affected facility that enters a control device (fraction).

9. G=the volume-weighted average mass of VOC's in coatings consumed in a calendar month per unit volume of applied coating solids (kilograms per liter).

10. L_c=the volume of coating consumed, as received (liters).

11. L_d=the volume of VOC solvent added to coatings (liters).

12. L_r=the volume of VOC solvent recovered by an emission control device (liters).

13. L_s=the volume of coating solids consumed (liters).

14. M_d=the mass of VOC solvent added to coatings (kilograms).

15. M_o=the mass of VOC's in coatings consumed, as received (kilograms).

16. M_r=the mass of VOC's recovered by an emission control device (kilograms).

17. Q_a=the volumetric flow rate of a gas stream leaving a control device and entering the atmosphere (dry standard cubic meters per hour).

18. Q_b=the volumetric flow rate of a gas stream entering a control device (dry standard cubic meters per hour).

19. Q_f=the volumetric flow rate of a gas stream emitted directly to the atmosphere (dry standard cubic meters per hour).

20. R=the overall VOC emission reduction achieved for an affected facility (fraction).

21. T=the transfer efficiency (fraction).

22. V_s=the proportion of solids in a coating (or input stream), as received (fraction by volume).

23. W_o=the proportion of VOC's in a coating (or input stream), as received (fraction by weight).

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. On and after the date on which the performance test required by s. NR 440.08 is completed, no owner or operator of an affected facility subject to the provisions of this section may discharge or cause the discharge of VOC emissions that exceed 0.90 kilogram of VOC's per liter of applied coating solids from any surface coating operation on a large appliance surface coating line.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08(4) and (6) does not apply to the performance test procedures required by this section.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under s. NR 440.08(1) and thereafter a performance test each calendar month for each affected facility according to the procedures in this paragraph.

1. An owner or operator shall use the following procedures for an affected facility that does not use a capture system and control device to comply with the emissions limit specified under sub. (3). The owner or operator shall determine the composition of the coatings by formulation data supplied by the coating manufacturer or by analysis of each coating, as received, using Reference Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17. The department may require the owner or operator who uses formulation data supplied by the coating manufacturer to determine the VOC content of coatings using Reference Method 24. The owner or operator shall determine the volume of coating and the mass of VOC-solvent used for thinning purposes from company records on a monthly basis. If a common coating distribution system serves more than one affected facility or serves both affected and existing facilities, the owner or operator shall estimate the volume of coatings used at each facility by using the average dry weight of coating and the surface area coated by each affected and existing facility or by other procedures acceptable to the department.

a. Except as provided in subpar. d., the weighted average of the total mass of VOC's consumed per unit volume of coatings solids applied each calendar month shall be determined as follows:

1) Calculate the mass of VOC's consumed ($M_o + M_d$) during the calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci}\ D_{ci}\ W_{oi} + \sum_{i=1}^{m} L_{dj}\ D_{dj}$$

$L_{dj}\ D_{dj}$ will be zero if no VOC-solvent is added to the coatings, as received.)

where:

n is the number of different coatings used during the calender month

m is the number of different VOC solvents added to coatings during the calendar month

2) Calculate the total volume of coatings solids used (L_s) in the calendar month for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci}\ V_{si}$$

where:

n is the number of different coatings used during the calendar month.

3) Select the appropriate transfer efficiency from Table I. If the owner or operator can demonstrate to the satisfaction of the department that transfer efficiencies other than those shown are appropriate, the department shall approve their use on a case-by-case basis. Transfer efficiencies for application methods not listed shall be determined by the department on a case-by-case basis. An owner or operator shall submit sufficient data for the department to judge the accuracy of the transfer efficiency claims.

Table I - TRANSFER EFFICIENCIES

Application method	Transfer efficiency (T_k)
Air atomized spray	0.40
Airless spray	0.45
Manual electrostatic spray	0.60
Flow coat	0.85
Dip coat	0.85
Nonrotational automatic electrostatic spray	0.85
Rotating head automatic electrostatic spray	0.90
Electrodeposition	0.95

Where more than one application method is used within a single surface coating operation, the owner or operator shall determine the composition and volume of each coating applied by each method through a means acceptable to the department and compute the weighted average transfer efficiency by the following equation:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{m} Lc_{ik} \, Vs_{ik} \, T_k}{L_s}$$

where:

n is the number of coatings (or input streams) used

m is the number of application methods used

4) Calculate the volume-weighted average mass of VOC's consumed per unit volume of coating solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{Mo + Md}{L_s T}$$

b. Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N = G$$

c. Where the volume-weighted average mass of VOC's discharged to the atmsophere per unit volume of coating solids applied (N) is equal to or less than 0.90 kilogram per liter, the affected facility is in compliance.

d. If each individual coating used by an affected facility has a VOC content, as received, which when divided by the lowest transfer efficiency at which the coating is applied, results in a value equal to or less than 0.90 kilogram per liter, the affected facility is in compliance, provided no VOC's are added to the coating during distribution or application.

