Chapter NR 440

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

NR 440.01 Applicability; purpose. (1) APPLICABILITY. On and after February 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 s. 111 of the federal clean air act, (42 U.S.C. 4711) as required by s. 144.375 (4), Stats.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84.

NR 440.02 Definitions. In addition to the definitions in this section, the definitions contained in ch. NR 400 apply to the terms used 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.

(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 administrator's satisfaction to produce, in specific cases, results adequate for his or her 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. How-

ever, 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 administrator'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.

(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 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.

(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. part 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).

(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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (intro.), (1), (5), (11) and (35), r. (24), Register, September, 1990, No. 417.

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

MJ - megajoule—10^6 joule

mol - mole

N - newton

ng - nanogram—10^9 gram

nm - nanometer—10^9 meter

Pa - pascal

s - second

V - volt

W - watt

(2) Other units of measure:

Btu - British thermal unit

°C - degree Celsius (centigrade)

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

hr - hour

in or " - inch

k - 1,000

l - liter

lpm - liter per minute

lb - pound

min - minute

ml - milliliter

mol. wt. - molecular weight

ppb - parts per billion (by volume)

ppm or ppmv - parts per million (by volume)

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

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (1) and (2), Register, September, 1990, No. 417.

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., Fitchburg, WI 53711.

(2) DNR Lake Michigan District, 1125 N. Military Ave., P.O. Box 10448, Green Bay, WI 54307-0488.

(3) DNR Western District, 1300 Clairemont Ave., Call Box 4001, Eau Claire, WI 54702.

(4) DNR Southeast District, Air Management Section, 2300 N. Dr. Martin Luther King, Jr. Dr., Box 12436, Milwaukee, WI 53212.

(5) DNR North Central District, 107 Sutcliff Ave., P.O. 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) Western 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

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (1) to (5), Register, September, 1990, No. 417.

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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84.

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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84.

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.

(f) A notification of the anticipated date for conducting the opacity observations required by s. NR 440.11 (5) (a). The notification shall also include, if appropriate, a request for the department to provide a visible emissions reader during a performance test. The notification shall be postmarked not less than 30 days prior to the anticipated opacity observation date.

(g) A notification that continuous opacity monitoring system data results will be used to determine compliance with the applicable opacity standard during a performance test required by s. NR 440.08, in lieu of Method 9 in 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, observation data, as allowed by s. NR 440.11 (5) (f). This notification shall be postmarked not less than 30 days prior to the date of the performance test.

(2) Any owner or operator subject to this chapter shall maintain records of the occurrence 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.

(5) Individual sections of this chapter may include specific provisions which clarify or make inapplicable the provisions set forth in this section.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; cr. (5), Register, September, 1986, No. 369, eff. 10-1-86; cr. (1) (f) and (g), Register, September, 1990, No. 417.

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 specifies or approves, in specific cases, the use of a reference method with minor changes in methodology or 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, or unless the administrator:

(a) Approves the use of an equivalent method, or

(b) Approves the use of an alternative method the results of which the administrator has determined to be adequate for indicating whether a specific source is in compliance.

(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.

(6) 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 deter-

mining 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2), renum, (5) (e) to be (6), Register, September, 1990, No. 417, eff. 10-1-90.

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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84.

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, with other requirements of chs. NR 400 to 499 or with ss. 144.30 to 144.426 or 144.96, Stats.

(2) In cases where an emission limitation or other requirement set in chs. NR 400 to 499, 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. Register, September, 1986, No. 369, eff. 10-1-86; am. (1), Register, September, 1990, No. 417, eff. 10-1-90.

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. part 60, Appendix A, incorporated by reference in s. NR 440.17, with any alternative method that is approved by the administrator, or as provided in sub. (5) (e). For purposes of determining initial compliance, the minimum total time of observations shall be 3 hours (30 6-minute averages) for the performance test or other set of observations (meaning those fugitive-type emission sources subject only to an opacity standard).

(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) For the purpose of demonstrating initial compliance, opacity observations shall be conducted concurrently with the initial performance test required in s. NR 440.08, unless one of the following conditions apply:

1. If no performance test under s. NR 440.08 is required, then opacity observations shall be conducted within 60 days after achieving the maximum production rate at which the affected facility will be operated, but no later than 180 days after initial startup of the facility.

2. If visibility or other conditions prevent the opacity observations from being conducted concurrently with the initial performance test required under s. NR 440.08, the owner or operator of an affected facility shall reschedule the opacity observations as soon after the initial performance test as possible, but not later than 30 days thereafter, and shall advise the department of the rescheduled date.

(b) When the conditions specified in par. (a) 1. or 2. are met, the 30-day prior notification to the department required in s. Nr 440.07 (1) (f) shall be waived. A rescheduled opacity observation shall be conducted, to the extent possible, under the same operating conditions that existed during the initial performance test conducted under s. NR 440.08. The visible emissions observer shall determine whether visibility or other conditions prevent the opacity observations from being made concurrently with the initial performance test in accordance with procedures contained in Reference Method 9 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17. 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 owner or operator of an affected facility shall make available, upon request by the department, such records as may be necessary to determine the conditions under which the visual observations were made and shall provide evidence indicating proof of current visible emissions observer certification. Except as provided in par. (f), 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 shall meet the burden of proving that the instrument used meets, at the time of the alleged violation indicated by visual observation, Prformance Specification 1 in Appendix B, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, has been properly maintained and that the resulting data collected at the time of the alleged violation have not been altered in any way.

(c) Except as provided in par. (d), the owner or operator of an affected facility to which an opacity standard in this chapter applies shall conduct opacity observations in accordance with sub. (2), shall record the opacity of emissions, and shall report to the department the opacity results along with the results of the initial performance test required under s. NR 440.08. The inability of an owner or operator to secure a visible emissions observer may not be considered a reason for not conducting the opacity observations concurrently with the initial performance test.

(d) The owner or operator of an affected facility to which an opacity standard in this chapter applies may request the department to determine and to record the opacity of emissions from the affected facility during the initial performance test and at such times as may be required. The owner or operator of the affected facility shall report the opacity results to the department. Any request to the department to determine and to record the opacity of emissions from an affected facility shall be included in the notification required in s. NR 440.07 (1) (f). If the department cannot determine and record the opacity of emissions from the affected facility during the performance test, then the provisions of pars. (a) and (b) shall apply.

(e) An owner or operator of an affected facility using a continuous opacity monitor (transmissometer) shall record the monitoring data produced during the initial performance test required by s. NR 440.08 and shall furnish the department a written report of the monitoring results along with the results obtained using Method 9 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, and s. NR 440.08 performance test results.

(f) An owner or operator of an affected facility subject to an opacity standard may submit, for compliance purposes, continuous opacity monitoring system (COMS) data results produced during any performance test required under s. NR 440.08 in lieu of Method 9 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, observation data. If an owner or operator elects to submit COMS data for compliance with the opacity standard, he or she shall notify the department of that decision, in writing, at least 30 days before any performance test required under s. NR 440.08 is conducted. Once the owner or operator of an affected facility has notified the department to that effect, the department shall use the COMS data results to determine opacity compliance during subsequent tests required under s. NR 440.08, until the owner or operator notifies the department, in writing, to the contrary. For the purpose of determining compliance with the opacity standard during a performance test required under s. NR 440.08 using COMS data, the minimum total time of COMS data collection shall be sufficient to include the averages of all 6-minute continuous periods within the duration of the mass emission performance test. Results of the COMS opacity determinations shall be submitted along with the results of the performance test required under s. NR 440.08. The owner or operator of an affected facility using a COMS for compliance purposes is responsible for demonstrating that the COMS meets the requirements specified in s. NR 440.13 (3), that the COMS has been properly maintained and operated, and that the resulting data have not been altered in any way. If COMS data results are submitted for compliance with the opacity standard for a period of time during which Method 9 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, data indicates noncompliance, the Method 9 data shall be used to determine opacity compliance.

(g) Upon receipt from an owner or operator of the written reports of the results of the performance tests required by s. NR 440.08, the opacity observation results and observer certification required by sub. (5) (b), and the COMS results, if applicable, the department shall make a finding concerning compliance with opacity and other applicable standards. If COMS data results are used to comply with an opacity standard, only those results are required to be submitted along with the performance test results required by s. NR 440.08. 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 such performance tests are being conducted fails to meet any applicable opacity standard, the department shall notify the owner or operator and advise him or her that he or she may petition the administrator within 10 days of receipt of notification to make appropriate adjustment to the opacity standard for the affected facility.

Note: Under 40 C.F.R. s. 60.11 (e) (7) and (8), the administrator will grant a petition for adjustment of the opacity standard for an affected facility upon a demonstration by the owner or operator that the facility and associated air pollution control equipment were 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. The administrator will establish an opacity standard for the affected facility 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 applicable mass or concentration emission standard. The administrator will promulgate the new opacity standard in the federal register.

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

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; cr. (6), Register, September, 1986, No. 369, eff. 10-1-86; am. (2), r. and recr. (5), Register, September, 1990, No. 417, eff. 10-1-90.

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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84.

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. part 60, Appendix B, incorporated by reference in s. NR 440.17, unless otherwise specified in an applicable section or by the department. If the continuous monitoring system is used to determine compliance with emission limits on a continuous basis, the quality assurance requirements of 40 C.F.R. part 60, Appendix F, incorporated by reference in s. NR 440.17, apply unless an applicable section or the department specify otherwise.

(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) If the owner or operator of an affected facility elects to submit continuous opacity monitoring system (COMS) data for compliance with the opacity standard as provided under s. NR 440.11 (5) (f), the owner or operator shall conduct a performance evaluation of the COMS as specified in Performance Specification 1, Appendix B, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, before the performance test required under s. NR 440.08 is conducted. Otherwise, the owner or operator of an affected facility shall conduct a performance evaluation of

the COMS or continuous emission monitoring system (CEMS) during any performance test required under s. NR. 440.08 or within 30 days thereafter in accordance with the applicable performance specification in Appendix B, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17. The owner or operator of an affected facility shall conduct COMS or CEMS performance evaluations at such other times as may be required by the department.

(a) The owner or operator of an affected facility using a COMS to determine opacity compliance during any performance test required under s. NR 440.08 and as described in s. NR 440.11 (5) (f) shall furnish the department 2 or, upon request, more copies of a written report of the results of the COMS performance evaluation described in this subsection at least 10 days before the performance test required under s. NR 440.08 is conducted.

(b) Except as provided in par. (a), the owner or operator of an affected facility shall furnish the department within 60 days of completion 2 or, upon request, more copies of a written report of the results of the performance evaluation.

(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. part 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 opacity condition and an upscale (span) 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) 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) for measuring emissions, except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing and data recording) for each successive 15-minute 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. part 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 (20) and (29), 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 may 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 1 of 40 C.F.R. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (1) (intro.), r. (1) (a) and (b), Register, September, 1986, No. 369, eff. 10-1-86; am. (1), (4) (b), (5) (a) and (b) and (8), r. and recr. (3), r. (5) (c), Register, September, 1990, No. 417, eff. 10-1-90.

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. part 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.

(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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84.

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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84.

NR 440.17 Incorporation by reference of code of federal regulations provisions and other materials. (1) CODE OF FEDERAL REGULATIONS. (a) *Federal regulations.* The federal regulations in effect on July 1, 1988 listed in this paragraph are incorporated by reference in the corresponding sections noted. Copies of these regulations 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. 40 C.F.R. s. 51.18 for s. NR 440.205 (2) (1).

2. 40 C.F.R. s. 51.24 for s. NR 440.205 (2) (1).

3. 40 C.F.R. s. 52.21 for s. NR 440.205 (2) (1).

4. 40 C.F.R. s. 60.11 (e) for s. NR 440.59 (5) (k).

5. 40 C.F.R. s. 60.484 for ss. NR 440.62 (3) (a) 3. and (6) (b) (intro.) and 440.66 (3) (c).

6. 40 C.F.R. s. 60.592 (c) for s. NR 440.66 (3) (c).

7. 40 C.F.R. part 261 for s. NR 440.205 (5) (g).

8. 40 C.F.R. part 761 for s. NR 440.205 (5) (g).

(b) *Appendices.* Appendices A, B, C and F of 40 C.F.R. part 60 as in effect on July 1, 1988 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, C and F of 40 C.F.R. part 60 as in effect on July 1, 1988 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), (n) and (y), 440.205 (2) (d) and (t) 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. and for 40 C.F.R. part 60, Appendix A, Method 19.

3. ASTM D3176-74, Standard Method for Ultimate Analysis of Coal and Coke, for s. NR 440.19 (6) (f) 5.a. and for 40 C.F.R. part 60, Appendix A, Method 19.

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. part 60, Appendix A, Method 19.

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. part 60, Appendix A, Method 19.

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. part 60, Appendix A, Method 19.

10. ASTM D396-78, Standard Specifications for Fuel Oils, for ss. NR 440.205 (2) (h) and (zf), 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 D323-82, Test Method for Vapor Pressure of Petroleum Products (Reid Method), for ss. NR 440.27 (2) (i), 440.28 (2) (h) and 440.285 (2) (i) and (7) (f) 2. b.

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 D1072-80, Standard 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. part 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. part 60, Appendix A, Method 6, par. 3.1.1.; Method 7, par. 3.2.2.; Method 7A, par. 3.2; Method 7C, par. 3.1.1; Method 7D, par. 3.1.1; Method 8, par. 3.1.3; Method 11, par. 6.1.3; Method 12, par. 4.1.3 and Method 13A, par. 6.1.2.

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

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

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

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

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

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. part 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. part 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. part 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. part 60, Appendix A, Method 24, par. 2.4.

34. ASTM E169-63 (reapproved 1977), General Techniques of Ultraviolet Quantitative Analysis, for ss. NR 440.62 (6) (d), 440.66 (4) (b) and 440.682 (3) (f).

35. ASTM E168-67 (reapproved 1977), General Techniques of Infrared Quantitative Analysis, for ss. NR 440.62 (6) (d), 440.66 (4) (b) and 440.682 (3) (f).

36. ASTM E260-73, General Gas Chromatography Procedures, for ss. NR 440.62 (6) (d), 440.66 (4) (b), 440.682 (3) (f) and 440.684 (6) (a) 8.

37. ASTM D2879-83, Test Method for Vapor Pressue - Temperature Relationship and Initial Decomposition Temperature of Liquids by

Isoteniscope, for ss. NR 440.285 (2) (f) 3., (7) (e) 3. b. and (f) 2. a. and 440.62 (6) (e).

38. ASTM D2382-76 (reapproved 1980), Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method), for ss. NR 440.18 (6) and 440.62 (6) (g).

39. ASTM D2504-67 (reapproved 1977), Noncondensable Gases in C_3 and Lighter Hydrocarbon Products by Gas Chromatography, for s. NR 440.62 (6) (g).

40. ASTM D86-78, Distillation of Petroleum Products, for ss. NR 440.66 (4) (d) and 440.682 (4) (h).

42. ASTM D3031-81, Standard Test Method for Total Sulfur in Natural Gas by Hydrogenation, for s. NR 440.50 (6) (b) 2.

43. ASTM D4084-82, Standard Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method), for s. NR 440.50 (6) (b) 2.

44. ASTM D3246-81, Standard Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry, for s. NR 440.50 (6) (b) 2.

45. ASTM D2584-68 (reapproved 1985), Standard Test Method for Ignition Loss of Cured Reinforced Resins, for s. NR 440.69 (6) (e).

46. ASTM D1946-77, Method for Analysis of Reformed Gas by Gas Chromatography, for s. NR 440.18 (6).

47. ASTM D3431-80 (reapproved 1987), Standard Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons (Microcoulometric Method), for s. NR 440.205 (10) (e) 3.

48. ASTM D129-64 (reapproved 1978), Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), for 40 C.F.R. part 60, Appendix A, Method 19.

49. ASTM D1552-83, Standard Test Method for Sulfur in Petroleum Products (High Temperature Method), for 40 C.F.R. part 60, Appendix A, Method 19.

50. ASTM D1835-86, Standard Specification for Liquified Petroleum (LP) Gases, to be approved for s. NR 440.205 (2) (y).

51. ASTM D3286-85, Standard Test Method for Gross Calorific Value of Coal and Coke by the Isothermal - Jacket Bomb Calorimeter, for 40 C.F.R. part 60, Appendix A, Method 19.

52. ASTM D4057-81, Standard Practice for Manual Sampling of Petroleum and Petroleum Products, for 40 C.F.R. part 60, Appendix A, Method 19.

53. ASTM D4239-85, Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods, for 40 C.F.R. part 60, Appendix A, Method 19.

54. ASTM D2016-74 (reapproved 1983), Standard Test Methods for Moisture Content of Wood, for 40 C.F.R. part 60, Appendix A, Method 28.

55. ASTM D4442-84, Standard Test Methods for Direct Moisture Content Measurement in Wood and Wood-base Materials, for 40 C.F.R. part 60, Appendix A, Method 28.

(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., 440.38 (5) (d)2., 440.39 (5) (d)2., 440.40 (5) (d)2., and 440.41 (5) (f)2.

(c) The following material is available for purchase from the American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

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).

(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.

(e) The following material is available for purchase from the Water Pollution Control Federation (WPCF), 2626 Pennsylvania Avenue N.W., Washington, D.C. 20037.

1. Method 209A, Total Residue Dried at 103-105 °C, in Standard Methods for the Examination of Water and Wastewater, 15th edition, 1980, for s. NR 440.69 (4) (b).

(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).

(g) 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.

(h) The following material is available for purchase from the Industrial Press, 93 Worth St., New York, New York: Gas Engineers Handbook, 1st edition, 2nd printing, 1966, page 6/25, Fuel Gas Engineering Practice, for s. NR 440.684 (9).

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (1), (2) (intro.), (a) 1., 3., 7. to 10., 13., 20., 22. and 24. to 28., (2) (b) 1. and (c) (intro.), cr. (2) (a) 34. to 55., (2) (e) and (h) renum. (2) (e) to be (2) (g), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.18 General control device requirements. (1) INTRODUCTION. This section contains requirements for control devices used to comply with applicable sections of this chapter and chs. NR 445 to 484. The requirements are placed in this section for administrative convenience and only apply to facilities covered by sections or chapters referring to this section.

(2) FLARES. Subsections (3) through (6) apply to flares.

(3) (a) Flares shall be designed for and operated with no visible emissions as determined by the methods specified in sub. (6), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

(b) Flares shall be operated with a flame present at all times, as determined by the methods specified in sub. (6).

(c) Flares shall be used only with the net heating value of the gas being combusted being 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted or air-assisted; or with the net heating value of the gas being combusted being 7.45 MJ/scm (200 Btu/scf) or greater if the flare is nonassisted. The net heating value of the gas being combusted shall be determined by the methods specified in sub. (6).

(d) 1. Steam-assisted and nonassisted flares shall be designed for and operated with an exit velocity, as determined by the methods specified in sub. (6) (d), less than 18.3m/sec (60 ft/sec), except as provided in subds. 2. and 3.

2. Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in sub. (6) (d), equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec) are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).

3. Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in sub. (6) (d), less than the velocity, V_{max}, as determined by the method specified in sub. (6) (e), and less than 122 m/sec (400 ft/sec) are allowed.

(e) Air-assisted flares shall be designed and operated with an exit velocity less than the velocity, V_{max}, as determined by the method specified in sub. (6) (f).

(f) Flares used to comply with this section shall be steam-assisted, air-assisted, or nonassisted.

(4) Owners or operators of flares used to comply with the provisions of this section shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs. Applicable sections below provide provisions stating how owners or operators of flares shall monitor these control devices.

(5) Flares used to comply with provisions of this section shall be operated at all times when emissions may be vented to them.

(6) (a) Reference Method 22 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, shall be used to determine the compliance of flares with the visible emission provisions of this section. The observation period is 2 hours and shall be used according to Method 22 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17.

(b) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

(c) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K \sum_{i=1}^{n} C_i H_i$$

where:

H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25°C and 700 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C;

K = Constant, $1.740 \times 10^{-7} \frac{1}{\text{ppm}} \frac{\text{g-mole}}{\text{scm}} \frac{\text{MJ}}{\text{kcal}}$

where the standard temperature for (g-mole)/scm is 20°C;

C_i = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77, incorporated by reference in s. NR 440.17; and

H_i = Net heat of combustion of sample component i, kcal/(g-mole) at 25°C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76, incorporated by reference in s. NR 440.17, if published values are not available or cannot be calculated.

(d) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined as appropriate by Reference Method 2, 2A, 2C, or 2D of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, by the unobstructed (free) cross sectional area of the flare tip.