2. An owner or operator shall use the following procedures for any affected facility that uses a capture system and a control device that destroys VOC's (e.g., incinerator) to comply with the emission limit specified under sub. (3).

a. Determine the overall reduction efficiency (R) for the capture system and control device. For the initial performance test the overall reduction efficiency (R) shall be determined as prescribed in this subparagraph. In subsequent months, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test, providing control device and capture system operating conditions have not changed. The procedure in this subparagraph shall be repeated when directed by the department or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

1) Determine the fraction (F) of total VOC's emitted by an affected facility that enter the control device using the following equation:

$$F = \frac{\sum_{i=1}^{n} C_{bi}\, Q_{bi}}{\sum_{i=1}^{n} C_{bi} Q_{bi} + \sum_{k=1}^{p} C_{fk} Q_{fk}}$$

where:

n is the number of gas streams entering the control device

p is the number of gas streams emitted directly to the atmosphere

2) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E = \frac{\sum_{i=1}^{n} Q_{bi} C_{bi} - \sum_{j=1}^{m} Q_{aj}\, C_{aj}}{\sum_{i=1}^{n} Q_{bi}\, C_{bi}}$$

where:

n is the number of gas streams entering the control device

m is the number of gas streams leaving the control device and entering the atmosphere

3) Determine overall reduction efficiency (R) using the following equation:

$$R = EF$$

b. Calculate the volume-weighted average of the total mass of VOC's per unit volume of applied coating solids (G) during each calendar month for each affected facility using the equations in subd. 1.a.1), 2), 3) if applicable, and 4).

c. Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

$$N = G\ (1-R)$$

d. If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is equal to or less than 0.90 kilogram per liter of applied coating solids, the affected facility is in compliance.

3. An owner or operator shall use the following procedure for any affected facility that uses a control device for VOC recovery (e.g., carbon adsorber) to comply with the applicable emission limits specified under sub. (3).

a. Calculate the total mass of VOC's assumed (M_o+M_d) and the volume-weighted average of the total mass of VOC's per unit volume of applied coating solids (G) during each calendar month for each affected facility using the equations in subd. 1.a.1), 2), 3) if applicable, and 4).

b. Calculate the total mass of VOC's recovered (M_r) during each calendar month using the following equation:

$$M_r=L_rD_r$$

c. Calculate overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R = \frac{Mr}{Mo + Md}$$

d. Calculate the volume-weighted average mass of VOC's emitted to the atmosphere (N) for each calendar month for each affected facility using equation in subd. 2.c.

e. If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is equal to or less than 0.90 kilogram per liter of applied coatings solids, the affected facility is in compliance. Each monthly calculation is considered a performance test.

(5) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator of an affected facility that uses a capture system and an incinerator to comply with the emission limits specified under sub. (3) shall install, calibrate, maintain and operate temperature measurement devices as prescribed below:

1. Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

2. Each temperature measurement device shall be installed, calibrated and maintained according to the manufacturer's specifications. The device shall have an accuracy of the greater of plus or minus 0.75% of the temperature being measured expressed in degrees Celsius or plus or minus 2.5°C.

3. Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(b) [Reserved]

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The reporting requirements of s. NR 440.08(1) apply only to the initial performance test. Each owner or operator subject to the provisions of this section shall include the following data in the report of the initial performance test required under s. NR 440.08(1):

1. Except as provided in subd. 2., the volume-weighted average mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) for a period of one calendar month from each affected facility.

2. For each affected facility where compliance is determined under the provisions of sub. (4)(b)1.d., a list of the coatings used during a period of one calendar month, the VOC content of each coating calculated from data determined using Reference Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, or supplied by the coating manufacturer, and the minimum transfer efficiency of any coating application equipment used during the month.

3. For each affected facility where compliance is achieved through use of an incineration system, the following additional information shall be reported:

a. The proportion of total VOC's emitted that enters the control device (F).

b. The VOC reduction efficiency of the control device (E).

c. The average combustion temperature (or the average temperature upstream and downstream of the catalyst bed), and

d. A description of the method used to establish the amount of VOC's captured and sent to the incinerator.

4. For each affected facility where compliance is achieved through use of a solvent recovery system, the following additional information shall be reported:

a. The volume of VOC solvent recovered (L_r), and

b. The overall VOC emission reduction achieved (R).

(b) Following the initial performance test, the owner or operator of an affected facility shall identify and record:

1. Each instance in which the volume-weighted average of the total mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) is greater than the limit specified under sub. (3).

2. Where compliance with sub. (3) is achieved through use of thermal incineration, each 3-hour period of coating operation during which the average temperature of the device is more than 28°C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under sub. (4).

3. Where compliance with sub. (3) is achieved through use of catalytic incineration, each 3-hour period of coating operation during which the average temperature recorded immediately before the catalyst bed is more than 28°C below the average temperature at the same location during the most recent performance test at which destruction efficiency was determined as specified under sub. (4). Additionally, all 3-hour periods of coating operation during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference across the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under sub. (4) shall be recorded.

(c) Each owner or operator subject to the provisions of this section shall maintain at the source for a period of at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain at the source daily records of the incinerator combustion chamber temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed. Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall maintain at the source daily records of the amount of solvent recovered by the system for each affected facility.

(7) TEST MEHTODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used to determine compliance with sub. (3) as follows:

1. Method 24 or formulation data supplied by the coating manufacturer to determine the VOC content of a coating. In the event of dispute, Reference Method 24 shall be the reference method. For determining compliance only, results of Method 24 analyses of waterborne coatings shall be adjusted as described in Subsection 4.4 of Method 24.

Note: Procedures to determine VOC emissions are provided in sub. (4).

2. Method 25 for the measurement of the VOC concentration in the gas stream vent,

3. Method 1 for sample and velocity traverses,

4. Method 2 for velocity and volumetric flow rate,

5. Method 3 for gas analysis, and

6. Method 4 for stack gas moisture.

(b) For Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the coating sample shall be a one-liter sample taken into a one-liter container at a point where the sample will be representative of the coating material.

(c) For Method 25 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sample time for each of 3 runs shall be at least 60 minutes and the minimum sample volume shall be at least 0.003 dscm except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(d) The department shall approve sampling of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the department that the testing of representative stacks would yield results comparable to those that would be obtained by testing all stacks.

NR 440.58 STANDARD OF PERFORMANCE FOR METAL COIL SURFACE COATING. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to the following affected facilities in a metal coil surface coating operation: each prime coat operation, each finish coat operation, and each prime and finish coat operation combined when the finish coat is applied wet on wet over the prime coat and both coatings are cured simultaneously.

(b) Any facility under par. (a) that commences construction, modification or reconstruction after January 5, 1981, is subject to the requirements of this section.

(2) DEFINITIONS. (a) As used in this section, all terms not defined in this paragraph have the meaning given them in s. NR 440.02.

1. "Coating" means any organic material that is applied to the surface of metal coil.

2. "Coating application station" means that portion of the metal coil surface coating operation where the coating is applied to the surface of the metal coil. Included as part of the coating application stations is the flashoff area between the coating application station and the curing oven.

3. "Curing oven" means the device that uses heat or radiation to dry or cure the coating applied to the metal coil.

4. "Finish coat operation" means the coating application station, curing oven and quench station used to apply and dry or cure the final coating or coatings on the surface of the metal coil. Where only a single coating is applied to the metal coil, that coating is considered a finish coat.

5. "Metal coil surface coating operation" means the application system used to apply an organic coating to the surface of any continuous metal strip with thickness of 0.15 millimeter (mm) (0.006 in.) or more that is packaged in a roll or coil.

6. "Prime coat operation" means the coating application station, curing oven and quench station used to apply and dry or cure the initial coating or coatings on the surface of the metal coil.

7. "Quench station" means that portion of the metal coil surface coating operation where the coated metal coil is cooled, usually by a water spray, after baking or curing.

8. "VOC content" means the quantity, in kilograms per liter of coating solids, of volatile organic compounds (VOC's) in a coating.

(b) As used in this section, all symbols not defined in this paragraph have the meaning given them in s. NR 440.03.

1. C_a=the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million by volume, as carbon).

2. C_b=the VOC concentration on each gas stream entering the control device (parts per million by volume, as carbon).

3. C_f=the VOC concentration in each gas stream emitted directly to the atmosphere (parts per million by volume, as carbon).

4. D_c=density of each coating, as received (kilograms per liter).

5. D_d=density of each VOC solvent added to coatings (kilograms per liter).

6. D_r=density of VOC solvent recovered by an emission control device (kilograms per liter).

7. E=VOC destruction efficiency of the control device (fraction).

8. F=the proportion of total VOC's emitted by an affected facility that enters the control device (fraction).

9. G=volume-weighted average mass of VOC's in coatings consumed in a calendar month per unit volume of coating solids applied (kilograms per liter).

10. L_c=the volume of each coating consumed, as received (liters).

11. L_d=the volume of each VOC solvent added to coatings (liters).

12. L_r=the volume of VOC solvent recovered by an emission control device (liters).

13. L_s=the volume of coating solids consumed (liters).

14. M_d=the mass of VOC solvent added to coatings (kilograms).

15. M_o=the mass of VOC's in coatings consumed, as received (kilograms).

16. M_r=the mass of VOC's recovered by an emission control device (kilograms).

17. N=the volume-weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter).

18. Q_a=the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour).

19. Q_b=the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour).

20. Q_f=the volumetric flow rate of each gas stream emitted directly to the atmosphere (dry standard cubic meters per hour).

21. R=the overall VOC emission reduction achieved for an affected facility (fraction).

22. S=the calculated monthly allowable emission limit (kilograms of VOC per liter of coating solids applied).

23. V_s=the proportion of solids in each coating as received (fraction by volume).

24. W_o=the proportion of VOC's in each coating, as received (fraction by weight).

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) On and after the date on which s. NR 440.08 requires a performance test to be completed, each owner or operator subject to this section may not cause to be discharged into the atmosphere more than:

1. 0.28 kilogram VOC per liter (kg VOC/l) of coating solids applied for each calendar month for each affected facility that does not use an emission control device; or

2. 0.14 kg VOC/l of coating solids applied for each calendar month for each affected facility that continuously uses an emission control device operated at the most recently demonstrated overall efficiency; or

3. 10% of the VOC's applied for each calendar month (90% emission reduction) for each affected facility that continuously uses an emission control device operated at the most recently demonstrated overall efficiency; or

4. A value between 0.14 (or a 90% emission reduction) and 0.28 kg/VOC/l of coating solids applied for each calendar month for each affected facility that intermittently uses an emission control device operated a the most recently demonstrated overall efficiency.