(e) The maximum permitted velocity, V_{max}, for flares complying with sub. (3) (d) 3. shall be determined by the following equation:

$$\text{Log}_{10}(V_{max}) = (H_T + 28.8)/31.7$$

where:
V_{max} = Maximum permitted velocity, m/sec
28.8 = Constant
31.7 = Constant
H_T = The net heating value as determined in par. (c).

(f) The maximum permitted velocity, V_{max}, for air-assisted flares shall be determined by the following equation.

$$V_{max} = 8.706 + 0.7084(H_T)$$

where:
V_{max} = Maximum permitted velocity, m/sec
8.706 = Constant
0.7084 = Constant

H_T = The net heating value as determined in par. (c).

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.19 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 does 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, terms not defined in this subsection have the meanings given 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.

(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_2} 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.

2. 129 nanograms per joule heat input (0.30 lb per million Btu) derived from liquid fossil fuel, liquid fossil fuel and wood residue, or gaseous 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:

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

in which:

PS_{NO_x} 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 sulfur 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. Methods 3 or 3A, 6, 6A, 6B, or 6C and 7, 7A, 7C, 7D or 7E of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, as applicable, shall be used for conducting relative accuracy evaluations of sulfur dioxide and nitrogen oxides continuous monitoring systems. Methods 3A, 6C and 7E shall be used only at the sole discretion of the source owner or operator.

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. part 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% 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

Note: For solid fuel the span value for nitrogen oxides should be 1,000. The table will be corrected when this error has been corrected in the code of federal regulations.

4. All span values computed under subd. 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.

(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 = 2.723×10^{-17} dscm/J (10,140 dscf/million Btu) and $F_c = 0.532 \times 10^{-17}$ 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 by reference in s. NR 440.17, F = 2.637×10^{-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 × 10^{-7} dscm/J (9,220 dscf/million Btu) and F_c = 0.384 × 10^{-7} scm CO_2/J (1,430 scf CO_2/million Btu).

d. For gaseous fossil fuels, F = 2.347 × 10^{-7} dscm/J (8,740 dscf/million Btu). For natural gas, propane and butane fuels, F_c = 0.279 × 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 × 10^{-7} dscm/J (9,640 dscf/million Btu) and F_c = 0.500 × 10^{-7} scm CO_2/J (1,840 scf CO_2/million Btu). For wood residue other than bark, F = 2.492 × 10^{-7} dscm/J (9,280 dscf/million Btu) and F_c = 0.494 × 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 × 10^{-7} dscm/J (9900 dscf/million Btu) and F_c = 0.516 × 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.:

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

$$F_c = \frac{2.0 \times 10^{-5}\ (\%\,C)}{GCV}$$

(SI units)

$$F = \frac{10^{6}[3.64(\%H) + 1.53(\%C) + 0.57(\%S) + 0.14(\%N) - 0.46(\%O)]}{GCV}$$

(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 D3178-73 or D3176-74 (solid fuels), or computed from results using ASTM methods D1137-53(1975), D1945-64(1976), 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:

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

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. part 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 Method 5, 5B, 6, 7, 7A, 7C, 7D or 17.

3. Method 5, 5B or 17 for concentration of particulate matter and the associated moisture content as follows: Method 5 is to be used at affected facilities without wet flue gas desulfurization (FGD) systems; Method 5B is to be used only after wet FGD systems; and Method 17 may be used at facilities with or without wet FGD systems provided that the stack gas temperature at the sampling location does not exceed an aver-

age temperature of 160°C (320°F). The procedures of sections 2.1 and 2.3 of Method 5B may be used with Method 17 after wet FGD systems if the effluent gas is saturated or laden with water droplets.

4. Method 6 or 6C for concentration of SO_2. Method 6A may be used whenever Methods 6 or 6C and 3 or 3A data are used to determine the SO_2 emission rate in ng/J. Method 6C shall be used only at the sole discretion of the source owner or operator.

5. Method 7, 7A, 7C, 7D, or 7E for concentration of NO_x. Method 7E shall be used only at the sole discretion of the source owner or operator.

(b) For Method 5, 5B, or 17 of 40 C.F.R. part 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 of 160°C ± 14°C (320°F ± 25° F).

(c) For Methods 6 and 7, 7A, 7C, or 7D of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling site shall be the same as that selected for Method 5, 5B, or 17. 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 Methods 6 and 7C or 7D, the samples shall be extracted at a constant volumetric flow rate.

(d) For Method 6 of 40 C.F.R. part 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, 7A, 7C, 7D, or 7E of 40 C.F.R. part 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. For Method 7C or 7D each run shall consist of a 1-hour sample.

(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, 6C, 7, 7A, 7C, 7D, or 7E.

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. part 60, Appendix A, incorporated by reference in s. NR 440.17, as applicable, or by using Method 3A. Method 3A shall be used only at the sole discretion

of the source owner or operator. Oxygen samples shall be obtained as follows:

a. For determination of sulfur dioxide by Method 6 or 6C and nitrogen oxides emissions by Method 7, 7A, 7C, 7D, or 7E, the oxygen sample shall be obtained simultaneously at the same point in the duct. For Method 7 or 7A the oxygen sample shall be obtained using the grab sampling and analysis procedures of Method 3 or by using Method 3A.

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, 5B or 17 under par. (b). Method 1 shall be used for selection of the number of oxygen 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 method 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (6) (c) 1., (7) (a) 2., 4. and 5., (7) (c), (e), (f) 2., 3. (intro.) and a., Register, September, 1986, No. 369, eff. 10-1-86; am. (1) (b), (2) (intro.), (6) (a) 1. and 2., (6) (c) 1. and (f) 5. a., (7) (a) 1. to 5., (b); (c) and (f) 3., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.20 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 utility 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, terms not defined in this subsection have the meanings given 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 for 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 for 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 for 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-1) 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.

(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 input:

$E_{SO_2} = [340\,x + 520\,y]/100$ 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	(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 significant 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. part 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. part 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. part 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 or 3A, 6 or 6C and 7, 7A, 7C, 7D, or 7E, as applicable, shall be used. Method 6A or 6B may be used whenever Methods 6 and 3 data are required to determine the SO_2 emission rate in ng/J. Methods 3A, 6C and 7E shall be used only at the sole discretion of the source owner or operator. The sampling location or locations shall be the same as those specified for the continuous emission monitoring system.

2. For Method 6 or 6A, 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. Method 6B shall be operated for 24 hours per sample, and the minimum sample volume is 0.02 dscm (0.71 dscf) for each sample. Each Method 6B sample represents 24 1-hour averages.

3. For Method 7 or 7A, samples shall be taken at approximately 30-minute intervals. The arithmetic average of these 2 consecutive samples represent a one-hour average. For Method 7C or 7D each run shall consist of a 1-hour sample.

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 or 6C and 7, 7A, 7C, 7D, or 7E 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. Methods 3 or 3A, 6, 6A, 6B, or 6C, and 7, 7A, 7C, 7D, or 7E of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, as applicable, shall be used for conducting relative accuracy evaluations of sulfur dioxide and nitrogen oxides continuous emission monitoring systems. Methods 3A, 6C, and 7E shall be used only at the sole discretion of the source owner or operator.

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. part 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. part 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 shall be used for gas analysis when applying Method 5, 5B, or 17.

2. Method 5, 5B or 17 shall be used for determining particulate matter emissions and associated moisture content as follows: Method 5 shall be used at affected facilities without FGD systems; Method 5B shall be used only after wet FGD systems; and Method 17 may be used at facilities with or without wet FGD systems provided that the stack gas temperature at the sampling location does not exceed a temperature of 160°C (320°F). The procedures of sections 2.1 and 2.3 of Method 5B may be used in Method 17 only if it is used after wet FGD systems. Method 17 may not be used after wet FGD systems if the effluent is saturated or laden with water droplets.

3. For Method 5, 5B, 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 or 5B, the probe and filter holder heating system in the sampling train shall be set to provide an average gas temperature of 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, 5B, or 17 by traversing the duct at the same sampling location. Method 1 shall be used for selection of the number of oxygen or carbon dioxide traverse points except that no more than 12 sample points are required.

6. For each run using Method 5, 5B, 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.

(b) The following procedures and reference methods of 40 C.F.R. part 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. part 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. part 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 diluent 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. part 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. part 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 performed 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 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (7) (h) 1., 3., 4., (i) 1. and (8) (a) 1., Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), (7) (h) 1. to 3., (i) 1., (8) (a) 1. to 6., r. (8) (a) 7., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.205 Industrial - commercial - institutional steam generating units. (1) APPLICABILITY. (a) The affected facility to which this section applies is each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels combusted in the steam generating unit of more than 29 MW (100 million Btu/hour).

(b) Any affected facility meeting the applicability requirements under par. (a) and commencing construction, modification, or reconstruction after June 19, 1984, but on or before June 19, 1986, is subject to the following standards:

1. Coal-fired affected facilities having a heat input capacity between 29 and 73 MW (100 and 250 million Btu/hour), inclusive, are subject to the particulate matter and nitrogen oxides standards under this section.

2. Coal-fired affected facilities having a heat input capacity greater than 73 MW (250 million Btu/hour) and meeting the applicability requirements under s. NR 440.19 (standards of performance for fossil fuel-fired steam generators) are subject to the particulate matter and nitrogen oxides standards under this section and to the sulfur dioxide standards in s. NR 440.19(4).

3. Oil-fired affected facilities having a heat input capacity between 29 and 73 MW (100 and 250 million Btu/hour), inclusive, are subject to the nitrogen oxides standards in this section.

4. Oil-fired affected facilities having a heat input capacity greater than 73 MW (250 million Btu/hour) and meeting the applicability requirements in s. NR 440.19 (standards of performance for fossil fuel-fired

steam generators) are also subject to the nitrogen oxides standards in this section and the particulate matter and sulfur dioxide standards in s. NR 440.19(3) and (4).

(c) Affected facilities which also meet the applicability requirements under s. NR 440.26 (standards of performance for petroleum refineries) are subject to the particulate matter and nitrogen oxides standards in s. NR 440.26(5).

(d) Affected facilities which also meet the applicability requirements in s. NR 440.21 (standards of performance for incinerators) are subject to the nitrogen oxides and particulate matter standards in this section.

(e) Steam generating units meeting the applicability requirements in s. NR 440.20 (standards of performance for electric utility steam generating units) are not subject to this section.

(f) Any change to an existing steam generating unit for the sole purpose of combusting gases containing TRS as defined in s. NR 440.45(2) is not considered a modification under s. NR 440.14 and the steam generating unit is not subject to this section.

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

(a) "Annual capacity factor" means the ratio between the actual heat input to a steam generating unit from the fuels listed in sub. (3) (a), (4) (a) or (5) (a), as applicable, during a calendar year and the potential heat input to the steam generating unit had it been operated for 8,760 hours at the maximum steady state design heat input capacity. In the case of steam generating units that are rented or leased, the actual heat input shall be determined based on the combined heat input from all operations of the affected facility in a calendar year.

(b) "Byproducts/waste" means any liquid or gaseous substance produced at chemical manufacturing plants or petroleum refineries (except natural gas, distillate oil, or residual oil) and combusted in a steam generating unit for heat recovery or for disposal. Gaseous substances with carbon dioxide levels greater than 50% or carbon monoxide levels greater than 10% are not byproduct/waste for the purposes of this section.

(c) "Chemical manufacturing plants" means industrial plants which are classified by the department of commerce under standard industrial classifications (SIC) code 28.

(d) "Coal" means all solid fuels classified as an anthracite, bituminous, subbituminous, or lignite by the American Society for Testing and Materials in ASTM D388-77, Standard Specification for Classification of Coals by Rank, incorporated by reference in s. NR 440.17, coal refuse, and petroleum coke. Coal-derived synthetic fuels, including but not limited to solvent refined coal, gasified coal, coal-oil mixtures, and coal-water mixtures, are also included in this definition for the purposes of this section.

(e) "Coal refuse" means any byproduct of coal mining or coal cleaning operations with an ash content greater than 50%, by weight, and a heating value less than 13,900 kJ/kg (6,000 Btu/lb) on a dry basis.

(f) "Combined cycle system" means a system where a separate source, such as a gas turbine, internal combustion engine, kiln, etc., provides exhaust gas to a heat recovery steam generating unit.

(g) "Conventional technology" means wet flue gas desulfurization (FGD) technology, dry FGD technology, atmospheric fluidized bed combustion technology, and oil hydrodesulfurization technology.

(h) "Distillate oil" means fuel oils which contain 0.05 weight % nitrogen or less and comply with the specifications for fuel oils number 1 and 2, as defined by the American Society for Testing and Materials in ASTM D396-78, Standard Specification for Fuel Oils, incorporated by reference in s. NR 440.17.

(i) "Dry flue gas desulfurization technology" means a sulfur dioxide control system that is located downstream of the steam generating unit and removes sulfur oxides from the combustion gases of the steam generating unit by contacting the combustion gases with an alkaline slurry or solution and forming a dry powder material. This definition includes devices where the dry powder material is subsequently converted to another form. Alkaline slurries or solutions used in dry flue gas desulfurization technology include but are not limited to lime and sodium.

(j) "Duct burner" means a device that combusts fuel and that is placed in the exhaust duct from another source, such as a stationary gas turbine, internal combustion engine, kiln, etc., to allow the firing of additional fuel to heat the exhaust gases before the exhaust gases enter a heat recovery steam generating unit.

(k) "Emerging technology" means any sulfur dioxide control system that is not defined as a conventional technology under this section, and for which the owner or operator of the facility has applied to the administrator and received approval to operate as an emerging technology under sub. (10) (a)4.

(l) "Federally enforceable" means all limitations and conditions that are enforceable by the administrator including the requirements of 40 C.F.R. parts 60 and 61, requirements within any applicable state implementation plan, and any permit requirements established under 40 C.F.R. s. 52.21 or under 40 C.F.R. s. 51.18 and 40 C.F.R. s. 51.24, incorporated by reference in s. NR 440.17.

(m) "Fluidized bed combustion technology" means combustion of fuel in a bed or series of beds (including but not limited to bubbling bed units and circulating bed units) of limestone aggregate (or other sorbent materials) in which these materials are forced upward by the flow of combustion air and the gaseous products of combustion.

(n) "Fuel pretreatment" means a process that removes a portion of the sulfur in a fuel before combustion of the fuel in a steam generating unit.

(o) "Full capacity" means operation of the steam generating unit at 90% or more of the maximum steady-state design heat input capacity.

(p) "Heat input" means heat derived from combustion of fuel in a steam generating unit and does not include the heat input from preheated combustion air, recirculated flue gases, or exhaust gases from other sources, such as gas turbines, internal combustion engines, kilns, etc.

(q) "Heat release rate" means the steam generating unit design heat input capacity (in MW or Btu/hour) divided by the furnace volume (in cubic meters or cubic feet); the furnace volume is that volume bounded by the front furnace wall where the burner is located, the furnace side waterwall, and extending to the level just below or in front of the first row of convection pass tubes.

(r) "Heat transfer medium" means any material that is used to transfer heat from one point to another point.

(s) "High heat release rate" means a heat release rate greater than 730,000 J/sec-m^3 (70,000 Btu/hour-ft^3).

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

(u) "Low heat release rate" means a heat release rate of 730,000 J/sec-m^3 (70,000 Btu/hour-ft^3) or less.

(v) "Mass-feed stoker steam generating unit" means a steam generating unit where solid fuel is introduced directly into a retort or is fed directly onto a grate where it is combusted.

(w) "Maximum heat input capacity" means the ability of a steam generating unit to combust a stated maximum amount of fuel on a steady state basis, as determined by the physical design and characteristics of the steam generating unit.

(x) "Municipal-type solid waste" means refuse, more than 50% of which is waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustible materials, and noncombustible materials such as glass and rock.

(y) "Natural gas" means:

1. A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth's surface, of which the principal hydrocarbon constituent is methane; or

2. Liquid petroleum gas, as defined by the American Society for Testing and Materials in ASTM D1835-86, Standard Specification for Liquid Petroleum Gases, incorporated by reference in s. NR 440.17.

(z) "Noncontinental area" means the state of Hawaii, the Virgin Islands, Guam, American Samoa, the commonwealth of Puerto Rico, or the Northern Mariana Islands.

(za) "Oil" means crude oil or petroleum or a liquid fuel derived from crude oil or petroleum, including distillate and residual oil.

(zb) "Petroleum refinery" means industrial plants as classified by the department of commerce under standard industrial classification (SIC) code 29.

(zc) "Potential sulfur dioxide emission rate" means the theoretical sulfur dioxide emissions (ng/J, lb/million Btu heat input) that would result from combusting fuel in an uncleaned state and without using emission control systems.

(zd) "Process heater" means a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst.

(ze) "Pulverized coal-fired steam generating unit" means a steam generating unit in which pulverized coal is introduced into an air stream that carries the coal to the combustion chamber of the steam generating unit where it is fired in suspension. This includes both conventional pulverized coal-fired and micropulverized coal-fired steam generating units.

(zf) "Residual oil" means crude oil, fuel oil numbers 1 and 2 that have a nitrogen content greater than 0.05 weight %, and all fuel oil numbers 4, 5 and 6, as defined by the American Society for Testing and Materials in ASTM D396-78, Standard Specifications for Fuel Oils, incorporated by reference in s. NR 440.17.

(zg) "Spreader stoker steam generating unit" means a steam generating unit in which solid fuel is introduced to the combustion zone by a mechanism that throws the fuel onto a grate from above and in which combustion takes place both in suspension and on the grate.

(zh) "Steam generating unit" means a device that combusts any fuel or byproduct/waste to produce steam or to heat water or any other heat transfer medium. This term includes any municipal-type solid waste incinerator with a heat recovery steam generating unit or any steam generating unit that combusts fuel and is part of a cogeneration system or a combined cycle system. This term does not include process heaters as they are defined in this section.

(zi) "Steam generating unit operating day" means a 24-hour period between 12:00 midnight and the following midnight during which any fuel is combusted at anytime in the steam generating unit. It is not necessary for fuel to be combusted continuously for the entire 24-hour period.

(zj) "Very low sulfur oil" means a distillate oil or residual oil that when combusted without post combustion SO_2 control has an SO_2 emission rate equal to or less than 130 ng/J (0.30 lb SO_2/million Btu).

(zk) "Wet flue gas desulfurization technology" means a sulfur dioxide control system that is located downstream of the steam generating unit and removes sulfur oxides from the combustion gases of the steam generating unit by contacting the combustion gas with an alkaline slurry or solution and forming a liquid material. This definition applies to devices where the aqueous liquid material product of this contact is subsequently converted to other forms. Alkaline reagents used in wet flue gas desulfurization technology include, but are not limited to, lime, limestone, and sodium.

(zl) "Wet scrubber system" means any emission control device that mixes an aqueous stream or slurry with the exhaust gases from a steam generating unit to control emissions of particulate matter or sulfur dioxide.

(zm) "Wood" means wood, wood residue, bark, or any derivative fuel or residue thereof, in any form, including, but not limited to, sawdust, sanderdust, wood chips, scraps, slabs, millings, shavings, and processed pellets made from wood or other forest residues.

(3) STANDARD FOR SULFUR DIOXIDE. (a) Except as provided in par. (b), (c), or (d), on and after the date on which the performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts coal or oil may cause to be discharged into the atmosphere any gases that contain sulfur dioxide in excess of 10% (0.10) of the potential sulfur dioxide emission rate (90% reduction) and that contain sulfur dioxide in excess of the emission limit determined according to the following formula:

$$E_s = (K_a H_a + K_b H_b)/(H_a + H_b)$$

where:

E_s is the sulfur dioxide emission limit, in ng/J or lb/million Btu heat input

K_a is 520 ng/J (or 1.2 lb/million Btu)

K_b is 340 ng/J (or 0.80 lb/million Btu)

H_a is the heat input from the combustion of coal, in J (million Btu)

H_b is the heat input from the combustion of oil, in J (million Btu)

Only the heat input supplied to the affected facility from the combustion of coal and oil is counted under this section. No credit is provided for the heat input to the affected facility from the combustion of natural gas, wood, municipal-type solid waste, or other fuels or heat input to the affected facility from exhaust gases from another source, such as gas turbines, internal combustion engines, kilns, etc.

(b) On and after the date on which the performance test is completed or required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility that combusts coal refuse alone in a fluidized bed combustion steam generating unit may cause to be discharged into the atmosphere any gases that contain sulfur dioxide in excess of 20% of the potential sulfur dioxide emission rate (80% reduction) and that contain sulfur dioxide in excess of 520 ng/J (1.2 lb/million Btu) heat input. If coal or oil is fired with coal refuse, the affected facility is subject to par. (a) or (d), as applicable.

(c) On and after the date on which the performance test is completed or is required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility that combusts coal or oil, either alone or in combination with any other fuel, and that uses an emerging technology for the control of sulfur dioxide emissions, may cause to be discharged into the atmosphere any gases that contain sulfur dioxide in excess of 50% of the potential sulfur dioxide emission rate (50% reduction) and that contain sulfur dioxide in excess of the emission limit determined according to the following formula:

$$E_s = (K_c H_c + K_d H_d)/(H_c + H_d)$$

where:

E_s is the sulfur dioxide emission limit, expressed in ng/J or lb/million Btu heat input

K_c is 260 ng/J (or 0.60 lb/million Btu)

K_d is 170 ng/J (or 0.40 lb/million Btu)

H_c is the heat input from the combustion of coal, in J (million Btu)

H_d is the heat input from the combustion of oil, in J (million Btu)

Only the heat input supplied to the affected facility from the combustion of coal and oil is counted under this section. No credit is provided for the heat input to the affected facility from the combustion of natural gas, wood, municipal-type solid waste, or other fuels, or from the heat input to the affected facility from exhaust gases from another source, such as gas turbines, internal combustion engines, kilns, etc.

(d) On and after the date on which the performance test is completed or required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility listed in subd. 1., 2., 3., or 4., may cause to be discharged into the atmosphere any gases that contain sulfur dioxide in excess of 520 ng/J (1.2 lb/million Btu) heat input if the affected facility combusts coal, or 130 ng/J (0.30 lb/million Btu) heat input if the affected facility combusts oil. Percent reduction requirements are not applicable to affected facilities under this paragraph.

1. Affected facilities that have an annual capacity factor for coal and oil of 30% (0.30) or less and are subject to a federally enforceable permit limiting the operation of the affected facility to an annual capacity factor for coal and oil to 30% (0.30) or less;

2. Affected facilities located in a noncontinental area;

3. Affected facilities combusting coal or oil, alone or in combination with any other fuel, in a duct burner as part of a combined cycle system where 30% (0.30) or less of the heat input to the steam generating unit is from combustion of coal and oil in the duct burner and 70% (0.70) or more of the heat input to the steam generating unit is from the exhaust gases entering the duct burner; or

4. Affected facilities combusting very low sulfur oil.

(e) Except as provided in par. (f), compliance with the emission limits and percent reduction requirements under this section are determined on a 30-day rolling average basis.

(f) Compliance with the emission limits under this section are determined on a 24-hour average basis for affected facilities which:

1. Have a federally enforceable permit limiting the annual capacity factor for oil to 10% or less;

2. Combust only oil which emits less than 130 ng/J (0.3 SO_2/million Btu); and

3. Do not combust any other fuel.

(g) Except as provided in par. (i), the sulfur dioxide emission limits and percent reduction requirements under this section apply at all times, including periods of startup, shutdown, and malfunction.

(h) Reductions in the potential sulfur dioxide emission rate through fuel pretreatment are not credited toward the percent reduction requirement under par. (c) unless:

1. Fuel pretreatment results in a 50% or greater reduction in potential sulfur dioxide emissions and

2. Emissions from the pretreated fuel (without combustion or post combustion sulfur dioxide control) are equal to or less than the emission limits specified in par. (c).

(i) An affected facility subject to par. (a), (b), or (c) may combust very low sulfur oil or natural gas when the sulfur dioxide control system is not being operated because of malfunction or maintenance of the sulfur dioxide control system.

(4) STANDARD FOR PARTICULATE MATTER. (a) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility which combusts coal or combusts mixtures of coal with other fuels, may cause to be discharged into the atmosphere from that affected facility any gases which contain particulate matter in excess of the following emission limits:

1. 22 ng/J (0.05 lb/million Btu) heat input;

a. If the affected facility combusts only coal, or

b. If the affected facility combusts coal and other fuels and has an annual capacity factor for the other fuels of 10% (0.10) or less.

2. 43 ng/J (0.10 lb/million Btu) heat input if the affected facility combusts coal and other fuels and has an annual capacity factor for the other fuels greater than 10% (0.10) and is subject to a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor greater than 10% (0.10) for fuels other than coal.

3. 86 ng/J (0.20 lb/million Btu) heat input if the affected facility combusts coal or coal and other fuels and:

a. Has an annual capacity factor for coal or coal and other fuels of 30% (0.30) or less,

b. Has a maximum heat input capacity of 73 MW (250 million Btu/hour) or less,

c. Has a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor 30% (0.30) or less for coal or coal and other solid fuels, and

d. Construction of the affected facility commenced after June 19, 1984 and before November 25, 1986.

(b) On or after the date on which the performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts oil or that combusts mixtures of oil with other fuels may cause to be discharged into the atmosphere from that affected facility any gases that contain particulate matter in excess of 43 ng/J (0.10 lb/million Btu) heat input.

(c) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts wood, or wood with other fuels, except coal, may cause to be discharged from that affected facility any gases that contain particulate matter in excess of the following emission limits:

1. 43 ng/J (0.10 lb/million Btu) heat input if the affected facility has an annual capacity factor greater than 30% (0.30) for wood.

2. 86 ng/J (0.20 lb/million Btu) heat input if:

a. The affected facility has an annual capacity factor of 30% (0.30) or less for wood,

b. Is subject to a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor 30% (0.30) or less for wood, and:

c. Has a maximum heat input capacity of 73 MW (250 million Btu/hour) or less.

(d) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that combusts municipal-type solid waste or mixtures of municipal-type solid waste with other fuels, may cause to be discharged into the atmosphere from that affected facility any gases that contain particulate matter in excess of the following emission limits:

1. 43 ng/J (0.10 lb/million Btu) heat input if;

a. the affected facility combusts only municipal-type solid waste, or

b. the affected facility combusts municipal-type solid waste and other fuels and has an annual capacity factor for the other fuels of 10% (0.10) or less.

2. 86 ng/J (0.20 lb/million Btu) heat input if the affected facility combusts municipal-type solid waste or municipal-type solid waste and other fuels; and

a. Has an annual capacity factor for municipal-type solid waste and other fuels of 30% (0.30) or less,

b. Has a maximum heat input capacity of 73 MW (250 million Btu/hour) or less,

c. Has a federally enforceable requirement limiting operation of the affected facility to an annual capacity factor of 30% (0.30) for municipal-type solid waste, or municipal-type solid waste and other fuels, and

d. Construction of the affected facility commenced after June 19, 1984, but before November 25, 1986.

(e) For the purposes of this section, the annual capacity factor is determined by dividing the actual heat input to the steam generating unit during the calendar year from the combustion of coal, wood, or municipal-type solid waste, and other fuels, as applicable, by the potential heat input to the steam generating unit if the steam generating unit had been operated for 8,760 hours at the maximum design heat input capacity.

(f) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility subject to the particulate matter emission limits under par. (a), (b) or (c) may cause to be discharged into the atmosphere any gases that exhibit greater than

20% opacity (6-minute average), except for one 6-minute period per hour of not more than 27% opacity.

(g) The particulate matter and opacity standards apply at all times, except during period of startup, shutdown or malfunction.

(5) STANDARD FOR NITROGEN OXIDES. (a) On and after the date on which the performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that is subject to the provisions of this section and that combusts only coal, oil, or natural gas may cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides (expressed as NO_2) in excess of the following emission limits:

Fuel/Steam generating unit type	Nitrogen oxide emission limits ng/J (lb/million Btu) (expressed as NO_2) heat input
1. Natural gas and distillate oil, except 4.:	
a. Low heat release rate	43 (0.10)
b. High heat release rate	86 (0.20)
2. Residual oil:	
a. Low heat release rate	130 (0.30)
b. High heat release rate	170 (0.40)
3. Coal:	
a. Mass-feed stoker	210 (0.50)
b. Spreader stoker and fluidized bed combustion	260 (0.60)
c. Pulverized coal	300 (0.70)
d. Lignite, except e.	260 (0.60)
e. Lignite mined in North Dakota, South Dakota, or Montana and combusted in a slag tap furnace	340 (0.80)
f. Coal-derived synthetic fuels	210 (0.50)
4. Duct burner used in a combined cycle system:	
a. Natural gas and distillate oil	86 (0.20)
b. Residual oil	170 (0.40)

(b) On and after the date on which the initial performance test is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that simultaneously combusts mixtures of coal, oil, or natural gas may cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides in excess of a limit determined by use of the following formula:

$$E_n = [(EL_{go} \times H_{go}) + (EL_{ro} \times H_{ro}) + (EL_c \times H_c)]/(H_{go} + H_{ro} + H_c)$$

where:

E_n is the nitrogen oxides emission limit (expressed as NO_2), ng/J (lb/million Btu)

EL_{go} is the appropriate emission limit from par. (a)1. for combustion of natural gas or distillate oil, ng/J (lb/million Btu)

H_{go} is the heat input from combustion of natural gas or distillate oil, J (million Btu)

EL_{ro} is the appropriate emission limit from par. (a)2. for combustion of residual oil

H_{ro} is the heat input from combustion of residual oil, J (million Btu)

EL_c is the appropriate emission limit from par. (a)3. for combustion of coal

H_c is the heat input from combustion of coal, J (million Btu)

(c) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever comes first, no owner or operator of an affected facility that simultaneously combusts coal or oil, or a mixture of these fuels with natural gas, and wood, municipal-type solid waste, or any other fuel may cause to be discharged into the atmosphere any gases that contain nitrogen oxides in excess of the emission limit for the coal or oil, or mixture of these fuels with natural gas combusted in the affected facility, as determined pursuant to par. (a) or (b), unless the affected facility has annual capacity factor for coal or oil, or mixture of these fuels with natural gas of 10% (0.10) or less and is subject to a federally enforceable requirement that limits operation of the facility to an annual capacity factor of 10% (0.10) or less for coal, oil, or a mixture of these fuels with natural gas.

(d) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that simultaneously combusts natural gas with wood, municipal-type solid waste, or other solid fuel, except coal, may cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides in excess of 130 ng/J (0.30 lb/million Btu) heat input unless the affected facility has an annual capacity factor for natural gas of 10% (0.10) or less and is subject to a federally enforceable requirement that limits operation of the affected facility to an annual capacity factor of 10% (0.10) or less for natural gas.

(e) On and after the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, no owner or operator of an affected facility that simultaneously combusts coal, oil, or natural gas with byproduct/waste may cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides in excess of an emission limit determined by the following formula unless the affected facility has an annual capacity factor for coal, oil, and natural gas of 10% (0.10) or less and is subject to a federally enforceable requirement which limits operation of the affected facility to an annual capacity factor of 10% (0.10) or less:

$$E_n = [(EL_{go} \times H_{go}) + (EL_{ro} \times H_{ro}) + (EL_c \times H_c)]/(H_{go} + H_{ro} + H_c)$$

where:

E_n is the nitrogen oxides emission limit (expressed as NO_2), ng/J (lb/million Btu)

EL_{go} is the appropriate emission limit from par. (a)1. for combustion of natural gas or distillate oil, ng/J (lb/million Btu)

H_{go} is the heat input from combustion of natural gas, distillate oil and gaseous byproduct/waste, J (million Btu)

EL_{ro} is the appropriate emission limit from par. (a)2. for combustion of residual oil, ng/J (lb/million Btu)

H_{ro} is the heat input from combustion of residual oil and/or liquid byproduct/waste, J (million Btu)

EL_c is the appropriate emission limit from par. (a)3. for combustion of coal

H_c is the heat input from combustion of coal, J (million Btu)

(f) Any owner or operator of an affected facility that combusts byproduct/waste with either natural gas or oil may petition the administrator within 180 days of the initial startup of the affected facility to establish a nitrogen oxide emission limit which shall apply specifically to that affected facility when the byproduct/waste is combusted. The petition shall include sufficient and appropriate data, as determined by the administrator, such as nitrogen oxides emissions from the affected facility, waste composition (including nitrogen content), and combustion conditions to allow the administrator to confirm that the affected facility is unable to comply with the emission limits in par. (e) and to determine the appropriate emission limit for the affected facility.

1. Any owner or operator of an affected facility petitioning for a facility-specific nitrogen oxides emission limit under this section shall:

a. Demonstrate compliance with the emission limits for natural gas and distillate oil in par. (a)1. or for residual oil in par. (a)2., as appropriate, by conducting a 30-day performance test as provided in sub. (7) (e). During the performance test only natural gas, distillate oil, or residual oil shall be combusted in the affected facility; and

b. Demonstrate that the affected facility is unable to comply with the emission limits for natural gas and distillate oil in par. (a)1. or for residual oil in par. (a)2., as appropriate, when gaseous or liquid byproduct/waste is combusted in the affected facility under the same conditions and using the same technological system of emission reduction applied when demonstrating compliance under subpar. a.

2. The nitrogen oxides emission limits for natural gas or distillate oil in par. (a)1. or for residual oil in par. (a)2., as appropriate, shall be applicable to the affected facility until and unless the petition is approved by the administrator. If the petition is approved by the administrator, a facility-specific nitrogen oxides emission limit will be established at the nitrogen oxides emission level achievable when the affected facility is combusting oil or natural gas and byproduct/waste in a manner which the administrator determines to be consistent with minimizing nitrogen oxides emissions.

(g) Any owner or operator of an affected facility that combusts hazardous waste, as defined by 40 C.F.R. part 261 or 40 C.F.R. part 761, incorporated by reference in s. NR 440.17, with natural gas or oil may petition the administrator within 180 days of the initial startup of the affected facility for a waiver from compliance with the nitrogen oxides emission limit which applies specifically to that affected facility. The petition shall include sufficient and appropriate data, as determined by the administrator, on nitrogen oxides emissions from the affected facility, waste destruction efficiencies, waste composition (including nitrogen content), the quantity of specific wastes to be combusted and combustion conditions, to allow the administrator to determine if the affected facility is able to comply with the nitrogen oxides emission limits required by this section. The owner or operator of the affected facility shall demonstrate that when hazardous waste is combusted in the affected facility, thermal destruction efficiency requirements for hazardous waste specified in an applicable federally enforceable requirement preclude compliance with the nitrogen oxides emission limits of this section. The nitrogen oxides emission limits for natural gas or distillate oil in par. (a)1. or for residual oil in par. (a)2., as appropriate, are applicable to the affected facility until and unless the petition is approved by the administrator.

Note: See 40 C.F.R. s. 761.70 for regulations applicable to the incineration of materials containing polychlorinated biphenyls (PCBs).

(h) The nitrogen oxide standards under this section apply at all times including periods of startup, shutdown or malfunction.

(6) COMPLIANCE AND PERFORMANCE TEST METHODS AND PROCEDURES FOR SULFUR DIOXIDE. (a) The sulfur dioxide emission standards under sub. (3) apply at all times.

(b) In conducting the performance tests required under s. NR 440.08, the owner or operator shall use the methods and procedures in Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, or the methods and procedures as specified in this section, except as provided in s. NR 440.08(2). Section NR 440.08(6) does not apply to this section. The 30-day notice required in s. NR 440.08(4) applies only to the initial performance test unless otherwise specified by the department.

(c) The owner or operator of an affected facility shall conduct performance tests to determine compliance with the percent of potential sulfur dioxide emission rate ($\%P_s$) and the sulfur dioxide emission rate (E_s) pursuant to sub. (3) following the procedures listed below, except as provided under par. (d).

1. The initial performance test shall be conducted over the first 30 consecutive operating days of the steam generating unit. Compliance with the sulfur dioxide standards shall be determined using a 30-day average. The first operating day included in the initial performance test shall be scheduled within 30 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.

2. If only coal or only oil is combusted, the following procedures are used:

a. The procedures in Method 19, Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, used to determine the hourly sulfur dioxide emission rate (E_{ho}) and the 30-day average emission rate (E_{ao}). The hourly averages used to compute the 30-day averages are obtained from the continuous emission monitoring system of sub. (8) (a) or (b).

b. The percent of potential sulfur dioxide emission rate ($\%P_s$) emitted to the atmosphere is computed using the following formula:

$$\%P_s = 100(1 - \%R_g/100)\ (1 - \%R_f/100)$$

where:

$\%R_g$ is the sulfur dioxide removal efficiency of the control device as determined by Method 19, Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17

$\%R_f$ is the sulfur dioxide removal efficiency of fuel pretreatment as determined by Method 19, Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17

3. If coal or oil is combusted with other fuels, the same procedures required in subd. 2. are used, except as provided in the following:

a. An adjusted hourly sulfur dioxide emission rate ($E_{ho}{}^{\circ}$) is used in Equation 19-19 of Method 19, Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, to compute an adjusted 30-day average emission rate ($E_{ao}{}^{\circ}$). The E_{ho} is computed using the following formula:

$$E_{ho}{}^{\circ} = [E_{ho} - E_w(1 - X_k)]/X_k$$

where:

$E_{ho}{}^{\circ}$ is the adjusted hourly sulfur dioxide emission rate, ng/J (lb/million Btu)

E_{ho} is the hourly sulfur dioxide emission rate, ng/J (lb/million Btu)

E_w is the sulfur dioxide concentration in fuels other than coal and oil combusted in the affected facility, as determined by the fuel sampling and analysis procedures in Method 19, ng/J(lb/million Btu). The value E_w for each fuel lot is used for each hourly average during the time that the lot is being combusted.

X_k is the fraction of total heat input from fuel combustion derived from coal, oil, or coal and oil, as determined by applicable procedures in Method 19

b. To compute the percent of potential sulfur dioxide emission rate ($\%P_s$), an adjusted $\%R_g$ ($\%R_g{}^{\circ}$) is computed from the adjusted $E_{ao}{}^{\circ}$ from par. (b)3.a. and an adjusted average sulfur dioxide inlet rate ($E_{ai}{}^{\circ}$) using the following formula:

$$\%R_g{}^{\circ} = 100(1.0 - E_{ao}{}^{\circ}/E_{ai}{}^{\circ})$$

To compute $E_{ai}{}^{\circ}$, an adjusted hourly sulfur dioxide inlet rate ($E_{hi}{}^{\circ}$) is used. The $E_{hi}{}^{\circ}$ is computed using the following formula:

$$E_{hi}{}^{\circ} = [E_{hi} - E_w(1 - X_k)]/X_k$$

where:

$E_{hi}{}^{\circ}$ is the adjusted hourly sulfur dioxide inlet rate, ng/J (lb/million Btu)

E_{hi} is the hourly sulfur dioxide inlet rate, ng/J (lb/million Btu)

4. The owner or operator of an affected facility subject to subd. 3. does not have to measure parameters E_w or X_k if the owner or operator elects to assume that $X_k = 1.0$. Owners or operators of affected facilities who assume $X_k = 1.0$ shall determine $\%P_s$, following the procedures in subd.

2., and sulfur dioxide emissions (E_s) shall be considered to be in compliance with sulfur dioxide emission limits under sub. (3).

5. The owner or operator of an affected facility that qualifies under the provisions of sub. (3) (d), does not have to measure parameters E_w or X_k under subd. 3. if the owner or operator of the affected facility elects to measure sulfur dioxide emission rates of the coal or oil following the fuel sampling and analysis procedures under Method 19, Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17,

(d) The owner or operator of an affected facility that combusts only oil emitting less than 130 ng/J (0.3 lb/million Btu) SO_2, has an annual capacity factor for oil of 10% (0.10) or less, and is subject to a federally enforceable requirement limiting operation of the affected facility to an annual capacity for oil of 10% (0.10) or less shall:

1. Conduct the initial performance test over 24 consecutive steam generating unit operating hours at full load;

2. Determine compliance with the standards after the initial performance test based on the arithmetic average of the hourly emissions data during each steam generating unit operating day if a continuous emission measurement system (CEMS) is used, or based on a daily average if Method 6B, Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, or fuel sampling and analysis procedures under Method 19, Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, are used.

(e) The owner or operator of an affected facility subject to sub. (3) (d) 1., shall demonstrate the maximum design capacity of the steam generating unit by operating the facility at maximum capacity for 24 hours. This demonstration will be made during the initial performance test and a subsequent demonstration may be requested at any other time. If the 24-hour average firing rate for the affected facility is less than the maximum design capacity provided by the manufacturer of the affected facility, the 24-hour average firing rate shall be used to determine the capacity utilization rate for the affected facility, otherwise the maximum design capacity provided by the manufacturer shall be used.

(f) For the initial performance test required under s. NR 440.08, compliance with the sulfur dioxide emission limits and percent reduction requirements under sub. (3) is based on the average emission rates and the average percent reduction for sulfur dioxide for the first 30 consecutive steam generating unit operating days, except as provided under par. (d). The initial performance test is the only test for which at least 30 days prior notice is required unless otherwise specified by the department. The initial performance test is to be scheduled so that the first steam generating unit operating day of the 30 successive steam generating unit operating days is completed within 30 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. The boiler load during the 30-day period does not have to be the maximum design load, but shall be representative of future operating conditions and include at least one 24-hour period at full load.