(b) [Reserved]

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08(4) and (6) does not apply to the performance test.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under s. NR 440.08(1) and thereafter a performance test for each calendar month for each affected facility according to the procedures in this subsection.

(c) The owner or operator shall use the following procedures for determining monthly volume-weighted average emissions of VOC's in kg/l of coating solids applied.

1. An owner or operator shall use the following procedures for each affected facility that does not use a capture system and control device to comply with the emission limit specified under sub. (3)(a)1. The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or by an analysis of each coating, as received, using Reference Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17. The department may require the owner or operator who uses formulation data supplied by the manufacturer of the coatings to determine the VOC content of coatings using Reference Method 24 or an equivalent or alternative method. The owner or operator shall determine the volume of coating and the mass of VOC solvent added to coatings from company records on a monthly basis. If a common coating distribution system serves more than one affected facility or serves both affected and existing facilities, the owner or operator shall estimate the volume of coating used at each affected facility by using the average dry weight of coating and the surface area coated by each affected and existing facility or by other procedures acceptable to the department.

a. Calculate the volume-weighted average of the total mass of VOC's consumed per unit volume of coating solids applied during each calendar month for each affected facility, except as provided under subpar. d. The weighted average of the total mass of VOC's used per unit volume of coating solids applied each calendar month shall be determined by the following procedures.

1) Calculate the mass of VOC's used (M_o+M_d) during each calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci}\, D_{ci}\, W_{oi} + \sum_{j=1}^{m} L_{dj}\, D_{dj}$$

($L_{dj}D_{dj}$ will be zero if no VOC solvent is added to the coatings, as received.)

where:

n is the number of different coatings used during the calendar month

m is the number of different VOC solvents added to coatings used during the calendar month

2) Calculate the total volume of coating solids used (L_s) in each calendar month for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} V_{si}\, L_{ci}$$

where:

n is the number of different coatings used during the calendar month

3) Calculate the volume-weighted average mass of VOC's used per unit volume of coating solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s}$$

b. Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N=G$$

c. Where the volume-weighted average mass of VOC's discharged to the atmosphere per unit volume of coating solids applied (N) is equal to or less than 0.28 kg/l, the affected facility is in compliance.

d. If each individual coating used by an affected facility has a VOC content, as received, that is equal to or less than 0.28 kg/l of coating solids, the affected facility is in compliance provided no VOC's are added to the coatings during distribution or application.

2. An owner or operator shall use the following procedures for each affected facility that continuously uses a capture system and a control device that destroys VOC's (e.g., incinerator) to comply with the emission limit specified under sub. (3)(a)2. or 3.

a. Determine the overall reduction efficiency (R) for the capture system and control device. For the initial performance test, the overall reduction efficiency (R) shall be determined as prescribed in this subparagraph. In subsequent months, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test, providing control device and capture system operating conditions have not changed. The procedure in this paragraph shall be repeated when requested by the department or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

1) Determine the fraction (F) of total VOC's emitted by an affected facility that enters the control device using the following equation.

$$F = \frac{\sum_{i=1}^{l} C_{bi}\ Q_{bi}}{\sum_{i=1}^{l} C_{bi}\ Q_{bi} + \sum_{i=1}^{p} C_{fi}\ Q_{fi}}$$

where:

l is the number of gas streams entering the control device

p is the number of gas streams emitted directly to the atmosphere

2) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E = \frac{\sum_{i=1}^{n} Q_{bi}\ C_{bi} - \sum_{j=1}^{m} Q_{aj}\ C_{aj}}{\sum_{i=1}^{n} Q_{bi}\ C_{bi}}$$

where:

n is the number of gas streams entering the control device

m is the number of gas streams leaving the control device and entering the atmosphere

The owner or operator of the affected facility shall construct the VOC emission reduction system so that all volumetric flow rates and total VOC emissions can be accurately determined by the applicable test methods and procedures specified in sub. (7). The owner or operator of the affected facility shall construct a temporary enclosure around the coating applicator and flashoff area during the performance test for the purpose of evaluating the capture efficiency of the system. The enclosure shall be maintained at a negative pressure to ensure that all VOC emissions are measurable. If a permanent enclosure exists in the affected facility prior to the performance test and the department is satisfied that the enclosure is adequately containing VOC emissions, no additional enclosure shall be required for the performance test.