(g) After the initial performance test required under s. NR 440.08, compliance with the sulfur dioxide emission limits and percent reduction requirements under sub. (3) is based on the average emission rates and the average percent reduction for sulfur dioxide for 30 successive steam generating unit operating days, except as provided under par. (d). A separate performance test shall be completed at the end of each steam generating unit operating day after the initial performance test, and a new 30-day average emission rate and percent reduction for sulfur dioxide shall be calculated to show compliance with the standard.

(h) Except as provided under par. (i), the owner or operator of an affected facility shall use all valid sulfur dioxide emissions data in calculating $\%P_s$ and E_{ho} under par. (c), whether or not the minimum emissions data requirements under sub. (7) are achieved. All valid emissions data, including valid sulfur dioxides emission data collected during periods of startup, shutdown and malfunctions, shall be used in calculating $\%P_s$ and E_{ho} pursuant to par. (c).

(i) During periods of malfunction or maintenance of the sulfur dioxide control systems when oil is combusted as provided under sub. (3) (i), emission data are not used to calculate $\%P_s$ or E_s under sub. (3) (a), (b) or (c). However, the emissions data are used to determine compliance with the emission limit under sub. (3) (i).

(7) COMPLIANCE AND PERFORMANCE TEST METHODS AND PROCEDURES FOR PARTICULAGE MATTER AND NITROGEN OXIDES. (a) The particulate matter emission standards and opacity limits under sub. (4) apply at all times except during periods of startup, shutdown, or malfunction. The nitrogen oxides emission standards under sub. (5) apply at all times.

(b) Compliance with the particulate matter emission standards under sub. (4) shall be determined through performance testing as described in par. (d).

(c) Compliance with the nitrogen oxides emission standards under sub. (5) shall be determined through performance testing as described in par. (e) or (f).

(d) The following procedures and reference methods are used to determine compliance with the standards for particulate matter emissions under sub. (4). These reference methods and procedures are incorporated by reference in s. NR 440.17.

1. Method 3 is used for gas analysis when applying Method 5 or Method 17.

2. Method 5, Method 5B, or Method 17 shall be used to measure the concentration of particulate matter as follows:

a. Method 5 shall be used at affected facilities without wet flue gas desulfurization (FGD) systems; and

b. Method 17 may be used at facilities with or without wet scrubber systems provided the stack gas temperature does not exceed a temperature of 160°C (320°F). The procedures of ss. 2.1 and 2.3 of Method 5B may be used in Method 17 only if it is used after a wet FGD system. Do not use Method 17 after wet FGD systems if the effluent is saturated or laden with water droplets.

c. Method 5B is to be used only after wet FGD systems.

3. Method 1 is 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 is 1.7 dscm (60 dscf) except that smaller sampling times or volumes may be approved by the department when necessitated by process variables or other factors.

4. For Method 5, the temperature of the sample gas in the probe and filter holder is monitored and is maintained at 160°C (320°F).

5. For determination of particulate emissions, the oxygen or carbon dioxide sample is obtained simultaneously with each run of Method 5, Method 5B or Method 17 by traversing the duct at the sampling location.

6. For each run using Method 5, Method 5B or Method 17, the emission rate expressed in nanograms per joule heat input is determined using:

a. The oxygen or carbon dioxide measurements and particulate matter measurements obtained under this section,

b. The dry basis F factor, and

c. The dry basis emission rate calculation procedure contained in Method 19 (Appendix A).

7. Method 9 is used for determining the opacity of stack emissions.

(e) To determine compliance with the emission limits for nitrogen oxides required under sub. (5), the owner or operator of an affected facility shall conduct the performance test as required under s. NR 440.08 using the continuous system for monitoring nitrogen oxides under sub. (9).

1. For the initial compliance test, nitrogen oxides from the steam generating unit shall be monitored for 30 successive steam generating unit operating days and the 30-day average emission rate is used to determine compliance with the nitrogen oxides emission standards under sub. (5). The 30-day average emission rate is calculated as the average of all hourly emissions data recorded by the monitoring system during the 30-day test period.

2. Following the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, the owner or operator of an affected facility which combusts coal or which combusts residual oil having a nitrogen content greater than 0.30 weight % shall determine compliance with the nitrogen oxides emission standards under sub. (5) on a continuous basis through the use of a 30-day rolling average emission rate. A new 30-day rolling average emission rate is calculated each steam generating unit operating day as the average of all of the hourly nitrogen oxides emission data for the preceding 30 steam generating unit operating days.

3. Following the date on which the initial performance test is completed or is required to be completed under s. NR 440.08, whichever date comes first, the owner or operator of an affected facility which has a heat input capacity greater than 73 MW (250 million Btu/hour) and which combusts natural gas, distillate oil, or residual oil having a nitrogen content of 0.30 weight % or less shall determine compliance with the nitrogen oxides standards under sub. (5) on a continuous basis through the use of a 30-day rolling average emission rate. A new 30-day rolling average emission rate is calculated each steam generating unit operating day

as the average of all of the hourly nitrogen oxides emission data for the preceding 30 steam generating unit operating days.

4. Following the date on which the initial performance test is completed or required to be completed under s. NR 440.08, whichever date comes first, the owner or operator of an affected facility which has a heat input capacity of 73 MW (250 million Btu/hour) or less and which combusts natural gas, distillate oil, or residual oil having a nitrogen content of 0.30 weight % or less shall, upon request, determine compliance with the nitrogen oxides standards under sub. (5) through the use of a 30-day performance test. During periods when performance tests are not requested, nitrogen oxides emissions data collected pursuant to sub. (9)(g)1. or 2. are used to calculate a 30-day rolling average emission rate on a daily basis and used to prepare excess emission reports, but will not be used to determine compliance with the nitrogen oxides emission standards. A new 30-day rolling average emission rate is calculated each steam generating unit operating day as the average of all of the hourly nitrogen oxides emission data for the preceding 30 steam generating unit operating days.

5. If the owner or operator of an affected facility which combusts residual oil does not sample and analyze the residual oil for nitrogen content, as specified in sub. (10) (e), the requirements of subd. 2. apply and the provisions of subd. 4. are inapplicable.

(f) To determine compliance with the emission limit for nitrogen oxides required by sub. (5) (a)4. for duct burners used in combined cycle systems, the owner or operator of an affected facility shall conduct the performance test required under s. NR 440.08 using the nitrogen oxides and oxygen measurement procedures in 40 C.F.R. part 60, Appendix A, Method 20, incorporated by reference in s. NR 440.17. During the performance test, one sampling site shall be located as close as practicable to the exhaust of the turbine, as provided by s. 6.1.1 of Method 20, Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17. A second sampling site shall be located at the outlet to the steam generating unit. Measurements of nitrogen oxides and oxygen shall be taken at both sampling sites simultaneously during the performance test. The nitrogen oxides emission rate from the combined cycle system shall be calculated by subtracting the nitrogen oxides emission rate measured at the sampling site at the outlet from the turbine from the nitrogen oxides emission rate measured at the sampling site at the outlet from the steam generating unit.

(8) EMISSION MONITORING FOR SULFUR DIOXIDE. (a) Except as provided in par. (b), the owner or operator of an affected facility subject to the sulfur dioxide standards under sub. (3) shall install, calibrate, maintain, and operate continuous emission monitoring systems (CEMS) for measuring sulfur dioxide concentrations and either oxygen (O_2) or carbon dioxide (CO_2) concentrations and shall record the output of the systems. The sulfur dioxide and either oxygen or carbon dioxide concentrations shall both be monitored at the inlet and outlet of the sulfur dioxide control device.

(b) As an alternative to operating CEMS as required under par. (a), an owner or operator may elect to determine the average sulfur dioxide emissions and percent reduction by:

1. Collecting coal or oil samples in an as-fired condition at the inlet to the steam generating unit and analyzing them for sulfur and heat content according to Method 19 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17. Method 19 provides procedures for converting these measurements into the format to be used in calculating the average sulfur dioxide input rate, or

2. Measuring sulfur dioxide according to Method 6B of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, at the inlet or outlet to the sulfur dioxide control system. An initial stratification test is required to verify the adequacy of the Method 6B sampling location. The stratification test shall consist of 3 paired runs of a suitable sulfur dioxide and carbon dioxide measurement train operated at the candidate location and a second similar train operated according to the procedures in Section 3.2 and the applicable procedures in Section 7 of Performance Specification 2, incorporated by reference in s. NR 440.17. Method 6B, Method 6A, or a combination of Methods 6 and 3 or Methods 6C and 3A, incorporated by reference in s. NR 440.17, are suitable measurement techniques. If Method 6B is used for the second train, sampling time and timer operation may be adjusted for the stratification test as long as an adequate sample volume is collected; however, both sampling trains are to be operated similarly. For the location to be adequate for Method 6B 24-hour tests, the mean of the absolute difference between the 3 paired runs shall be less than 10%.

3. A daily sulfur dioxide emission rate, E_D, shall be determined using the procedure described in Method 6A, Section 7.6.2 (Equation 6A-8) and stated in ng/J (lb/million Btu) heat input.

4. The mean 30-day emission rate is calculated using the daily measured values in ng/J (lb/million Btu) for 30 successive steam generating unit operating days using equation 19-20 of Method 19.

(c) The owner or operator of an affected facility shall obtain emission data for at least 75% of the operating hours in at least 22 out of 30 successive boiler operating days. If this minimum data requirement is not met with a single monitoring system, the owner or operator of the affected facility shall supplement the emission data with data collected with other monitoring systems as approved by the department or the reference methods and procedures as described in par. (b).

(d) The 1-hour average sulfur dioxide emission rates measured by the CEMS required by par. (a) and required under s. NR 440.13(8) shall be expressed in ng/J or lb/million Btu heat input and shall be used to calculate the average emission rates under sub. (3). Each 1-hour average sulfur dioxide emission rate shall be based on more than 30 minutes of steam generating unit operation and include at least 2 data points with each representing a 15-minute period. Hourly sulfur dioxide emission rates are not calculated if the affected facility is operated less than 30 minutes in a 1-hour period and are not counted toward determination of a steam generating unit operating day.

(e) The procedures in s. NR 440.13 shall be followed for installation, evaluation, and operation of the CEMS.

1. All CEMS shall be operated in accordance with the applicable procedures under Performance Specifications 1, 2, and 3, Appendix B, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17.

2. Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with Procedure 1 of Appendix F, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17.

3. For affected facilities combusting coal or oil, alone or in combination with other fuels, the span value of the sulfur dioxide CEMS at the inlet to the sulfur dioxide control device shall be 125% of the maximum estimated hourly potential sulfur dioxide emissions of the fuel combusted, and the span value of the CEMS at the outlet to the sulfur dioxide control device shall be 50% of the maximum estimated hourly potential sulfur dioxide emissions of the fuel combusted.

(9) EMISSION MONITORING FOR PARTICULATE MATTER AND NITROGEN OXIDES. (a) The owner or operator of an affected facility subject to the opacity standard under sub. (4) shall install, calibrate, maintain, and operate a continuous monitoring system for measuring the opacity of emissions discharged to the atmosphere and record the output of the system.

(b) Except as provided in pars. (g) and (h), the owner or operator of an affected facility subject to the nitrogen oxides standard of sub. (5) (a) shall install, calibrate, maintain, and operate a continuous monitoring system for measuring nitrogen oxides emissions discharged to the atmosphere and record the output of the system.

(c) The continuous monitoring systems required under par. (b) shall be operated and data recorded during all periods of operation of the affected facility except for continuous monitoring system breakdowns and repairs. Data shall be recorded during calibration checks, and zero and span adjustments.

(d) The 1-hour average nitrogen oxides emission rates measured by the continuous nitrogen oxides monitor required by par. (b) and required under s. NR 440.13 shall be expressed in ng/J or lb/million Btu heat input and shall be used to calculate the average emission rates under sub. (5). The 1-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 each 1-hour average.

(e) The procedures under s. NR 440.13 shall be followed for installation, evaluation, and operation of the continuous monitoring systems.

1. For affected facilities combusting coal, wood or municipal-type solid waste, the span value for a continuous monitoring system for measuring opacity shall be between 60 and 80%.

2. For affected facilities combusting coal, oil, or natural gas, the span value for nitrogen oxides is determined as follows:

Fuel	Span Values for Nitrogen Oxides (ppm)
Natural Gas	500
Oil	500
Coal	1,000
Combination	500(x + y) + 1,000z

where:

x is the fraction of total heat input derived from natural gas y is the fraction of total heat input derived from oil

z is the fraction of total heat input derived from coal

3. All span values computed under subd. 2. for combusting mixtures of regulated fuels shall be rounded to the nearest 500 PPM.

(f) When nitrogen oxides emission data are not obtained because of continuous monitoring system breakdowns, repairs, calibration checks and zero and span adjustments, emission data will be obtained by using standby monitoring systems, Method 7 or 7A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, or other approved reference methods to provide emission data for a minimum of 75% of the operating hours in each steam generating unit operating day, in at least 22 out of 30 successive steam generating unit operating days.

(g) The owner or operator of an affected facility that has a heat input capacity of 73 MW (250 million Btu/hour) or less, and which has an annual capacity factor for residual oil having a nitrogen content of 0.30 weight % or less, natural gas, distillate oil, or any mixture of these fuels, greater than 10% (0.10) shall:

1. Comply with the provisions of pars. (b), (c), (d), (e)2., (e)3., and (f), or

2. Monitor steam generating unit operating conditions and predict nitrogen oxides emission rates as specified in a plan submitted pursuant to sub. (10) (c).

(h) The owner or operator of an affected facility which is subject to the nitrogen oxides standards of sub. (5) (a)4. is not required to install or operate a continuous monitoring system to measure nitrogen oxides emissions.

(10) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The owner or operator of each affected facility shall submit notification of the date of initial startup, as provided by s. NR 440.07. This notification shall include:

1. The design heat input capacity of the affected facility and identification of the fuels to be combusted in the affected facility,

2. If applicable, a copy of any federally enforceable requirement that limits the annual capacity factor for any fuel or mixture of fuels under subs. (3) (d)1., (4) (a)2., 3.c., (c)2.b., (d)2.c., (5) (c), (d), (e), or (6) (d),

3. The annual capacity factor at which the owner or operator anticipates operating the facility based on all fuels fired and based on each individual fuel fired, and

4. Notification that an emerging technology will be used for controlling emissions of sulfur dioxide. The administrator will examine the description of the emerging technology and will determine whether the technology qualifies as an emerging technology. In making this determination, the administrator may require the owner or operator of the affected facility to submit additional information concerning the control device. The affected facility is subject to the provisions of sub. (3) (a) unless and until this determination is made by the administrator.

(b) The owner or operator of each affected facility subject to the sulfur dioxide, particulate matter and nitrogen oxides emission limits under subs. (3), (4), and (5), shall submit to the department the performance test data from the initial performance test and the performance evaluation of the CEMS using the applicable performance specifications in Appendix B, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17.

(c) The owner or operator of each affected facility subject to the nitrogen oxides standard of sub. (5) who seeks to demonstrate compliance with those standards through the monitoring of steam generating unit operating conditions under the provisions of sub. (9) (g)2. shall submit to the department for approval a plan that identifies the operating conditions to be monitored under sub. (9) (g)2. and the records to be maintained under par. (j). This plan shall be submitted to the department for approval within 360 days of the initial startup of the affected facility. The plan shall:

1. Identify the specific operating conditions to be monitored and the relationship between these operating conditions and nitrogen oxides emission rates (i.e., ng/J or lbs/million Btu heat input). Steam generating unit operating conditions include, but are not limited to, the degree of staged combustion (i.e., the ratio of primary air to secondary and/or tertiary air) and the level of excess air (i.e., flue gas oxygen level);

2. Include the data and information that the owner or operator used to identify the relationship between nitrogen oxides emission rates and these operating conditions;

3. Identify how these operating conditions, including steam generating unit load, will be monitored under sub. (9) (g) on an hourly basis by the owner or operator during the period of operation of the affected facility; the quality assurance procedures or practices that will be employed to ensure that the data generated by monitoring these operating conditions will be representative and accurate; and the type and format of the records of these operating conditions, including steam generating unit load, that will be maintained by the owner or operator under par. (j). If the plan is approved, the owner or operator shall maintain records of predicted nitrogen oxide emission rates and the monitored operating conditions, including steam generating unit load, identified in the plan.

(d) The owner or operator of an affected facility shall record and maintain records of the amounts of all fuels combusted during each day and calculate the annual capacity factor individually for coal, distillate oil, residual oil, natural gas, wood, and municipal-type solid waste for each calendar quarter. The annual capacity factor is determined on a 12-month rolling average basis with a new annual capacity factor calculated at the end of each calendar month.

(e) For affected facilities that:

1. Combust residual oil having a nitrogen content of 0.3 weight % or less;

2. Have heat input capacities of 73 MW (250 million Btu/hour) or less; and

3. Monitor nitrogen oxides emissions or steam generating unit operating conditions under sub. (9) (g), the owner or operator shall maintain records of the nitrogen content of the oil combusted in the affected facil-

ity and calculate the average fuel nitrogen content on a per calendar quarter basis. The nitrogen content shall be determined using ASTM Method D3431-80 (reapproved 1987), Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons, incorporated by reference in s. NR 440.17, or fuel specification data obtained from fuel suppliers. If residual oil blends are being combusted, fuel nitrogen specifications may be prorated based on the ratio of residual oils of different nitrogen content in the fuel blend.

(f) For facilities subject to the opacity standard under sub. (4), the owner or operator shall maintain records of opacity.

(g) For facilities subject to nitrogen oxides standards under sub. (5), the owner or operator shall maintain records of the following information for each steam generating unit operating day:

1. Calendar date.

2. The average hourly nitrogen oxides emission rates (expressed as NO_2) (ng/J or lb/million Btu heat input) measured or predicted.

3. The 30-day average nitrogen oxides emission rates (ng/J or lb/million Btu heat input) calculated at the end of each steam generating unit operating day from the measured or predicted hourly nitrogen oxide emission rates for the preceding 30 steam generating unit operating days.

4. Identification of the steam generating unit operating days when the calculated 30-day average nitrogen oxides emission rates are in excess of the nitrogen oxides emissions standards under sub. (5), with the reasons for such excess emissions as well as a description of corrective actions taken.

5. Identification of the steam generating unit operating days for which pollutant data have not been obtained, including reasons for not obtaining sufficient data and a description of corrective actions taken.

6. Identification of the times when emission data have been excluded from the calculation of average emission rates and the reasons for excluding data.

7. Identification of "F" factor used for calculations, method of determination, and type of fuel combusted.

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 that could affect the ability of the continuous monitoring system to comply with Performance Specification 2 or 3 of Appendix B, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17.

10. Results of daily CEMS drift tests and quarterly accuracy assessments as required under 40 C.F.R. part 60, Appendix F, Procedure 1, incorporated by reference in s. NR 440.17.

(h) The owner or operator of any affected facility in any category listed in subd. 1. or 2. is required to submit excess emission reports for any calendar quarter during which there are excess emissions from the affected facility. If there are no excess emissions during the calendar quarter, the owner or operator shall submit a report semiannually stating that no excess emissions occurred during the semiannual reporting period.

1. Any affected facility subject to the opacity standards under sub. (4) (e) or to the operating parameter monitoring requirements under s. NR 440.13(9) (a).

2. Any affected facility which is subject to the nitrogen oxides standard of sub. (5), and that:

a. Combusts natural gas, distillate oil, or residual oil with a nitrogen content of 0.3 weight % or less, or

b. Has a heat input capacity of 73 MW (250 million Btu/hour) or less and is required to monitor nitrogen oxides emissions on a continuous basis under sub. (9) (g)1. or steam generating unit operating conditions under sub. (9) (g)2.

3. For the purpose of sub. (4), excess emissions are defined as all 6-minute periods during which the average opacity exceeds the opacity standards under sub. (4) (f).

4. For purposes of sub. (9) (g)1., excess emissions are defined as any calculated 30-day rolling average nitrogen oxides emission rate, as determined under sub. (7) (e), which exceeds the applicable emission limits in sub. (5).

(i) The owner or operator of any affected facility subject to the continuous monitoring requirements for nitrogen oxides under sub. (9) shall submit a quarterly report containing the information recorded under par. (g). All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

(j) The owner or operator of any affected facility subject to the sulfur dioxide standards under sub. (3) shall submit written reports to the department for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.

(k) For each affected facility subject to the compliance and performance testing requirements of sub. (6) and the reporting requirement in par. (j) the following information shall be reported to the department:

1. Calendar dates covered in the reporting period.

2. Each 30-day average sulfur dioxide emission rate (ng/J or lb/million Btu heat input) measured during the reporting period, ending with the last 30-day period in the quarter; reasons for noncompliance with the emission standards; and a description of corrective actions taken.

3. Each 30-day average percent reduction in sulfur dioxide emissions calculated during the reporting period, ending with the last 30-day period in the quarter; reasons for noncompliance with the emission standards; and a description of corrective actions taken.

4. Identification of the steam generating unit operating days that coal or oil was combusted and for which sulfur dioxide or diluent (oxygen or carbon dioxide) data have not been obtained by an approved method for at least 75% of the operating hours in the steam generating unit operating day; justification for not obtaining sufficient data; and description of corrective action taken.

5. Identification of the times when emissions data have been excluded from the calculation of average emission rates; justification for excluding data; and description of corrective action taken if data have been excluded for periods other than those during which coal or oil were not combusted in the steam generating unit.

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 CEMS.

9. Description of any modifications to the CEMS that could affect the ability of the CEMS to comply with Performance Specification 2 or 3 of Appendix B, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17.

10. Results of daily CEMS drift tests and quarterly accuracy assessments as required under 40 C.F.R. part 60, Appendix F, Procedure 1, incorporated by reference in s. NR 440.17.

11. The annual capacity factor of each fuel fired as provided under par. (d).

(l) For each affected facility subject to the compliance and performance testing requirements of sub. (6) (d) and the reporting requirements of par. (j), the following information shall be reported to the department:

1. Calendar dates when the facility was in operation during the reporting period;

2. The 24-hour average sulfur dioxide emission rate measured for each steam generating unit operating day during the reporting period that coal or oil was combusted, ending in the last 24-hour period in the quarter; reasons for noncompliance with the emission standards; and a description of corrective actions taken;

3. Identification of the steam generating unit operating days that coal or oil was combusted for which sulfur dioxide or diluent (oxygen or carbon dioxide) data have not been obtained by an approved method for at lest 75% of the operating hours; justification for not obtaining sufficient data; and description of corrective action taken.

4. Identification of the times when emissions data have been excluded from the calculation of average emission rates; justification of excluding data, and description of corrective action taken if data have been excluded for periods other than those during which coal or oil were not combusted in the steam generating unit.

5. Identification of "F" factor used for calculations, method of determination and type of fuel combusted.

6. Identification of times when hourly averages have been obtained based on manual sampling methods.

7. Identification of the times when the pollutant concentration exceeded full span of the CEMS.

8. Description of any modifications to the CEMS which could affect the ability of the CEMS to comply with Performance Specification 2 or 3 of Appendix B, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17.

9. Results of daily CEMS drift tests and quarterly accuracy assessments as required under 40 C.F.R. part 60, Appendix F, Procedure 1, incorporated by reference in s. NR 440.17.

(m) For each affected facility subject to the sulfur dioxide standards under sub. (3) for which the minimum amount of data required under sub. (8) (f) were not obtained during a calendar quarter, the following information is reported to the department in addition to that required under par. (k).

1. The number of hourly averages available for outlet emission rates and inlet emission rates.

2. The standard deviation of hourly averages for outlet emission rates and inlet emission rates, as determined in Method 19, Section 7, incorporated by reference in s. NR 440.17.

3. The lower confidence limit for the mean outlet emission rate and the upper confidence limit for the mean inlet emission rate, as calculated in Method 19, Section 7, incorporated by reference in s. NR 440.17.

4. The ratio of the lower confidence limit for the mean outlet emission rate and the allowable emission rate, as determined in Method 19, Section 7, incorporated by reference in s. NR 440.17.

(n) If a percent removal efficiency by fuel pretreatment (i.e., $\%R_f$) is used to determine the overall percent reduction (i.e., $\%R_o$) under sub. (6), the owner or operator of the affected facility shall submit a signed statement with the quarterly report:

1. Indicating what removal efficiency by fuel pretreatment (i.e., $\%R_f$) was credited for the calendar quarter;

2. Listing the quantity, heat content, and date each pretreated fuel shipment was received during the previous calendar 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 calendar quarter;

3. Documenting the transport of the fuel from the fuel pretreatment facility to the steam generating unit;

4. Including a signed statement from the owner or operator of the fuel pretreatment facility certifying that the percent removal efficiency achieved by fuel pretreatment was determined in accordance with the provisions of Method 19 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, and listing the heat content and sulfur content of each fuel before and after fuel pretreatment.

(o) All records required under this section shall be maintained by the owner or operator of the affected facility for a period of 2 years following the date of the record.

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.21 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, terms not defined in this subsection have the meanings given 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.

(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.

(5) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. part 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. part 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. part 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. part 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. part 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:

$$(\%\ CO_2)_{adj} = (\%\ CO_2)_{di}\ (Q_{di}/Q_{do})$$

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. part 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. part 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. part 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. part 60, Appendix A, incorporated by reference in s. NR 440.17.

c. Calculate the adjusted CO_2 percentage using the following equation:

$$(\%CO_2)_{adj} = (\%CO_2)_{di} \frac{100 + (\%\ EA)_i}{100 + (\%\ EA)_o}$$

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. part 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. part 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)

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.22 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, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Portland cement plant" means any facility manufacturing portland cement by either the wet or dry 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 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.

(5) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. part 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. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.August, 1990, No. 416.

NR 440.23 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, terms not defined in this subsection have the meanings given 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% 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.

(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. part 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, 7A, 7B, 7C, or 7D of 40 C.F.R. part 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.

(e) For the purpose of reports required under s. NR 440.07(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. part 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, 7A, 7B, 7C, or 7D 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, 7A, 7B, 7C, or 7D in 40 C.F.R. part 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 at the centroid of the stack or duct or at a point no closer to the walls than 1 m (3.28 ft). For Method 7, 7A, or 7B, each run shall consist of 4 grab samples taken at approximately 15-minute intervals. The arithmetic mean of the samples shall constitute the run value. For Method 7C or 7D each run shall consist of a one-hour sample. 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 in 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (4) (a), (5) (a) 1., and (b), Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), (4) (e) and (5) (b), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.24 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, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Acid mist" means sulfuric acid mist, as measured by Method 8 of 40 C.F.R. part 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 2.0 kg per metric ton of acid produced 4.0 lb per ton), the production being expressed as 100% H_2SO_4.

(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.

(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. part 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. part 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) Alternatively, a source that processes elemental sulfur or an area that contains elemental sulfur and uses air to supply oxygen may use the following continuous emission monitoring approach and calculation procedures in determining SO_2 emission rates in terms of the standard. This procedure is not required but is an alternative that would alleviate problems encountered in the measurement of gas velocities or production rate. Continuous emission monitoring of SO_2, O_2 and CO_2 (if required) shall be installed, calibrated, maintained and operated by the owner or operator and subjected to the certification procedures in Performance Specifications 2 and 3. The calibration procedure and span value for this SO_2 monitor shall be as specified in par.(b). The span value for CO_2 (if required) shall be 10% and for O_2 shall be 20.9% (air). A conversion factor based on process rate data is not necessary. Calculate the SO_2 emission rate as follows:

$$E_{SO_2} = C_{SO_2} S \frac{1}{0.265 - 0.0126\,(O_2) - A(CO_2)}$$

where E_{SO_2} is the SO_2 emission rate in kg/t acid (lb/ton acid); C_{SO_2} is the SO_2 concentration in kg/dscm (lb/dscf) (see table below); S is the acid production rate factor equal to 368 dscm/t acid for metric unit, or 11800 dscf/ton acid for English units; O_2 is the O_2 concentration in percent; A is the auxiliary fuel factor equal to 0.00 for no fuel, 0.0226 for methane, 0.0217 for natural gas, 0.0196 for propane, 0.0172 for #2 oil, 0.0161 for #6 oil, 0.0148 for coal, 0.0126 for coke; CO_2 is the CO_2 concentration in percent.

Note: It is necessary in some cases to convert measured concentration units to other units for these calculations. Use the following table for such conversions:

FROM	TO	MULTIPLY BY
g/scm	kg/scm	10^{-3}
mg/scm	kg/scm	10^{-6}
ppm (SO_2)	kg/scm	2.660×10^{-6}
ppm (SO_2)	lb/scm	1.660×10^{-7}

(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. part 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. part 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 = $Q_s \times c$, 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.

(e) Alternatively, a source that processes elemental sulfur or an ore that contains elemental sulfur and uses air to supply oxygen may use the SO_2, acid mist, O_2 and CO_2 (if required) measurement data in determining SO_2 and acid mist emission rates in terms of the standard. Data from the reference method tests as specified in par. (a) are required; that is, Method 8 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, for O_2 and CO_2. No determinations of production rate or total gas flow rate are necessary. Calculate the SO_2 and acid mist emission rate as described in sub. (5) (d) substituting the acid mist concentration for C_{SO_2} as appropriate.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; cr. (5) (d) and (6) (e), Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.) and (3) (a), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.25 Asphalt concrete plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each hot mix asphalt facility. For the purpose of this section, a hot mix asphalt facility 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 hot mix asphalt; 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, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Hot mix asphalt facility" means any facility, as described in sub. (1), used to manufacture hot mix asphalt by heating and drying aggregate and mixing with asphalt cement.

(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 (0.039 gr/dscf).

2. Exhibit 20% opacity, or greater.

(4) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. part 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. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (1) (a), (2) (intro.) and (a), (3) (a) 1., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.26 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, terms not defined in this subsection have the meanings given 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/1000 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 particulate 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.

(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 of 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.

(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% 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. Installation of a carbon monoxide (CO) continuous monitoring system is not required if the owner or operator files a written request for exemption to the department and demonstrates by the following exemption performance test that the average CO emissions are less than 10% of the applicable standard listed in sub. (4). The exemption performance test shall consist of continuously monitoring CO emissions for 30 days using an instrument that meets the requirements of Performance Specification 4 of Appendix B, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, except the span value shall be 100 ppm instead of 1,000 ppm, and if required, the relative accuracy limit shall be 10% or 5 ppm, whichever is greater.

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 Specifi-

cation 2 of 40 C.F.R. part 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. part 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.

(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)1. 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)1. exceeds the level specified in sub. (5) (a)1., 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)1., the following reference methods of 40 C.F.R. part 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 5B or 5F shall be used to determine particulate matter emissions and associated moisture content from affected facilities without wet FGD systems; only Method 5B shall be used after FGD systems,

b. Method 1 for sample and velocity traverses, and

c. Method 2 for velocity and volumetric flow rate.

2. For Method 5B or 5F, 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:

$$R_c = 0.2982\, Q_{RE}\, (\%CO_2 + \%CO) + 2.088\, Q_{RA} - 0.0994\, Q_{RE}\, [\%CO/2 + \%CO_2 + \%O_2]$$

(Metric Units) or

$$R_c = 0.0186\, Q_{RE}\, (\%CO_2 + \%CO) + 0.1303\, Q_{RA} - 0.0062\, Q_{RE}\, [\%CO/2 + \%CO_2 + \%O_2]$$

(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:

$R_E = (60 \times 10^{-6}) Q_{RV} C_s$ (Metric Units)

or

$R_E = (8.57 \times 10^{-3}) Q_{RV} C_s$ (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. part 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. part 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. Method 15A may be used as alternative method for determining reduced sulfur compunds. These Methods are set out in 40 C.F.R. part 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. If Method 15A is used, each run shall consist of one 3-hour sample or 3 1-hour samples. The sampling point shall be at the centroid of the cross section of the duct 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. For Method 15, to ensure minimum residence time for the sample inside the sample lines, the sampling rate shall be at least 3 liters/min (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. part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine the moisture content of the gases when using Method 15. 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:

$$B_{wo} = \sum_{v=1}^{N} B_{si} \frac{t_{si}}{T}$$

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

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), (3) (a) 1., (6) (a) 2., (7) (a) 1. a. and 2., (d) (intro.) and 2., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.27 Storage vessels for petroleum liquids for which construction, reconstruction, or modification commenced 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, terms not defined in this subsection have the meanings given 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 nonviscous petroleum liquids, except liquified petroleum gases, as determined by ASTM D323-82, 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.

(l) "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.

(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).

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.) and (i), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.28 Storage vessels for petroleum liquids for which construction, reconstruction, or modification commenced after May 28, 1978, and prior to July 23, 1984. (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, terms not defined in this subsection have the meanings given 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 nonviscous petroleum liquids, except liquified petroleum gases, as determined by ASTM D323-82, 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 storage vessel wall, and between the secondary seal and the storage vessel wall according to the following frequency:

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).

4) Keep records of each gap measurement at the plant for a period of at least 2 years following the date of measurement. Each record shall iden-

tify the vessel on which the measurement was performed and shall contain the date of the seal gap measurement, the raw data obtained in the measurement process required by subpar. b. and the calculation required by subpar. c.

5) If either the seal gap calculated in accord with subpar. c. or the measured maximum seal gap exceeds the limitations specified by sub. (3), a report shall be furnished to the department within 60 days of the date of the measurement. The report shall identify the vessel and list each reason why the vessel did not meet the specifications of sub. (3). the report shall also describe the actions necessary to bring the storage vessel into compliance with the specifications of sub. (3).

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 ⅛" 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.

(5) ALTERNATIVE MEANS OF EMISSION LIMITATION. (a) If, in the administrator's judgment, an alternative means of emission limitation will achieve a reduction in emissions at least equivalent to the reduction in emissions achieved by any requirements in sub. (3), the administrator

will publish in the federal register a notice permitting the use of the alternative means for purpose of compliance with that requirement.

(b) Any notice under par. (a) will be published only after notice and an opportunity for a hearing.

(c) Any person seeking permission to use an alternative means of emission limitation under this subsection shall submit to the administrator a written application including:

1. An actual emissions test that uses a full-sized or scale-model storage vessel that accurately collects and measures all VOC emissions from a given control device and that accurately simulates wind and accounts for other emission variables such as temperature and barometric pressure.

2. An engineering evaluation that the administrator determines is an accurate method of determining equivalence.

(d) The administrator may condition the permission on requirements that may be necessary to ensure operation and maintenance to achieve the same emissions reduction as specified in sub. (3).

(e) 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).

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.) and (h), (4) (a) 1. a. intro., r. (5) (a) and (b), renum. (5) (c) to (e), cr. (4) (a) 1. a. 4) and 5), (5) (a) to (d), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.285 Volatile organic liquid storage vessels (including petroleum liquid storage vessels) for which construction, reconstruction, or modification commenced after July 23, 1984. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in pars. (b) to (d), the affected facility to which this section applies is each storage vessel with a capacity greater than or equal to 40 cubic meters (m^3) that is used to store volatile organic liquids (VOLs) for which construction, reconstruction, or modification is commenced after July 23, 1984.

(b) Except as specified in sub. (7) (a) and (b), storage vessels with design capacity less than 75 m^3 are exempt from ss. NR 440.01 to 440.18, and from the provisions of this section.

(c) Except as specified in sub. (7) (b) and (c), vessels either with a capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor less than 3.5 kPa or with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa are exempt from ss. NR 440.01 to 440.18 and from the provisions of this section.

(d) This section does not apply to the following:

1. Vessels at coke oven by-product plants.

2. Pressure vessels designed to operate in excess of 204.9 kPa and without emissions to the atmosphere.

3. Vessels permanently attached to mobile vehicles such as trucks, railcars, barges or ships.

4. Vessels with a design capacity less than or equal to 1,589.874 m^3 used for petroleum or condensate stored, processed, or treated prior to custody transfer.

5. Vessels located at bulk gasoline plants.

6. Storage vessels located at gasoline service stations.

7. Vessels used to store beverage alcohol.

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

(a) "Bulk gasoline plant" means any gasoline distribution facility that has a gasoline throughput less than or equal to 75,700 liters per day. Gasoline throughput shall be the maximum calculated design throughput as may be limited by compliance with an enforceable condition under federal requirements or federal, state, or local law, and discoverable by the department and any other person.

(b) "Condensate" means hydrocarbon liquid separated from natural gas that condenses due to changes in the temperature or pressure, or both, and remains liquid at standard conditions.

(c) "Custody transfer" means the transfer of produced petroleum or condensate, after processing or treatment in the producing operations, from storage vessels or automatic transfer facilities to pipelines or any other forms of transportation.

(d) "Fill" means the introduction of VOL into a storage vessel but not necessarily to complete capacity.

(e) "Gasoline service station" means a site where gasoline is dispensed to motor vehicle fuel tanks from stationary storage tanks.

(f) "Maximum true vapor pressure" means the equilibrium partial pressure exerted by the stored liquid at the temperature equal to the highest calendar-month average of the liquid storage temperature for liquids stored above or below the ambient temperature or at the local maximum monthly average temperature as reported by the national weather service for liquids stored at the ambient temperature, as determined:

1. In accordance with the method described in American Petroleum Institute Bulletin 2517, Evaporation Loss From External Floating Roof Tanks, incorporated by reference in s. NR 440.17; or

2. As obtained from standard reference texts; or

3. As determined by ASTM Method D2879-83, incorporated by reference in s. NR 440.17; or

4. Any other method approved by the administrator.

(g) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(h) "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery.

(i) "Reid vapor pressure" means the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids except liquified petroleum gases, as determined by ASTM D323-82, incorporated by reference in s. NR 440.17.

(j) "Storage vessel" means each tank, reservoir, or container used for the storage of volatile organic liquids but does not include:

1. Frames, housing, auxiliary supports, or other components that are not directly involved in the containment of liquids or vapors; or

2. Subsurface caverns or porous rock reservoirs.

(k) "Volatile organic liquid" or "VOL" means any organic liquid which can emit organic compounds except those VOLs that emit only those compounds which are excluded by name from the definition of volatile organic compound in s. NR 400.02 (100).

(l) "Waste" means any liquid resulting from industrial, commercial, mining or agricultural operations, or from community activities that is discarded or is being accumulated, stored, or physically, chemically, or biologically treated prior to being discarded or recycled.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS (VOC). (a) The owner or operator of each storage vessel with a design capacity greater than or equal to 151 m^3 containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 5.2 kPa but less than 76.6 kPa, or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 27.6 kPa but less than 76.6 kPa, shall equip each storage vessel with one of the following:

1. A fixed roof in combination with an internal floating roof meeting the following specifications:

a. The internal floating roof shall rest or float on the liquid surface (but not necessarily in complete contact with it) inside a storage vessel that has a fixed roof. The internal floating roof shall be floating on the liquid surface at all times, except during initial fill and during those intervals when the storage vessel is completely emptied or subsequently emptied and refilled. When the roof is resting on the leg supports, the process of filling, emptying, or refilling shall be continuous and shall be accomplished as rapidly as possible.

b. Each internal floating roof shall be equipped with one of the following closure devices between the wall of the storage vessel and the edge of the internal floating roof:

1) A foam- or liquid-filled seal mounted in contact with the liquid (liquid-mounted seal). A liquid-mounted seal means a foam- or liquid-filled seal mounted in contact with the liquid between the wall of the storage vessel and the floating roof continuously around the circumference of the storage vessel.

2) Two seals mounted one above the other so that each forms a continuous closure that completely covers the space between the wall of the storage vessel and the edge of the internal floating roof. The lower seal may be vapor-mounted, but both must be continuous.

3) A mechanical shoe seal. A mechanical shoe seal is a metal sheet held vertically against the wall of the storage vessel 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.

c. Each opening in a noncontact internal floating roof except for automatic bleeder vents (vacuum break vents) and the rim space vents is to provide a projection below the liquid surface.

d. Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder wells, sample wells and stub drains is to be equipped with a cover or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. The cover or lid shall be equipped with a gasket. Covers on each access hatch and automatic gauge float well shall be bolted except when they are in use.

e. Automatic bleeder vents shall be equipped with a gasket and are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports.

f. Rim space vents shall be equipped with a gasket and are to be set to open only when the internal floating roof is not floating or at the manufacturer's recommended setting.

g. Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The sample well shall have a slit fabric cover that covers at least 90% of the opening.

h. Each penetration of the internal floating roof that allows for passage of a column supporting the fixed roof shall have a flexible fabric sleeve seal or a gasketed sliding cover.

i. Each penetration of the internal floating roof that allows for passage of a ladder shall have a gasketed sliding cover.

2. An external floating roof. An external floating roof means a pontoon-type or double-deck type cover that rests on the liquid surface in a vessel with no fixed roof. Each external floating roof shall meet the following specifications:

a. Each external floating roof shall be equipped with a closure device between the wall of the storage vessel and the roof edge. The closure device is to 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.