3) Determine overall reduction efficiency (R) using the following equation:

$$R=EF$$

If the overall reduction efficiency (R) is equal to or greater than 0.90, the affected facility is in compliance and no further computations are necessary. If the overall reduction efficiency (R) is less than 0.90, the average total VOC emissions to the atmosphere per unit volume of coating solids applied (N) shall be computed as specified in subpars. b., c. and d.

b. Calculate the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in subd. l.a.l), 2), and 3).

c. Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

$$N=G(1-R)$$

d. If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.14 kg/l of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

3. An owner or operator shall use the following procedure for each affected facility that uses a control device that recovers the VOC's (e.g., carbon adsorber) to comply with the applicable emission limit specified under sub. (3)(a)2. or 3.

a. Calculate the total mass of VOC's consumed (M_o+M_d) during each calendar month for each affected facility using the equation in subd. l.a.l).

b. Calculate the total mass of VOC's recovered (M_r) during each calendar month using the following equation:

$$M_r=L_rD_r$$

c. Calculate the overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R = \frac{M_r}{M_o + M_d}$$

If the overall reduction efficiency (R) is equal to or greater than 0.90, the affected facility is in compliance and no further computation are necessary. If the overall reduction efficiency (R) is less than 0.90, the average total VOC emissions to the atmosphere per unit volume of coating solids applied (N) must be computed as described in subpars. d., e. and f.

d. Calculate the total volume of coating solids consumed (L_s) and the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in subd. l.a.2) and 3).

e. Calculate the volume-weighted average mass of VOC's emitted to the atmosphere (N) for each calendar month for each affected facility using the equation in subd. 2.c.

f. If the weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.14 kg/l of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

4. An owner or operator shall use the following procedures for each affected facility that intermittently uses a capture system and a control device to comply with the emission limit specified in sub. (3)(a)4.:

a. Calculate the total volume of coating solids applied without the control device in operation (L_{sn}) during each calendar month for each affected facility using the following equation:

$$L_{sn} = \sum_{i=1}^{n} V_{si} L_{ci}$$

where:

n is the number of coatings used during the calendar month without the control device in operation

b. Calculate the total volume of coating solids applied with the control device in operation (L_{sc}) during each calendar month for each affected facility using the following equation:

$$L_{sc} = \sum_{i=1}^{m} V_{si} L_{ci}$$

where:

m is the number of coatings used during the calendar month with the control device in operation.

c. Calculate the mass of VOC's used without the control device in operation ($M_{on}+M_{dn}$) during each calendar month for each affected facility using the following equation:

$$M_{on} + M_{dn} = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{i=1}^{m} L_{dj} D_{dj}$$

where:

n is the number of different coatings used without the control device in operation during the calendar month

m is the number of different VOC solvents added to coatings used without the control device in operation during the calendar month

d. Calculate the volume-weighted average of the total mass of VOC's consumed per unit volume of coating solids applied without the control device in operation (G_n) during each calendar month for each affected facility using the following equation:

$$G_n = \frac{M_{on} + M_{dn}}{L_{sn}}$$

e. Calculate the mass of VOC's used with the control device in operation ($M_{oc}+M_{dc}$) during each calendar month for each affected facility using the following equation:

$$M_{oc} + M_{dc} = \sum_{i=1}^{n} L_{ci}\, D_{ci}\, W_{oi} + \sum_{i=1}^{m} L_{dj}\, D_{dj}$$

where:

n is the number of different coatings used with the control device in operation during the calendar month

m is the number of different VOC-solvents added to coatings used with the control device in operation during the calendar month

f. Calculate the volume-weighted average of the total mass of VOC's used per unit volume of coating solids applied with the control device in operation (G_c) during each calendar month for each affected facility using the following equation:

$$G_c = \frac{M_{oc} + M_{dc}}{L_{sc}}$$

g. Determine the overall reduction efficiency (R) for the capture system and control device using the procedures in subd. 2.a.1). 2), and 3) or subd. 3.a., b. and c., whichever is applicable.

h. Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each calendar month for each affected facility using the following equation:

$$N = \frac{G_n L_{sn} + G_c L_{sc}(1-R)}{L_{sn} + L_{sc}}$$

i. Calculate the emission limit or limits for each calendar month for each affected facility using the following equation:

$$S = \frac{0.28\, L_{sn} + 0.1\, G_c\, L_{sc}}{L_{sn} + L_{sc}} \quad \text{or} \quad \frac{0.28\, L_{sn} + 0.14\, L_{sc}}{L_{sn} + L_{sc}},$$

whichever is greater.

j. If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to the calculated emission limit (S) for the calendar month, the affected facility is in compliance. Each monthly calculation is a performance test.

(5) MONITORING OF EMISSIONS AND OPERATIONS. (a) Where compliance with the numerical limit specified in sub. (3)(a)1. or 2. is achieved through the use of low VOC-content coatings without the use of emission control devices or through the use of higher VOC-content coatings in conjunction with emission control devices, the owner or operator shall compute and record the average VOC content of coatings applied during each calendar month for each affected facility according to the equations provided in sub. (4).

(b) Where compliance with the limit specified in sub. (3)(a)4. is achieved through the intermittent use of emission control devices, the owner or operator shall compute and record for each affected facility the average VOC content of coatings applied during each calendar month according to the equations provided in sub. (4).