1) The primary seal shall be either a mechanical shoe seal or a liquid-mounted seal. Except as provided in sub. (4) (b)4., the seal shall completely cover the annular space between the edge of the floating roof and storage vessel wall.

2) The secondary seal shall completely cover the annular space between the external floating roof and the wall of the storage vessel in a continuous fashion except as allowed in sub. (4) (b)4.

b. Except for automatic bleeder vents and rim space vents, each opening in a noncontact external floating roof shall provide a projection below the liquid surface. Except for automatic bleeder vents, rim space vents, roof drains, and leg sleeves, each opening in the roof is to be equipped with a gasketed cover, seal, or lid that is to 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 are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports. Rim vents are to be set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting. Automatic bleeder vents and rim space vents are to be gasketed. Each emergency roof drain is to be provided with a slotted membrane fabric cover that covers at least 90% of the area of the opening.

c. The roof shall be floating on the liquid at all times (i.e., off the roof leg supports) except during initial fill until the roof is lifted off leg supports and when the storage vessel is completely emptied and subsequently refilled. The process of filling, emptying, or refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.

3. A closed vent system and control device meeting the following specifications:

a. The closed vent system shall be designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined in s. NR 440.62 (6) (b).

b. The control device shall be designed and operated to reduce inlet VOC emissions by 95% or greater. If a flare is used as the control device, it shall meet the specifications described in the general control device requirements under s. NR 440.18.

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 with a design capacity greater than or equal to 75 m^3 which contains a VOL that, as stored, has a maximum true vapor pressure greater than or equal to 76.6 kPa shall equip each storage vessel with one of the following:

1. A closed vent system and control device as specified in sub. (3) (a)3.

2. A system equivalent to that described in subd. 1. as provided in sub. (5).

(4) TESTING AND PROCEDURES. The owner or operator of each storage vessel as specified in sub. (3) (a) shall meet the requirements of par. (a), (b), or (c). The applicable paragraph for a particular storage vessel depends on the control equipment installed to meet the requirements of sub. (3).

(a) After installing the control equipment required to meet sub. (3) (a)1. (permanently affixed roof and internal floating roof), each owner or operator shall:

1. Visually inspect the internal floating roof, the primary seal, and the secondary seal (if one is in service), prior to filling the storage vessel with VOL. If there are holes, tears, or other openings in the primary seal, the secondary seal, or the seal fabric or defects in the internal floating roof, or both, the owner or operator shall repair the items before filling the storage vessel.

2. For vessels equipped with a liquid-mounted or mechanical shoe primary seal, visually inspect the internal floating roof and the primary seal or the secondary seal (if one is in service) through manholes and roof hatches on the fixed roof at least once every 12 months after initial fill. If the internal floating roof is not resting on the surface of the VOL inside the storage vessel, or there is liquid accumulated on the roof, or the seal is detached, or there are holes or tears in the seal fabric, the owner or operator shall repair the items or empty and remove the storage vessel from service within 45 days. If a failure that is detected during inspections required under this paragraph cannot be repaired within 45 days and if the vessel cannot be emptied within 45 days, a 30-day extension may be requested from the department in the inspection report required in sub. (6) (a)3. A request for an extension shall document that alternate storage capacity is unavailable and specify a schedule of actions the company owner or operator shall take to assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

3. For vessels equipped with a double-seal system as specified in sub. (3) (a)1.b.2).

a. Visually inspect the vessel as specified in subd. 4. at least every 5 years; or

b. Visually inspect the vessel as specified in subd. 2.

4. Visually inspect the internal floating roof, the primary seal, the secondary seal (if one is in service), gaskets, slotted membranes (if any), and sleeve seals (if any) each time the storage vessel is emptied and degassed. If the internal floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, the secondary seal has

holes, tears, or other openings in the seal or the seal fabric, the gaskets no longer close off the liquid surfaces from the atmosphere, or the slotted membrane has more than 10% open area, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before refilling the storage vessel with VOL. In no event may inspections conducted in accordance with this provision occur at intervals greater than 10 years in the case of vessels undergoing annual visual inspections as specified in subd. 2. or at intervals greater than 5 years in the case of vessels specified in subd. 3.

5. Notify the department in writing at least 30 days prior to the filling or refilling of each storage vessel for which an inspection is required by subds. 1. and 4. to afford the department the opportunity to have an observer present. If the inspection required by subd. 4. is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the storage vessel, the owner or operator shall notify the department at least 7 days prior to the refilling of the storage vessel. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification including the written documentation may be made in writing and sent by express mail so that it is received by the department at least 7 days prior to the refilling.

(b) After installing the control equipment required to meet sub. (3)(a)2. (external floating roof), the owner or operator shall:

1. Determine the gap areas and maximum gap widths, between the primary seal and the wall of the storage vessel and between the secondary seal and the wall of the storage vessel according to the following frequency.

a. Measurements of gaps between the storage vessel wall and the primary seal (seal gaps) shall be performed during the hydrostatic testing of the vessel or within 60 days of the initial fill with VOL and at least once every 5 years thereafter.

b. Measurements of gaps between the storage vessel wall and the secondary seal shall be performed within 60 days of the initial fill with VOL and at least once per year thereafter.

c. If any source ceases to store VOL for a period of one year or more, subsequent introduction of VOL into the vessel shall be considered an initial fill for the purposes of subpars. a. and b.

2. Determine gap widths and areas in the primary and secondary seals individually by the following procedures:

a. Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports.

b. Measure seal gaps around the entire circumference of the storage vessel in each place where a 0.32-cm diameter uniform probe passes freely (without forcing or binding against the seal) between the seal and the wall of the storage vessel and measure the circumferential distance of each such location.

c. The total surface area of each gap described in subpar. b. shall be determined by using probes of various widths to measure accurately the actual distance from the storage vessel wall to the seal and multiplying each such width by its respective circumferential distance.

3. Add the gap surface area of each gap location for the primary seal and the secondary seal individually and divide the sum for each seal by the nominal diameter of the storage vessel and compare each ratio to the respective standards in subd. 4.

4. Make necessary repairs or empty the storage vessel within 45 days of identification in any inspection for seals not meeting the requirements listed in subpar. a.

a. The accumulated area of gaps between the storage vessel wall and the mechanical shoe or liquid-mounted primary seal may not exceed 212 cm^2 per meter of storage vessel diameter, and the width of any portion of any gap may not exceed 3.81 cm.

1) One end of the mechanical shoe is to extend into the stored liquid, and the other end is to extend a minimum vertical distance of 61 cm above the stored liquid surface.

2) There may be no holes, tears, or other openings in the shoe, seal fabric, or seal envelope.

b. The secondary seal is to meet the following requirements:

1) The secondary seal is to be installed above the primary seal so that it completely covers the space between the roof edge and the storage vessel wall except as provided in subd. 2.c.

2) The accumulated area of gaps between the storage vessel wall and the secondary seal may not exceed 21.2 cm^2 per meter of storage vessel diameter, and the width of any portion of any gap may not exceed 1.27 cm.

3) There may be no holes, tears, or other openings in the seal or seal fabric.

c. If a failure that is detected during inspections required in subd. 1. cannot be repaired within 45 days, a 30-day extension may be requested from the department in the inspection report required in sub. (6) (b)4. An extension request shall include a demonstration of unavailability of alternate storage capacity and a specification of a schedule that will assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

5. Notify the department 30 days in advance of any gap measurements required by subd. 1. to afford the department opportunity to have an observer present.

6. Visually inspect the external floating roof, the primary seal, secondary seal, and fittings each time the vessel is emptied and degassed.

a. If the external floating roof has defects, or the primary seal has holes, tears, or other openings in the seal or the seal fabric, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before filling or refilling the storage vessel with VOL.

b. For all the inspections required by this subdivision, the owner or operator shall notify the department in writing at least 30 days prior to the filling or refilling of each storage vessel to afford the department the opportunity to inspect the storage vessel prior to refilling. If the inspection required by this subdivision is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the storage vessel, the owner or operator shall notify the department at least 7 days prior to the refilling of the storage vessel. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification including the written documentation may be made in writing and sent by express mail so that it is received by the department at least 7 days prior to the refilling.

(c) The owner or operator of each source that is equipped with a closed vent system and control device as required in sub. (3) (a)3. or (b)2. (other than a flare) is exempt from s. NR 440.08 and shall meet the following requirements:

1. Submit for approval by the administrator as an attachment to the notification required by s. NR 440.07 (1) (a), or if the facility is exempt from s. NR 440.07 (1) (b), an operating plan containing the following information:

a. Documentation demonstrating that the control device will achieve the required control efficiency during maximum loading conditions. This documentation shall include a description of the gas stream which enters the control device, including flow and VOC content under varying liquid level conditions (dynamic and static) and manufacturer's design specifications for the control device. If the control device or the closed vent capture system receives vapors, gases, or liquids other than fuels from sources that are not designated sources under this section, the efficiency demonstration shall include consideration of all vapors, gases, and liquids received by the closed vent capture system and control devices. If an enclosed combustion device with a minimum residence time of 0.75 seconds and a minimum temperature of 816°C is used to meet the 95% requirement, documentation that those conditions will exist is sufficient to meet the requirements of this paragraph.

b. A description of the parameter or parameters to be monitored to ensure that the control device will be operated in conformance with its design and an explanation of the criteria used for selection of that parameter (or parameters).

2. Operate the closed vent system and control device and monitor the parameters of the closed vent system and control device in accordance with the operating plan submitted to the department in accordance with subd. 1., unless the plan was modified by the department during the review process. In this case, the modified plan applies.

(d) The owner or operator of each source that is equipped with a closed vent system and a flare to meet the requirements in sub. (3) (a)3. or (b)2. shall meet the requirements as specified in the general control device requirements under s. NR 440.18 (5) and (6).

(5) ALTERNATIVE MEANS OF EMISSION LIMITATIONS. (a) If, in the administrator's judgment, an alternative means of emission limitation will achieve a reduction in emissions at least equivalent to the reduction in emissions achieved by any requirement in sub. (3), the administrator will

publish in the federal register a notice permitting the use of the alternative means for purposes of compliance with that requirement.

(b) Any notice under par. (a) will be published only after notice and an opportunity for a public hearing.

(c) Any person seeking permission under this section shall submit to the administrator a written application including:

1. An actual emissions test that uses a full-sized or scale-model storage vessel that accurately collects and measures all VOC emissions from a given control device and that accurately simulates wind and accounts for other emission variables such as temperature and barometric pressure.

2. An engineering evaluation that the administrator determines is an accurate method of determining equivalence.

(d) The administrator may condition the permission on requirements that may be necessary to ensure operation and maintenance to achieve the same emission reduction as specified in sub. (3).

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. The owner or operator of each storage vessel as specified in sub. (3) (a) shall keep records and furnish reports as required by par. (a), (b), or (c) depending upon the control equipment installed to meet the requirements of sub. (3). The owner or operator shall keep copies of all reports and records required by this section, except for the record required by par. (c)1., for at least 2 years. The record required by par. (c)1. will be kept for the life of the control equipment.

(a) After installing control equipment in accordance with sub. (3) (a)1. (fixed roof and internal floating roof), the owner or operator shall meet the following requirements:

1. Furnish the department with a report that describes the control equipment and certifies that the control equipment meets the specifications of subs. (3) (a)1. and (4) (a)1. This report shall be an attachment to the notification required by s. NR 440.07 (1) (c).

2. Keep a record of each inspection performed as required by sub. (4) (a)1. to 4. Each record shall identify the storage vessel on which the inspection was performed and shall contain the date the vessel was inspected and the observed condition of each component of the control equipment (seals, internal floating roof, and fittings).

3. If any of the conditions described in sub. (4) (a)2. are detected during the annual visual inspection required by sub. (4) (a)2., a report shall be furnished to the department within 30 days of the inspection. Each report shall identify the storage vessel, the nature of the defects, and the date the storage vessel was emptied or the nature of and date the repair was made.

4. After each inspection required by sub. (4) (a)3. that finds holes or tears in the seal or seal fabric, defects in the internal floating roof, or other control equipment defects listed in sub. (4) (a)3.b., a report shall be furnished to the department within 30 days of the inspection. The report shall identify the storage vessel and the reason it did not meet the specifications of sub. (3) (a)1. or (4) (a)3. and list each repair made.

(b) After installing control equipment in accordance with sub. (3) (a)2. (external floating roof), the owner or operator shall meet the following requirements:

1. Furnish the department with a report that describes the control equipment and certifies that the control equipment meets the specifications of subs. (3) (a)2. and (4) (b)2. to 4. This report shall be an attachment to the notification required by s. NR 440.07 (1) (c).

2. Within 60 days of performing the seal gap measurements required by sub. (4) (b)1., furnish the department with a report that contains:

a. The date of measurement.

b. The raw data obtained in the measurement.

c. The calculations described in sub. (4) (b)2. and 3.

3. Keep a record of each gap measurement performed as required by sub. (4) (b). Each record shall identify the storage vessel in which the measurement was performed and shall contain:

a. The date of measurement.

b. The raw data obtained in the measurement.

c. The calculations described in sub. (4) (b)2. and 3.

4. After each seal gap measurement that detects gaps exceeding the limitations specified by sub. (4) (b)4., submit a report to the department within 30 days of the inspection. The report will identify the vessel and contain the information specified in par. (b)2. and the date the vessel was emptied or the repairs made and date of repair.

(c) After installing control equipment in accordance with sub. (3) (a)3. or (b)1. (closed vent system and control device other than a flare), the owner or operator shall keep the following records:

1. A copy of the operating plan.

2. A record of the measured values of the parameters monitored in accordance with sub. (4) (c)2.

(d) After installing a closed vent system and flare to comply with sub. (3), the owner or operator shall meet the following requirements:

1. A report containing the measurements required by s. NR 440.18 (6) shall be furnished to the department as required by s. NR 440.08. This report shall be submitted within 6 months of the initial startup date.

2. Records shall be kept of all periods of operation during which the flare pilot flame is absent.

3. Semiannual reports of all periods recorded under subd. 2. in which the pilot flame was absent shall be furnished to the department.

(7) MONITORING OF OPERATIONS. (a) The owner or operator shall keep copies of all records required by this section, except for the record required by par. (b) for at least 2 years. The record required by par. (b) shall be kept for the life of the source.

(b) The owner or operator of each storage vessel as specified in sub. (1) (a) shall keep readily accessible records showing the dimension of the storage vessel and an analysis showing the capacity of the storage vessel. Each storage vessel with a design capacity less than 75 m^3 is subject to no provisions of this section other than those required by this paragraph.

(c) Except as provided in pars. (f) and (g), the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure greater than or equal to 3.6 kPa, or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure greater than or equal to 15.0 kPa, shall maintain a record of the VOL stored, the period of storage, and the maximum true vapor pressure of that VOL during the respective storage period.

(d) Except as provided in par. (g), the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure that is normally less than 5.2 kPa, or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure that is normally less than 27.6 kPa, shall notify the department within 30 days when the maximum true vapor pressure of the liquid exceeds the respective maximum true vapor pressure values for each volume range.

(e) Available data on the storage temperature may be used to determine the maximum true vapor pressure as follows:

1. For vessels operated above or below ambient temperatures, the maximum true vapor pressure is calculated based upon the highest expected calendar-month average of the storage temperature. For vessels operated at ambient temperatures, the maximum true vapor pressure is calculated based upon the maximum local monthly average ambient temperature as reported by the national weather service.

2. For crude oil or refined petroleum products the vapor pressure may be obtained by the following:

a. Available data on the Reid vapor pressure and the maximum expected storage temperature based on the highest expected calendar-month average 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 the sample or samples.

b. The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa or with physical properties that preclude determination by the recommended method is to be determined from available data and recorded if the estimated maximum true vapor pressure is greater than 3.5 kPa.

3. For other liquids, the vapor pressure:

a. May be obtained from standard reference texts, or

b. Determined by ASTM Method D2879-83, incorporated by reference in s. NR 440.17, or

c. Measured by an appropriate method approved by the administrator, or

d. Calculated by an appropriate method approved by the administrator.

(f) The owner or operator of each vessel storing a waste mixture of indeterminate or variable composition shall be subject to the following requirements.

1. Prior to the initial filling of the vessel, the highest maximum true vapor pressure for the range of anticipated liquid compositions to be stored shall be determined using the methods described in par. (e).

2. For vessels in which the vapor pressure of the anticipated liquid composition is above the cutoff for monitoring but below the cutoff for controls as defined in sub. (3) (a), an initial physical test of the vapor pressure is required; and a physical test at least once every 6 months thereafter is required as determined by the following methods:

a. ASTM Method D2879-83, incorporated by reference in s. NR 440.17; or

b. ASTM Method D323-82 incorporated by reference in s. NR 440.17; or

c. As measured by an appropriate method as approved by the administrator.

(g) The owner or operator of each vessel equipped with a closed vent system and control device meeting the specifications of sub. (3) is exempt from the requirements of pars. (c) and (d).

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.29 Secondary lead smelters. (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, terms not defined in this subsection have the meanings given 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. part 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. part 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. Particulate sampling shall be conducted during representative periods of furnace operation, including charging and tapping.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.30 Secondary brass and bronze 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 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. Furnaces from which molten brass or bronze are cast into the shape of finished products, such as foundry furnaces, are not considered to be affected facilities.

(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, terms not defined in this subsection have the meanings given 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. part 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,

4. Method 3 for gas analysis, and

5. Method 9 for visual determination of the opacity of emissions.

(b) For Method 5 of 40 C.F.R. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (1) (a), (4) (a) 3. and 4., cr. (4) (a) 5., Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro)., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.31 Primary emissions from basic oxygen process furnaces for which construction is commenced after June 11, 1973. (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, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Basic oxygen process furnace" or "BOPF" means any furnace with a refractory lining in which molten steel is produced by charging scrap metal, molten iron, and flux materials or alloy additions into a vessel and introducing a high volume of an oxygen-rich gas. Open hearth, blast and reverberatory furnaces are not included in this definition.

(b) "Primary emissions" means particulate matter emissions from the BOPF generated during the steel production cycle and captured by the BOPF primary control system.

(c) "Primary oxygen blow" means the period in the steel production cycle of a BOPF during which a high volume of oxygen-rich gas is introduced to the bath of molten iron by means of a lance inserted from the top of the vessel or through tuyeres in the bottom or through the bottom and sides of the vessel. This definition does not include any additional or secondary oxygen blows made after the primary blow or the introduction of nitrogen or other inert gas through tuyeres in the bottom or bottom and sides of the vessel.

(d) "Steel production cycle" means the operations conducted within the BOPF steelmaking facility that are required to produce each batch of steel and includes the following operations: scrap charging, preheating (when used), hot metal charging, primary oxygen blowing, sampling (vessel turndown and turnup), additional oxygen blowing (when used), tapping, and deslagging. This definition applies to an affected facility constructed, modified, or reconstructed after January 20, 1983. For an affected facility constructed, modified, or reconstructed after June 11, 1973, but on or before January 20, 1983, "steel production cycle" means the operations conducted within the BOPF steelmaking facility that are required to produce each batch of steel and includes the following operations: scrap charging, preheating (when used), hot metal charging, primary oxygen blowing, sampling (vessel turndown and turnup), additional oxygen blowing (when used) and tapping.

(3) STANDARD FOR PARTICULATE MATTER. (a) Except as provided under par. (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 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) For affected facilities constructed, modified, or reconstructed after January 20, 1983, the following limits shall apply:

1. On or after the date on which the performance test under s. NR 440.08 is required to be completed, no owner or operator of an affected facility for which open hooding is the method for controlling primary emissions may cause to be discharged to the atmosphere any gases that:

a. Contain particulate matter in excess of 50 mg/dscm (0.022 gr/dscf), as measured for the primary oxygen blow.

b. Exit from a control device not used solely for the collection of secondary emissions, as defined in s. NR 440.315 (2), and exhibit 10% opacity or greater, except that an opacity greater than 10% but less than 20% may occur once per steel production cycle.

2. On or after the date on which the performance test required by s. NR 440.08 is completed, no owner or operator of an affected facility for which closed hooding is the method for controlling primary emissions may cause to be discharged into the atmosphere any gases that:

a. Contain particulate matter in excess of 68 mg/dscm (0.030 gr/dscf), as measured for the primary oxygen blow.

b. Exit from a control device not used solely for the collection of secondary emissions, as defined in s. NR 440.315 (2), and exhibit 10% opacity or greater, except that an opacity greater than 10% but less than 20% may occur once per steel production cycle.

(c) On and after the date on which the performance test required by s. NR 440.08 is completed, each owner or operator of an affected facility subject to par. (b) shall operate the primary gas cleaning system during any reblow in a manner identical to operation during the primary oxygen blow.

(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 ± 250 Pa (± 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 ± 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 shall be consulted for approval in advance of selecting 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 to the department, on a semiannual basis, 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 mass standards under sub. (3) (a) 1., (b) 1. a. or 2. a. 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. part 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. part 60, Appendix A, incorporated by reference in s. NR 440.17, the sampling time shall be as follows:

1. For affected facilities that commenced construction, modification, or reconstruction on or before January 20, 1983, the sampling for each run shall continue for an integral number of steel production cycles with total duration of at least 60 minutes. A cycle shall start at the beginning of either the scrap preheat or the oxygen blow and shall terminate immediately prior to tapping. The minimum sample volume shall be at least 1.5 dscm (53 dscf). Shorter sampling times and smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

2. For affected facilities that commence construction, modification, or reconstruction after January 20, 1983, the sampling for each run shall continue for an integral number of primary oxygen blows, with total duration of at least 60 minutes. The minimum sample volume shall be at least 1.5 dscm (53 dscf). Shorter sampling times and smaller sample volumes, when necessitated by process variables or other factor, may be approved by the department.

(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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), and (a), (3) (a) (intro.), (4) (b) 2. and (c), (5) (b), r. and recr. (2) (b), renum. (2) (c) to be (2) (d) and am., cr. (2) (c), (3) (b) and (c), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.315 Basic oxygen process steelmaking facilities for which construction is commenced after January 20, 1983. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITIES. (a) The provisions of this section apply to the following affected facilities in an iron and steel plant: top-blown BOPFs and hot metal transfer stations and skimming stations used with bottom-blown or top-blown BOPFs.

(b) This section applies to any facility identified in par. (a) that commences construction, modification or reconstruction after January 20, 1983.

(c) Any BOPF subject to the provisions of this section is subject to those provisions of s. NR 440.31 applicable to affected facilities commencing construction, modification or reconstruction after January 20, 1983.

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

(a) "Basic oxygen process furnace" or "BOPF" means any furnace with a refractory lining in which molten steel is produced by charging scrap metal, molten iron, and flux materials or alloy additions into a vessel and by introducing a high volume of oxygen-rich gas. Open hearth, blast and reverberatory furnaces are not included in this definition.

(b) "Bottom-blown furnace" means any BOPF in which oxygen and other combustion gases are introduced to the bath of molten iron through tuyeres in the bottom of the vessel or through tuyeres in the bottom and sides of the vessel.

(c) "Fume suppression system" means the equipment comprising any system used to inhibit the generation of emissions from steelmaking facilities with an inert gas, flame or steam blanket applied to the surface of molten iron or steel.

(d) "Hot metal transfer station" means the facility where molten iron is emptied from the railroad torpedo car or hot metal car to the shop ladle. This includes the transfer of molten iron from the torpedo car or hot metal car to a mixer (or other intermediate vessel) and from a mixer (or other intermediate vessel) to the ladle. This facility is also known as the reladling station or ladle transfer station.

(e) "Primary emission control system" means the combination of equipment used for the capture and collection of primary emissions, e.g., an open hood capture system used in conjunction with a particular cleaning device such as an electrostatic precipitator or a closed hood capture system used in conjunction with a particulate matter cleaning device such as a scrubber.

(f) "Primary emissions" means particulate matter emissions from the BOPF generated during the steel production cycle which are captured by, and do not thereafter escape from the BOPF primary control system.

(g) "Primary oxygen blow" means the period in the steel production cycle of a BOPF during which a high volume of oxygen-rich gas is introduced to the bath of molten iron by means of a lance inserted from the top of the vessel. This definition does not include any additional, or secondary, oxygen blows made after the primary blow.

(h) "Secondary emission control system" means the combination of equipment used for the capture and collection of secondary emissions, e.g.:

1. An open hood system for the capture and collection of primary and secondary emissions from the BOPF, with local hooding ducted to a secondary emission collection device such as a baghouse for the capture and

collection of emissions from the hot metal transfer and skimming station; or

2. An open hood system for the capture and collection of primary and secondary emissions from the furnace, plus a furnace enclosure with local hooding ducted to a secondary emission collection device, such as a baghouse, for additional capture and collection of secondary emissions from the furnace, with local hooding ducted to a secondary emission collection device, such as a baghouse for the capture and collection of emissions from hot metal transfer and skimming stations; or

3. A furnace enclosure with local hooding ducted to a secondary emission collection device such as a baghouse for the capture and collection of secondary emissions from a BOPF controlled by a closed hood primary emission control system, with local hooding ducted to a secondary emission collection device, such as baghouse, for the capture and collection of emissions from hot metal transfer and skimming stations.

(i) "Secondary emissions" means particulate matter emissions that are not captured by the BOPF primary control system, including emissions from hot metal transfer and skimming stations. This definition also includes particulate matter emissions that escape from openings in the primary emission control system, such as from lance hole openings, gaps or tears in the ductwork of the primary emission control system, or leaks in hoods.

(j) "Skimming station" means the facility where slag is mechanically raked from the top of the molten iron.

(k) "Steel production cycle" means the operations conducted within the BOPF steelmaking facility that are required to produce each batch of steel, including the following operations: scrap charging, preheating (when used), hot metal charging primary oxygen blowing, sampling (vessel turndown and turnup), additional oxygen blowing (when used), tapping and deslagging. Hot metal transfer and skimming operations from the next steel production cycle are also included when the hot metal transfer station or skimming station is an affected facility.

(l) "Top-blown furnace" means any BOPF in which oxygen is introduced to the bath of molten iron by means of an oxygen lance inserted from the top of the vessel.

(3) STANDARDS FOR PARTICULATE MATTER. (a) Except as provided under pars. (b) and (c), on and after the date on which the performance test under s. NR 440.08 is required to be 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 secondary emissions that:

1. Exit from the BOPF shop roof monitor (or other building openings) and exhibit greater than 10% opacity during the steel production cycle of any top-blown BOPF or during hot metal transfer or skimming operations for any bottom-blown BOPF, except that an opacity greater than 10% but less than 20% may occur once per steel production cycle.

2. Exit from a control device used solely for the collection of secondary emissions from a top-blown BOPF or from hot metal transfer or skimming operations for a top-blown BOPF and contain particulate matter in excess of 23 mg/dscm (0.010 gr/dscf).

3. Exit from a control device used solely for the collection of secondary emissions from a top-blown BOPF or from hot metal transfer or skimming operations for a top-blown or a bottom-blown BOPF and exhibit more than 5% opacity.

(b) A fume suppression system used to control secondary emissions from an affected facility is not subject to par. (a)2. and 3.

(c) A control device used to collect both primary and secondary emissions from a BOPF is not subject to par. (a)2. and 3.

(4) MONITORING OF OPERATIONS. (a) Each owner or operator of an affected facility shall install, calibrate, operate, and maintain a monitoring device that continually measures and records for each steel production cycle the various rates or levels of exhaust ventilation at each phase of the cycle through each duct of the secondary emission capture system. The monitoring device or devices are to be placed at locations near each capture point of the secondary emission capture system to monitor the exhaust ventilation rates or levels adequately, or in alternative locations approved in advance by the department.

(b) If a chart recorder is used, the owner or operator shall use chart recorders that are operated at minimum chart speed of 3.8 cm/hr (1.5 in/hr).

(c) All monitoring devices are to be certified by the manufacturer to be accurate to within ± 10% compared to Reference Method 2, 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17. The owner or operator shall recalibrate and check the devices annually and at other times as the department may require, in accordance with the written instructions of the manufacturer and by comparing the device against Reference Method 2, 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

(d) Each owner or operator subject to the requirements of par. (a) shall report on a semiannual basis all measurements of exhaust ventilation rates or levels over any 3-hour period that average more than 10% below the average rates or levels of exhaust ventilation 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)2. The accuracy of the respective measurements, not to exceed the values specified in par. (c), may be considered when determining the measurement results that are to be reported.

(e) If a scrubber primary emission control device is used to collect secondary emissions, the owner or operator shall report on a semiannual basis all measurements of exhaust ventilation rate over any 3-hour period that average more than 10% below the average levels maintained during the most recent performance text conducted under s. NR 440.08 in which the affected facility demonstrated compliance with the standard under sub. (3) (a)1.

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

1. Method 1 for sample and velocity traverses;

2. Method 2 for volumetric flow rate;

3. Method 3 for gas analysis;

4. Method 5 for concentration of particulate matter and associated moisture content; and

5. Method 9 for visible emissions except as provided in par. (b).

(b) For Method 9, the following instructions for recording observations and reducing data shall apply instead of Section 2.4 and 2.5 of Method 9:

1. Substitute for Section 2.4. Opacity observations shall be recorded to the nearest 5% at 15-second intervals. During the initial performance test conducted under s. NR 440.08, observations shall be made and recorded in this manner for a minimum of 3 steel production cycles. During any subsequent compliance test, observations may be made for any number of steel production cycles, although, where conditions permit, observations will generally be made for a minimum of 3 steel production cycles.

2. Substitute for Section 2.5. Opacity shall be determined as an average of 12 consecutive observations recorded at 15-second intervals. For each steel production cycle, divide the observations recorded into sets of 12 consecutive observations. Sets need not be consecutive in time, and in no case may 2 sets overlap. For each set of 12 observations, calculate the average by summing the opacity of 12 consecutive observations and dividing this sum by 12.

(c) For the sampling of secondary emissions by Method 5 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, each run is to continue for a sufficient number of steel production cycles to ensure a total sample volume of at least 5.67 dscm (200 dscf) for each run. Shorter sampling times and smaller sample volumes, when necessitated by process variables or other factors, may be approved by the department. Sampling is to be conducted only during the steel production cycle.

(d) For the monitoring and recording of exhaust ventilation rates or levels required by sub. (4) (a), the following instructions for Reference Method 2, Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, shall apply:

1. For devices that monitor and record the exhaust ventilation rate, compare velocity readings recorded by the monitoring device against the velocity readings obtained by Method 2. Take Method 2 readings at a point or points that would properly characterize the monitoring device's performance and that would adequately reflect the various rates of exhaust ventilation. Obtain readings at sufficient intervals to obtain 12 pairs of readings for each duct of the secondary emission capture system. Compare the averages of the 2 sets to determine whether the monitoring device velocity is within ± 10% of the Method 2 average.

2. For devices that monitor the level of exhaust ventilation and record only step changes when a set point rate is reached, compare step changes recorded by the monitoring device against the velocity readings obtained by Method 2. Take Method 2 readings at a point or points that would properly characterize the performance of the monitoring device and that

would adequately reflect the various rates of exhaust ventilation. Obtain readings at sufficient intervals to obtain 12 pairs of readings for each duct of the secondary emission capture system. Compare the averages of the 2 sets to determine whether the monitoring device step change is within ± 10% of the setpoint rate.

(6) COMPLIANCE PROVISIONS. (a) When determining compliance with mass and visible emission limits specified in sub. (3) (a)2. and 3., the owner or operator of a BOPF shop that normally operates 2 furnaces with overlapping cycles may elect to operate only one furnace. If an owner or operator chooses to shut down one furnace, he or she shall be allowed a reasonable time period to adjust the production schedule before the compliance tests are conducted. The owner or operator of an affected facility may also elect to suspend shop operations not subject to this section during compliance testing.

(b) During compliance testing for mass and visible emission standards, if an owner or operator elects to shut down one furnace in a shop that normally operates 2 furnaces with overlapping cycles, the owner or operator shall operate the secondary emission control system for the furnace being tested at exhaust ventilation rates or levels for each duct of the secondary emission control system that are appropriate for single-furnace operating. Following the compliance test, the owner or operator shall operate the secondary emission control system at exhaust ventilation rates or levels for each duct of the system that are no lower than 90% of the exhaust ventilation values established during the most recent compliance test.

(c) For the purpose of determining compliance with visible and mass emission standards, a steel production cycle begins when the scrap or hot metal is charged to the vessel (whichever operation occurs first) and terminates 3 minutes after slag is emptied from the vessel into the slag pot. Consecutive steel production cycles are not required for the purpose of determining compliance. Where a hot metal transfer or skimming station is an affected facility, the steel production cycle also includes the hot metal transfer or skimming operation for the next steel production cycle for the affected vessel. Visible emission observations for both hot metal transfer and skimming operations begin with the start of the operation and terminate 3 minutes after completion of the operation.

(d) For the purpose of determining compliance with visible emission standards specified in sub. (3) (a)1. and 3., the starting and stopping times of regulated process operations shall be determined and the starting and stopping times of visible emissions data sets shall be determined accordingly.

(e) To determine compliance with sub. (3) (a)1., select the data sets yielding the highest and second highest 3-minute average opacities for each steel production cycle. Compliance is achieved if the highest 3-minute average for each cycle observed is less than 20% and the second highest 3-minute average is 10% or less.

(f) To determine compliance with sub. (3) (a)2., determine the concentration of particulate matter in exhaust gases exiting the secondary emission collection device with Reference Method 5 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17. Compliance is achieved if the concentration of particulate matter does not exceed 23 mg/dscm (0.010 gr/dscf).

(g) To determine compliance with sub. (3) (a)3., construct consecutive 3-minute averages for each steel production cycle. Compliance is achieved if no 3-minute average is more than 5%.

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.32 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, terms have the meanings given 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/kg dry sludge input (1.30 lb/ton dry sludge input).

2. Any gases which exhibit 20% opacity or greater.

(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.

(5) TEST METHOD AND PROCEDURES. (a) The reference methods of 40 C.F.R. part 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. part 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:

$S_D = (60 \times 10^{-3})\ (R_{DV}S_V/T)$ (Metric Units) or

$S_D = (8.021)\ (R_{DV}S_V/T)$ (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)

60×10^{-3} is the metric units conversion factor, l-kg-min/m^3 -mg-hr

8.021 is the English units conversion factor, ft^3-min/gal-hr

b. If the mass of sludge charged is used:

$S_D = (60)\ (R_{DM}S_M/T)$ (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:

$C_{aw} = C_sQ_s$ (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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.33 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, terms not defined in this subsection have the meanings given 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).

(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% 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. part 60, Appendix B, incorporated by reference in s. NR 440.17, shall be Reference Method 6 of 40 C.F.R. part 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 may 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 be included within the 1.5%.

(7) TEST METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. part 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. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.) and (6) (d) 2., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.34 Primary zinc smelters. (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, terms not defined in this subsection have the meanings given 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).

(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).

(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 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% 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. part 60, Appendix B, incorporated by reference in s. NR 440.17, shall be Reference Method 6 of 40 C.F.R. part 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. part 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. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.35 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, terms not defined in this subsection have the meanings given 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).

(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.

(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% 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. part 60, Appendix B, incorporated by reference in s. NR 440.17 shall be Reference Method 6 of 40 C.F.R. part 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. part 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. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.36 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, terms not defined in this subsection have the meanings given 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 fluorides 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. 0.050 kg/Mg (0.10 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 ch. NR 439.

Note: Under 40 C.F.R. s. 60.195 (b), an owner or operator may petition the administrator 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 it can be shown that their emissions have low variability during day-to-day operations. The alternative testing requirment must be published in the federal register and 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. part 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. part 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:

$$E_{pg} = \frac{(C_sQ_s)_1 10^{-6} + (C_sQ_s)_2 10^{-6}}{M}$$

where:

E_{pg} is the potroom group emissions of total fluorides in kg/Mg of aluminum produced

C_s 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. part 60, Appendix A, incorporated by reference in s. NR 440.17, as applicable

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. part 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)

$(C_sQ_s)_1$ is the product of C_s and Q_s 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 $(C_sQ_s)_1$ from the most recent performance test shall be used.

$(C_sQ_s)_2$ is the product of C_s and Q_s for measurements of secondary control system or roof monitor effluent gas streams

(i) For each run, as applicable, anode bake plant emissions expressed in kg/Mg of aluminum equivalent shall be determined using the following equation:

$$E_{bp} = \frac{C_sQ_s\, 10^{-6}}{M_e}$$

where:

E_{bp} is the anode bake plant emissions of total fluorides in kg/Mg of aluminum equivalent

C_s is the concentration of total fluorides in mg/dscm as determined by Method 13A or 13B of 40 C.F.R. part 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. part 60, Appendix A

10^{-6} is the conversion factor from mg to kg

M_e is the aluminum equivalent for anodes produced by anode bake plants in Mg/hr as determined by par. (g)

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (6) (a), Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), (3) (a) 3., (6) (a), r. (6) (b), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.37 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, terms not defined in this subsection have the meanings given 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) "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).

(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 flow rate 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. part 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. part 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 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. part 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. part 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)

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.38 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, terms not defined in this subsection have the meanings given 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).

(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. part 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. part 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 flourides 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. part 60, Appendix A, incorporated by reference in s. NR 440.17

Q_s is the volumetric flow of the effluent gas stream in dscm/hr as determined by Method 2 of 40 C.F.R. part 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).

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.39 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, terms not defined in this subsection have the meanings given 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).

(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. part 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. part 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. part 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. part 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)

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.40 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, terms not defined in this section have the meanings given 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).

(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 PROCEDURES. (a) Reference methods in 40 C.F.R. part 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. part 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. part 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. part 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)

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.41 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, terms not defined in this subsection have the meanings given 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).

(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. part 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. part 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:

$E = (C_s Q_s)\, 10^{-3} / M_{P_2O_5}$

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. part 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. part 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)

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.42 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, terms not defined in this subsection have the meanings given 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. part 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. part 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).

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.43 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, terms not defined in this subsection have the meanings given 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% 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% by weight chromium, 5 to 8% by weight carbon, and 3 to 6% 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% by weight manganese, 28 to 32% 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% by weight silicon, 1.5 to 2.5% by weight calcium, 5 to 7% by weight zirconium, 0.75 to 1.25% by weight aluminum, 5 to 7% by weight manganese, and 2 to 3% 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 high-carbon 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 % 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.

(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. part 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% 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% 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. part 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. part 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. part 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. part 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. part 60, Appendix A.

(h) For Method 5 of 40 C.F.R. part 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:

$$E = \frac{\sum_{n=1}^{N} E_n}{p}$$

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)

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.44 Steel plants: electric arc furnaces constructed after October 21, 1974, and on or before August 17, 1983. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in steel plants that produce carbon, alloy, or specialty steels: electric arc furnaces and dust-handling systems.

(b) The provisions of this section apply to each affected facility identified under par. (a) that commenced construction, modification, or reconstruction after October 21, 1974 and on or before August 17, 1983.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given 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 that continuously feed direct-reduced iron ore pellets as the primary source of iron 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 arithmetic average of 24 or more opacity observations of emissions from the shop taken in accordance with Method 9 of 40 C.F.R. part 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 6% opacity or greater except:

a. Shop opacity less than 20% may occur during charging periods.

b. Shop opacity less than 40% may occur during tapping periods.

c. Opacity standards of this subdivision apply only during periods when pressures and either control system fan motor amperes and damper positions or flow rate are being established under sub. (5) (c) and (g).

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.

(c) No continuous monitoring system is required on any modular, multiple-stack, negative-pressure, or positive-pressure fabric filters if observations of the opacity of the visible emissions from the control device are performed by a certified visible emission observer in accordance with sub. (6) (i).

(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 check and record on a once-per-shift basis the furnace static pressure (if a direct shell evacuation or DEC system is in use) and either check and record the control system fan motor amperes and damper positions on a once-per-shift basis; or 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. part 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 that either the control system fan motor amperes and all damper positions or 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 subject to par. (b). The owner or operator may petition the department for reestablishment of these parameters whenever the owner or operator can demonstrate to the department's satisfaction that the EAF operating conditions upon which the parameters were previously established are no longer applicable. The values of these parameters as determined during the most recent demonstration of compliance shall be maintained at the appropriate level for each applicable period. Operation at other than baseline values may be subject to the requirements of sub. (7) (a).

Note: Under 40 C.F.R. s. 60.274 (d), the owner or operator may petition the administrator to approve any alternative method that will provide a continuous record of operation of each emission capture system.

(e) The owner or operator shall perform monthly operational status inspections of the equipment that is important to the performance of the total capture system (i.e., pressure sensors, dampers and damper switches). This inspection shall include observations of the physical appearance of the equipment (e.g., presence of hole in ductwork or hoods, flow constrictions caused by dents or accumulated dust in ductwork, and fan erosion). Any deficiencies shall be noted and proper maintenance performed.

(f) 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.

(g) 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.

(h) 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.

(i) During any performance test required under s. NR 440.08 and for any report thereof required under sub. (6) (c) or to determine compliance with sub. (3) (a) 3., the owner or operator shall monitor the following information for all heats covered by the test:

1. Charge weights and materials, and tap weights and materials;

2. Heat times, including start and stop times, and a log of process operation, including periods of no operation during testing and the pressure inside the furnace where direct-shell evacuation systems are used;

3. Control device operation log; and

4. Continous monitor or Reference Method 9 data.

(6) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. part 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. Either Method 5 for negative-pressure fabric filters and other types of control devices or Method 5D 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 the opacity of visible emissions.