(c) If thermal incineration is used, each owner or operator subject to the provisions of this section shall install, calibrate, operate and maintain a device that continuously records the combustion temperature of any effluent gases incinerated to achieve compliance with sub. (3)(a)2., 3. or 4. This device shall have an accuracy of plus or minus 2.5°C or plus or minus 0.75% of the temperature being measured expressed in degrees Celsius, whichever is greater. Each owner or operator shall also record all periods (during actual coating operations) in excess of 3 hours during which the average temperature in any thermal incinerator used to control emissions from an affected facility remains more than 28°C (50°F) below the temperature at which compliance with sub. (3)(a)2., 3. or 4. was demonstrated during the most recent measurement of incinerator efficiency required by s. NR 440.08. The records required by s. NR 440.07 shall identify each such occurrence and its duration. If catalytic incineration is used, the owner or operator shall install, calibrate, operate and maintain a device to monitor and record continuously the gas temperature both upstream and downstream of the incinerator catalyst bed. This device shall have an accuracy of plus or minus 2.5°C or plus or minus 0.75% of the temperature being measured expressed in degrees Celsius, whichever is greater. During coating operations, the owner or operator shall record all periods in excess of 3 hours where the average difference between the temperature upstream and downstream of the incinerator catalyst bed remains below 80% of the temperature difference at which compliance was demonstrated during the most recent measurement of incinerator efficiency or when the inlet temperature falls more than 28°C (50°F) below the temperature at which compliance with sub. (3)(a)2., 3. or 4. was demonstrated during the most recent measurement of incinerator efficiency required by s. NR 440.08. The records required by s. NR 440.07 shall identify each such occurrence and its duration.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) Where compliance with the numerical limit specified in sub. (3)(a)1., 2. or 4. is achieved through the use of low VOC-content coatings without emission control devices or through the use of higher VOC-content coatings in conjunction with emission control devices, each owner or operator subject to the provisions of this section shall include in the initial compliance report required by s. NR 440.08 the weighted average of the VOC content of coatings used during a period of one calendar month for each affected facility. Where compliance with sub. (3)(a)4. is achieved through the intermittent use of a control device, reports shall include separate values of the weighted average VOC content of coatings used with and without the control device in operation.

(b) Where compliance with sub. (3)(a)2., 3. or 4. is achieved through the use of an emission control device that destroys VOC's, each owner or operator subject to the provisions of this section shall include the following data in the initial compliance report required by s. NR 440.08:

1. The overall VOC destruction rate used to attain compliance with sub. (3)(a)2., 3. or 4. and the calculated emission limit used to attain compliance with sub. (3)(a)4.; and

2. The combustion temperature of the thermal incinerator or the gas temperature, both upstream and downstream of the incinerator catalyst bed, used to attain compliance with sub. (3)(a)2., 3. or 4.

(c) Each owner or operator subject to the provisions of this section shall maintain at the source for a period of at least 2 years, records of all data and calculations used to determine monthly VOC emissions from each affected facility and to determine the monthly emission limit where applicable. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain, at the source, daily records of the incinerator combustion temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed.

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under s. NR 440.08(2), shall be used to determine compliance with sub. (3) as follows:

1. Reference Method 24, or data provided by the formulator of the coating for determining the VOC content of each coating as applied to the surface of the metal coil. In the event of a dispute, Reference Method 24 shall be the reference method. When VOC content of waterborne coatings, determined by Reference Method 24, is used to determine compliance of affected facilities, the results of the Reference Method 24 analysis shall be adjusted as described in Section 4.4 of Reference Method 24.

2. Reference Method 25, both for measuring the VOC concentration in each gas stream entering and leaving the control device on each stack equipped with an emission control device and for measuring the VOC concentration in each gas stream emitted directly to the atmosphere,

3. Method 1 for sample and velocity traverses,

4. Method 2 for velocity and volumetric flow rate,

5. Method 3 for gas analysis, and

6. Method 4 for stack gas moisture.

(b) For Method 24 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the coating sample shall be at least a one-liter sample taken at a point where the sample will be representative of the coating as applied to the surface of the metal coil.

(c) For Method 25 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time shall be at least 60 minutes, and the minimum sample volume shall be at least 0.003 dry standard cubic meter (DSCM); however, shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

(d) The department shall approve testing of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the department that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

NR 440.59 STANDARDS OF PERFORMANCE FOR ASPHALT PROCESSING AND ASPHALT ROOFING MANUFACTURE. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITIES. (a) The affected facilities to which this section applies are each saturator and each mineral handling and storage facility at asphalt roofing plants; and each asphalt storage tank and each blowing still at asphalt processing plants, petroleum refineries and asphalt roofing plants.

(b) Any saturator or mineral handling and storage facility under par. (a) that commences construction or modification after November 18, 1980 is subject to the requirements of this section. Any asphalt storage tank or blowing still that processes or stores, or both processes and stores, asphalt used for roofing only or for roofing and other purposes, and that commences construction or modification after November 18, 1980 is subject to the requirements of this section. Any asphalt storage tank or blowing still that processes or stores, or both processes and stores, only nonroofing asphalts and that commences construction or modification after May 26, 1981 is subject to the requirements of this section.

(2) DEFINITIONS. As used in this section, all terms not defined in this subsection have the meaning given them in s. NR 440.02.

(a) "'Afterburner' or 'A/B'" means an exhaust gas incinerator used to control emissions of particulate matter.

(b) "Asphalt processing" means the storage and blowing of asphalt.

(c) "Asphalt processing plant" means a plant which blows asphalt for use in the manufacture of asphalt products.

(d) "Asphalt roofing plant" means a plant which produces asphalt roofing products (shingles, roll roofing, siding or saturated felt).

(e) "Asphalt storage tank" means any tank used to store asphalt at asphalt roofing plants, petroleum refineries and asphalt processing plants. Storage tanks containing cutback asphalts (asphalts diluted with solvents to reduce viscosity for low temperature applications) and emulsified asphalts (asphalts dispersed in water with an emulsifying agent) are not included.

(f) "Blowing still" means the equipment in which air is blown through asphalt flux to change the softening point and penetration rate.

(g) "Catalyst" means a substance which, when added to asphalt flux in a blowing still, alters the penetrating-softening point relationship or increases the rate of oxidation of the flux.

(h) "Coating blow" means the process in which air is blown through hot asphalt flux to produce coating asphalt. The coating blow starts when the air is turned on and stops when the air is turned off.

(i) "'Electrostatic precipitator' or 'ESP'" means an air pollution control device in which solid or liquid particulates in a gas stream are charged as they pass through an electric field and precipitated on a collection surface.

(j) "'High velocity air filter' or 'HVAF'" means an air pollution control filtration device for the removal of sticky, oily or liquid aerosol particulate matter from exhaust gas streams.

(k) "Mineral handling and storage facility" means the areas in asphalt roofing plants in which minerals are unloaded from a carrier, the conveyor transfer points between the carrier and the storage silos and the storage silos.

(l) "Saturator" means the equipment in which asphalt is applied to felt to make asphalt roofing products. The term saturator includes the saturator, wet looper and coater.

(3) STANDARDS FOR PARTICULATE MATTER. (a) On and after the date on which s. NR 440.08(2) requires a performance test to be completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any saturator:

1. Particulate matter in excess of:

a. 0.04 kilograms of particulate per megagram of asphalt shingle or mineral-surfaced roll roofing produced, or

b. 0.4 kilograms per megagram of saturated felt or smooth-surfaced roll roofing produced;

2. Exhaust gases with opacity greater than 20%; and

3. Any visible emissions from a saturator capture system for more than 20% of any period of consecutive valid observations totaling 60 minutes. Saturators that were constructed before November 18, 1980 and that have not been reconstructed since that date and that become subject to this section through modification are exempt from the visible emissions standard. Saturators that have been newly constructed or reconstructed since November 18, 1980 are subject to the visible emissions standard.

(b) On and after the date on which s. NR 440.08(2) requires a performance test to be completed, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any blowing still:

1. Particulate matter in excess of 0.67 kilograms of particulate per megagram of asphalt charged to the still when a catalyst is added to the still; and

2. Particulate matter in excess of 0.71 kilograms of particulate per megagram of asphalt charged to the still when a catalyst is added to the still and when No. 6 fuel oil is fired in the afterburner; and

3. Particulate matter in excess of 0.60 kilograms of particulate per megagram of asphalt charged to the still during blowing without a catalyst; and

4. Particulate matter in excess of 0.64 kilograms of particulate per megagram of asphalt charged to the still during blowing without a catalyst and when No. 6 fuel oil is fired in the afterburner; and

5. Exhaust gases with an opacity greater than zero percent unless an opacity limit for the blowing still when fuel oil is used to fire the afterburner has been established by the department in accordance with the procedures in sub. (5)(k).

(c) Within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any asphalt storage tank exhaust gases with opacity greater than zero percent, except for one consecutive 15-minute period in any 24-hour period when the transfer lines are being blown for cleaning. The control device may not be bypassed during this 15-minute period. If, however, the emissions from any asphalt storage tank or tanks are ducted to a control device for a saturator, the combined emissions shall meet the emission limit contained in par. (a) during the time the saturator control device is operating. At any other time the asphalt storage tank or tanks shall meet the opacity limit specified in this paragraph for storage tanks.

(d) Within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from any mineral handling and storage facility emissions with opacity greater than one percent.

(4) MONITORING OF OPERATIONS. (a) The owner or operator subject to the provisions of this section, and using either an electrostatic precipitator or a high velocity air filter to meet either the emission limit in sub. (3)(a)1. or (b)1., or both, shall continuously monitor and record the temperature of the gas at the inlet of the control device. The temperature monitoring instrument shall have an accuracy of plus or minus 15°C over its range.

(b) The owner or operator subject to the provisions of this section and using an afterburner to meet either the emission limit in sub. (3)(a)1. or (b)1., or both, shall continuously monitor and record the temperature in the combustion zone of the afterburner. The monitoring instrument shall have an accuracy of plus or minus 10°C over its range.

(c) An owner or operator subject to the provisions of this section and using a control device not mentioned in pars. (a) and (b) shall provide to the department information describing the operation of the control device and the process parameter or parameters which would indicate proper operation and maintenance of the device. The department may require continuous monitoring and determine the process parameters to be monitored.

(d) The industry is exempted from the quarterly reports required under s. NR 440.07(3). The owner or operator is required to record and report the operating temperature of the control device during the performance test and, as required by s. NR 440.07(4), maintain a file of the temperature monitoring results for at least 2 years.

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided in s. NR 440.08(2), shall be used to determine compliance with the standards prescribed in sub. (3) as follows:

1. Method 5A for the concentration of particulate matter,
2. Method 1 for sample and velocity traverses,
3. Method 2 for velocity and volumetric flow rate,
4. Method 3 for gas analysis, and
5. Method 9 for opacity.

(b) The department shall determine compliance with the standards prescribed in sub. (3)(a)3. by using Method 22 of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, modified so that readings are recorded every 15 seconds for a period of consecutive observations during representative conditions (in accordance with s. NR 440.08(3)) totaling 60 minutes. A performance test shall consist of one run.

(c) For Method 5A of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time for each run on a saturator shall be at least 120 minutes, and the sampling volume shall be at least 3 dscm. Method 5A shall be used to measure the emissions from the saturator while 106.6-kg (235-lb) asphalt shingle is being produced if the final product is shingle or mineral-surfaced roll roofing or while 6.8-kg (15-lb) saturated felt is being produced if the final product is saturated felt or smooth-surfaced roll roofing. If the saturator produces only fiberglass shingles, Method 5A shall be used to measure saturator emissions while a nominal 100-kg (220-lb) shingle is being produced. Method 5A shall be used to measure emissions from the blowing still for at least 90 minutes or for the duration of the coating blow, whichever is greater. If the blowing still is not used to blow coating asphalt, Method 5A shall be used to measure emissions from the blowing still for at least 90 minutes or for the duration of the blow, whichever is greater.

(d) The particulate emission rate, E, shall be computed as follows:

$$E=Q_{sd}xC_s$$

where:

E is the particulate emission rate (kg/h)

Q_{sd} is the average volumetric flow rate (dscm/h) as determined by Method 2

C_s is the average concentration (kg/dscm) of particulate matter as determined by Method 5A of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17

(e) The asphalt roofing production rate, P (Mg/h), shall be determined by dividing the weight in megagrams (Mg) of roofing produced on the shingle or saturated felt process lines during the performance test by the number of hours required to conduct the performance test. The roofing production shall be obtained by direct measurement.

(f) The production rate of asphalt from the blowing still, P_s (Mg/h), shall be determined by dividing the weight of asphalt charged to the still by the time required for the performance test during an asphalt blow. The weight of asphalt charged to the still shall be determined at the starting temperature of the blow. The weight of asphalt shall be converted from the volume measurement as follows:

$$M=Vd/c$$

where:

M is the weight of asphalt in megagrams

V is the volume of asphalt in cubic meters

d is the density of asphalt in kilograms per cubic meter

c is the conversion factor 1,000 kilograms per megagram

The density of asphalt at any measured temperature is calculated by using the following equation:

$$d=1056.1 - (0.6176 \times {}^\circ C)$$

The method of measurement shall have an accuracy of plus or minus 10%.

(g) The saturator emission rate shall be computed as follows: $R=E/P$.

(h) The blowing still emission rate shall be computed as follows:

$$R_s=E/P_s$$

where:

R is the saturator emission rate (kg/Mg)

R_s is blowing still emission rate (kg/Mg)

E is the particulate emission rate (kg/h) from par. (c)

P is the asphalt roofing production rate (Mg/h)

P_s is the asphalt charging rate (Mg/h).

(i) Temperature shall be measured and continuously recorded with the monitor required under sub. (4)(a) or (b) during the measurement of particulate by Method 5A of 40 C.F.R. pt. 60, Appendix A, incorporated by reference in s. NR 440.17, and reported to the department with the performance test results.

(j) If at a later date the owner or operator believes the emission limits in sub. (3)(a) and (b) are being met even though the temperature measured in accordance with sub. (4)(a) is exceeding that measured during the performance test, the owner or operator may submit a written request to the department to repeat the performance test and procedure outlined in par. (h).

(k) If fuel oil is to be used to fire an afterburner used to control a blowing still, the owner or operator may petition the department in accordance with s. NR 440.11(5) to establish an opacity standard for the blowing still that will be the opacity standard when fuel oil is used to fire the afterburner. To obtain this opacity standard, the owner or operator shall request the department to determine opacity during an initial, or subsequent, performance test when fuel oil is used to fire the afterburner. Upon receipt of the results of the performance test, the department shall make a finding concerning compliance with the mass standard for the blowing still. If the department finds that the facility was in compliance with the mass standard during the performance test but failed to meet the zero opacity standard, the department shall establish an opacity standard for the blowing still that will be the opacity standard when fuel oil is used to fire the afterburner. When the afterburner is fired with natural gas, the zero percent opacity remains the applicable opacity standard.

The forgoing rules were approved and adopted by the State of Wisconsin Natural Resources Board on July 27, 1983.

The rules contained herein shall take effect as provided in s. 227.026(1)(intro), Stats.

Dated at Madison, Wisconsin September 27, 1983

STATE OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES

By Carroll D. Besadny
Carroll D. Besadny, Secretary

(SEAL)