(b) For Method 5 or 5 D of 40 C.F.R. part 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. For Method 5 or 5D 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) and furnish the department a written report of the results of the test. This report shall include the following information:

1. Facility name and address;

2. Plant representative;

3. Make and model of process, control device, and continuous monitoring device;

4. Flow diagram of process and emission capture equipement or process(es) ducted to the same control device;

5. Rated design capacity of process equipment;

6. Those data required under par. (5) (i);

a. List of charge and tap weights and materials;

b. Heat times and process log;

c. Control device operation log; and

d. Continuous monitor or Reference Method 9 data.

7. Test dates and test times;

8. Test company;

9. Test company representative;

10. Test observers from outside agency;

11. Description of test methodology used, including any deviation from standard reference methods;

12. Schematic of sampling location;

13. Number of sampling points;

14. Description of sampling equipment;

15. Listing of sampling equipment calibrations and procedures;

16. Field and laboratory data sheets;

17. Description of sample recovery procedures;

18. Sampling equipment leak check results;

19. Description of quality assurance procedures;

20. Description of analytical procedures;

21. Notation of sample blank corrections; and

22. Sample emission calculations.

(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. part 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.

(i) Visible emissions observations of modular, multiple-stack, negative pressure or positive pressure fabric filters shall occur at least once per day of operation. The observations shall occur when the furnace is operating in the melting and refining period. These observations shall be taken in accordance with Method 9 and, for at least three 6-minute periods, the opacity shall be recorded for any point(s) where visible emissions are observed. Where it is possible to determine that a number of visible emission sites relate to only one incident of the visible emissions, only one set of three 6-minute observations will be required. In this case Reference Method 9 observations must be made for the site of highest opacity that directly relates to the cause (or location) of visible emissions observed during a single incident. Records shall be maintained of any 6-minute average that is in excess of the emission limit specified in sub. (3) (a).

(j) Unless the presence of inclement weather makes concurrent testing infeasible the owner or operator shall conduct concurrently the performance tests required under s. NR 440.08 to demonstrate compliance with sub. (3) (a) 1., 2., and 3.

(7) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) Operation at a furnace static pressure that exceeds the value established under sub. (5) (f) and either operation of control system fan motor amperes at values exceeding ± 15% of the value established under sub. (5) (c) or operation at flow rates lower than those established under sub. (5) (c) may be considered by the department to be unacceptable operation and maintenance of the affected facility. Operation at such values shall be reported to the department semi-annually.

(b) When the owner or operator of an EAF is required to demonstrate compliance with the standard under sub. (6) (g) 2. or 3. the owner or operator shall obtain approval from the department of the procedure(s) that will be used to determine compliance. Notification of the procedure to be used must be postmarked 30 days prior to the performance test.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (1) (a) and (b), (20 (g), (3) (a) 3. intro., a. to c., (5) (b) and (c), (6) (a) 1., 3. and 4., (b) (b) and (c), renum. (5) (e), (f) and (g) to be (5) (f), (g) and (h), cr. (4) (c), (5) (e) and (i), (6) (a) 5., (6) (i) and (j) and (7), Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (a) (intro.), (4) (c) and (5) (c), r. (5) (d), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.445 Steel plants: electric arc furnaces and argon-oxygen decarburization vessels constructed after August 17, 1983. (1) APPLICABILITY. (a) The provisions of this section are applicable to the following facilities in steel plants that produce carbon, alloy, or specialty steels: electric arc furnaces, argon-oxygen decarburization vessels and dust-handling systems.

(b) The provisions of this section apply to each affected facility identified in par. (a) that commences construction, modification, or reconstruction after August 17, 1983.

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

(a) "Argon-oxygen decarburization vessel" (AOD vessel) means any closed-bottom, refractory-lined converter vessel with submerged tuyeres through which gaseous mixtures containing argon and oxygen or nitrogen may be blown into molten steel for further refining.

(b) "Capture system" means the equipment (including ducts, hoods, fans, dampers, etc.) used to capture or transport particulate matter generated by an electric arc furnace or AOD vessel to the air pollution control device.

(c) "Charge" means the addition of iron and steel scrap or other materials into the top of an electric arc furnace or the addition of molten steel or other materials into the top of an AOD vessel.

(d) "Control device" means the air pollution control equipment used to remove particulate matter from the effluent gas stream generated by an electric arc furnace or AOD vessel.

(e) "Direct-shell evacuation control system" (DEC system) means a system that maintains a negative pressure within the electric arc furnace above the slag or metal and ducts emissions to the control device.

(f) "Dust-handling system" means equipment used to handle particulate matter collected by the control device for an electric arc furnace or AOD vessel subject to this section. For the purposes of this section the dust-handling system shall consist of the control device dust hoppers, the dust-conveying equipment, any central dust storage equipment, the dust-treating equipment (e.g., pug mill, pelletizer), dust transfer equipment (from storage to truck) and any secondary control devices used with the dust transfer equipment.

(g) "Electric arc furnace" (EAF) means a furnace that produces molten steel and heats the charge materials with electric arcs from carbon electrodes. For the purposes of this section an EAF shall consist of the furnace shell and roof and the transformer. Furnaces that continuously feed direct-reduced iron ore pellets as the primary source of iron are not affected facilities within the scope of this definition.

(h) "Heat cycle" means the period beginning when scrap is charged to an empty EAF and ending when the EAF tap is completed or beginning when molten steel is charged to an empty AOF vessel and ending when the AOD vessel tap is completed.

(i) "Melting" means that phase of steel production cycle during which the iron and steel scrap is heated to the molten state.

(j) "Negative-pressure fabric filter" means a fabric filter with the fans on the downstream side of the filter bags.

(k) "Positive-pressure fabric filter" means a fabric filter with the fans on the upstream side of the filter bags.

(l) "Refining" means the phase of the steel production cycle during which undesirable elements are removed from the molten steel and alloys are added to reach the final metal chemistry.

(m) "Shop" means the building which houses one or more EAF's or AOD vessels.

(n) "Shop opacity" means the arithmetic average of 24 observations of the opacity of emissions from the shop taken in accordance with Method 9 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

(o) "Tap" means the pouring of molten steel from an EAF or AOD vessel.

(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 EAF or an AOD vessel 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; and

3. Exit from a shop and, due solely to the operations of any affected EAF(s) or AOD vessel(s), exhibit 6% 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 cause to be discharged into the atmosphere from the dust-handling system any gases that exhibit 10% opacity or greater.

(4) EMISSION MONITORING. (a) Except as provided under pars. (b) and (c) a continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from the control device(s) shall be installed, calibrated, maintained and operated by the owner or operator subject to the provisions of this section.

(b) No continuous monitoring system is required on any control device serving the dust-handling system.

(c) No continuous monitoring system is required on modular, multiple-stack, negative-pressure or positive-pressure fabric filters if observations of the opacity of the visible emissions from the control device are performed by a certified visible emission observer in accordance with sub. (6) (c).

(5) MONITORING OF OPERATIONS. (a) The owner or operator subject to the provisions of this section shall maintain records of the following information:

1. All data obtained under par. (b); and

2. All monthly operational status inspections performed under par. (c).

(b) Except as provided under par. (d), the owner or operator subject to the provisions of this section shall check and record on a once-per-shift basis the furnace static pressure (if DEC system is in use) and either check and record the control system fan motor amperes and damper position and a once-per-shift basis, or install, calibrate and maintain a monitoring device that continuously records the volumetric flow rate through each separately ducted hood. The monitoring device may be installed 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 ± 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. part 60, Appendix A, incorporated by reference in s. NR 440.17.

(c) When the owner or operator of an affected facility is required to demonstrate compliance with the standards under sub. (3) (a) 3. and at any other time, the department may require that either the control system fan motor amperes and all damper positions or the volumetric flow rate through each separately ducted hood shall be determined during all periods in which a hood is operated for the purpose of capturing emissions from the affected facility subject to par. (b). The owner or operator may petition the department for reestablishment of these parameters whenever the owner or operator can demonstrate to the department's satisfaction that the affected facility operating conditions upon which the parameters were previously established are no longer applicable. The values of these parameters as determined during the most recent demonstration of compliance shall be maintained at the appropriate level for each applicable period. Operation at other than baseline values may be subject to the requirements of sub. (7) (c).

(d) The owner or operator shall perform monthly operational status inspections of the equipment that is important to the performance of the total capture system (i.e., pressure sensors, dampers and damper switches). This inspection shall include observations of the physical appearance of the equipment (e.g., presence of holes in ductwork or hoods, flow constrictions caused by dents or accumulated dust in ductwork and fan erosion). Any deficiencies shall be noted and proper maintenance performed.

Note: Under 40 C.F.R. s. 60.274a (e), the owner or operator may petition the administrator to approve any alternative to monthly operational status inspections that will provide a continuous record of the operation of each emission capture system.

(f) If emissions during any phase of the heat time are controlled by the use of a DEC system the owner or operator shall install, cablibrate and maintain a monitoring device that allows the pressure in the free space inside EAF to be monitored. The monitoring device may be installed in any appropriate location in the EAF or DEC duct prior to the introduction of ambient air such that reproducible results will be obtained. The pressure monitoring device shall have an accuracy of ±5mm of water gauge over its normal operating range and shall be calibrated according to the manufacturer's instruction.

(g) When the owner or operator of an EAF controlled by a DEC 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 melting and refining period(s) using the monitoring device required under par. (f). The owner or operator may petition the department for reestablishment of the 15-minute integrated average of the 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 over no longer applicable. The pressure determined during the most recent demonstration of compliance shall be maintained at all times when 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.

(h) During any performance test required under s. NR 440.08 and for any report thereof required by sub. (6) (d), or to determine compliance with sub. (3) (a) 3., the owner or operator shall monitor the following information for all heats covered by the test:

1. Charge weights and materials and tap weights and materials;

2. Heat times, including start and stop times, and a log of process operation including periods of no operation during testing and the pressure inside an EAF when direct-shell evacuation control system are used;

3. Control device operation log; and

4. Continuous monitor or Reference Method 9 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17., data.

(6) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. part 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 1 for sample and velocity traverses;

2. Method 2 for velocity and volumetric flow rate;

3. Method 3 for gas analysis;

4. Either Method 5 for negative-pressure fabric filters and other types of control devices or Method 5D for positive-pressure fabric filters for concentration or particulate molten and associated moisture content; and

5. Method 9 for the opacity of visible emissions.

(b) For Method 5 or 5D the sampling time for each run shall be at least 4 hours. When a single EAF or AOD vessel 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. For Method 5 or 5D the minimum sample volume shall be 4.5 dscm (160 dscf).

(c) Visible emissions observations of modular, multiple-stack, negative-pressure or positive-pressure fabric filters shall occur at least once per day of operation. The observations shall occur when the furnace or vessel is operating in the melting or refining phase of a heat cycle. These observations shall be taken in accordance with Method 9 and, for at least three 6-minute periods, the opacity shall be recorded for any point(s) where visible emissions are observed. Where it is possible to determine that a number of visible emission sites relate to only one incident of the visible emissions only one set of three 6-minute observations will be required. In this case Reference Method 9 observations must be made for the site of highest opacity that directly relates to the cause (or location) of visible emissions observed during a single incident. Records shall be maintained of any 6-minute average that is in excess of the emission limit specified in sub. (3).

(d) For the purpose of this section the owner or operator shall conduct the demonstration of compliance with sub. (3) (a) and furnish the department a written report of the results of the test. This report shall include the following information:

1. Facility name and address;

2. Plant representative;

3. Make and model of process, control device, and continuous monitoring equipment;

4. Flow diagram of process and emission capture equipment including other equipment or process(es) ducted to the same control device;

5. Rated (design) capacity of process equipment;

6. Those data required under sub. (5) (h):

a. List of charge and tap weights and materials;

b. Heat times and process log;

c. Control device operation log; and

d. Continuous monitor or Reference Method data.

7. Test dates and test times;

8. Test company;

9. Test company representative;

10. Test observers from outside agency;

11. Description of test methodology used, including any deviation from standard reference methods;

12. Schematic of sampling location;

13. Number of sampling points;

14. Description of sampling equipment;

15. Listing of sampling equipment calibrations and procedures;

16. Field and laboratory data sheets;

17. Description of sample recovery procedures;

18. Sampling equipment leak check results;

19. Description of quality assurance procedures;

20. Description of analytical procedures;

21. Notation of sample blank corrections; and

22. Sample emission calculations.

(e) During any performance test required under s. NR 440.08 no gaseous diluents may be added to the effluent gas streams after the fabric in any pressurized fabric filter collector, unless the amount of dilution is separately determined and considered in the determination of emissions.

(f) When more than one control device serves the EAF or AOD vessel being tested the concentration of particulate matter shall be determined using the following equation:

$$C = \frac{\sum_{n=1}^{N} (CQ)_n}{\sum_{n=1}^{N} (Q)_n}$$

where:

C = concentration of particulate matter in mg/dscm (gr/dscf) as determined by Method 5 or 5D.

N = total number of control devices tested.

Q = volumetric flow rate of the effluent gas stream in dscm/hr (dscf/hr) as determined by Method 2.

$(CQ)_n$, $(Q)_n$ = value of the applicable parameter for each control device tested.

(g) 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.

(h) Where emissions from any EAF or AOD vessel 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 that compensates for the emissions from the facilities not subject to the provisions of this section or;

3. Any combination of the criteria of subd. 1. and 2.

(i) Where emissions from any EAF or AOD vessel are combined with emissions from facilities not subject to the provisions of this section determinations of compliance with sub. (3) (a) 3. will only be based upon emissions originating from the affected facility(ies).

(j) Unless the presence of inclement weather makes concurrent testing infeasible the owner or operator shall conduct concurrently the performance tests required under s. NR 440.08 to demonstrate compliance with sub. (3) (a) 1., 2. and 3.

(7) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) Records of the measurements required in sub. (5) must be retained for at least 2 years following the date of the measurement.

(b) Each owner or operator shall submit a written report of exceedances of the control device opacity to the department semi-annually. For the purposes of these reports exceedances are defined as all 6-minute periods during which the average opacity is 3% or greater.

(c) Operation at a furnace static pressure that exceeds the value established under sub. (5) (g) and either operation of control system fan motor amperes at values exceeding ± 15% of the value established under sub. (5) (c) or operation at flow rates lower than those established under sub. (5) (c) may be considered by the department to be unacceptable operation and maintenance of the affected facility. Operation at such values shall be reported to the department semi-annually.

(e) When the owner or operator of an EAF or AOD is required to demonstrate compliance with the standard under sub. (6) (h) 2. or 3. the owner or operator shall obtain approval from the department of the procedure that will be used to determine compliance. Notification of the procedure to be used must be postmarked 30 days prior to the performance test.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), (3) (b), (4) (b) and (c), r. (5) (e) and (7) (d) Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.45 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, 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) Except as noted in sub. (4) (a) 1. d., 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, terms not defined in this subsection have the meanings given 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. Diffusion washers are excluded from this definition.

(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. part 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 0.10 g/kg black liquor solids, dry weight (0.20 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 gr/dscf) corrected to 10% oxygen, when liquid fossil fuel is burned.

(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 or condensate stripper system any gases which contain TRS in excess of 5.0 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 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 or condensate stripper 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 5.0 ppm by volume on a dry basis, corrected to the actual oxygen content of the untreated gas stream.

f. The uncontrolled exhaust gases from a new, modified, or reconstructed digester system contain TRS less than 0.0050 g/kg air dried pulp (0.010 lb/ton air dried pulp).

2. From any straight kraft recovery furnace any gases which contain TRS in excess of 5.0 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 0.016 g/kg black liquor solids, as H_2S (0.033 lb/ton black liquor solids, as H_2S).

5. From any lime kiln any gases which contain TRS in excess of 8.0 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, or condensate stripper system, except where the provisions of sub. (4) (a) 1.c. or d. apply. These systems shall be located downstream of the control devices 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. For any incinerator, 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 ± 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

4. Record once per shift measurements obtained from the continuous monitoring devices installed under par. (b) 2.

(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 semiannually 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 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. c. 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. part 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. part 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. part 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. part 60, Appendix A, incorporated by reference in s. NR 440.17 shall be used:

1. Method 16 or, at the discretion of the owner or operator, Method 16A or 16B, 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, 16A or 16B and the black liquor solids feed rate in the following equation to determine the TRS emission rate on an equivalent hydrogen sulfide (H_2S) basis.

$E = (C_{TRS})\ (F)\ (Q_{sd})/BLS$

where:

E is the mass of TRS emitted per unit of black liquor solids, g/kg (lb/ton)

C_{TRS} is the average combined concentration of TRS as determined by Method 16, 16A or 16B during the test period, ppm

F = is 0.001417 g H_2S/m^3-ppm for metric units,

= 0.08844 lb H_2S/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 (ton/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:

$GLS = 100\ C_{Na_2S}/(C_{Na_2S} + C_{NaOH} + C_{Na_2CO_3})$

where:

GLS is the percent green liquor sulfidity

C_{Na_2S} is the average concentration of Na_2S expressed as Na_2O (mg/l)

C_{NaOH} is the average concentration of NaOH expressed as Na_2O (mg/l)

$C_{Na_2CO_3}$ is the average concentration of Na_2CO_3 expressed as Na_2O (mg/l)

5. When determining compliance with sub. (4) (a) 1.f. use the results of Methods 2 and 16 of 40 C.F.R., part 60, Appendix A, incorporated by reference in s. NR 440.17, and the pulp production rate in the equation specified in subd. 3., except substitute the pulp production rate (PPR) [kg/hr (tons/hr)] for the black liquor solids feed rate (BLS).

(e) All concentrations of particulate matter and TRS required to be measured by this subsection 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; cr. (4) (a) 1. f. and (6) (d) 5., Register, September, 1986, No. 369, eff. 10-1-86; am. (1) (a) and (b), (2) (intro.) and (c), (3) (a) 2., (4) (a) 1. intro., d. and f., 2., 4. and 5., (5) (a) 2. intro., (b) 1., (a) (intro.), 3. intro. and b., (6) (d) 1., cr. (5) (c) 4., r. recr. (6) (d) 3., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.46 Glass manufacturing plants. (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, terms not defined in this subsection have the meanings given 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 glass product composition of the following approximate ranges of weight proportions: 60 to 80% silicon dioxide, 4 to 10% total R_2O (e.g., Na_2O and K_2O), 5 to 35% boric oxides and 0 to 13% other oxides.

(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.

(cm) "Experimental furnace" means a glass melting furnace with the sole purpose of operating to evaluate glass melting processes, technologies, or glass products. An experimental furnace does not produce glass that is sold (except for further research and development purposes) or that is used as a raw material for nonexperimental furnaces.

(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.

(dm) "Flow channels" means appendages used for conditioning and distributing molten glass to forming apparatuses and are a permanently separate source of emissions such that no mixing of emissions occurs with emissions from the melter cooling system prior to their being vented to the atmosphere.

(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 and flow channels in wool fiberglass and textile 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 glass product composition of the following ranges of weight proportions: 50 to 60% silicon dioxide, 18 to 35% lead oxides, 5 to 20% total R_2O (e.g., Na_2O and K_2O), 0 to 8% total R_2O_3 (e.g., Al_2O_3), 0 to 15% total RO (e.g., CaO, MgO), other than lead oxide, and 5 to 10% other oxides.

(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 glass product composition of the following ranges of weight proportions: 60 to 75% silicon dioxide, 10 to 17% total R_2O (e.g., Na_2O and K_2O), 8 to 20% total RO but not to include any PbO (e.g., CaO and MgO), 0 to 8% total R_2O_3 (e.g., Al_2O_3) and 1 to 5% other oxides.

(km) "Textile fiberglass" means fibrous glass in the form of continuous strands having uniform thickness.

(ks) "With modified-processes" means using any technique designed to minimize emissions without the use of add-on pollution controls.

(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 1, 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 1 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 $(1 - Y)$

Table 1 — Emission Rates
[g of particulate/kg of glass produced]

COL. 1 — Glass manufacturing plant industry segment	COL. 2 — Furnace fired with gaseous fuel	COL. 3 — Furnace fired with liquid fuel
Container glass	0.10	0.13
Pressed and blown glass		
(a) Borosilicate Recipes	0.50	0.65
(b) Soda-Lime and Lead Recipes	0.10	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

(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.

(d) An owner or operator of an experimental furnace is not subject to the requirements of this section.

(e) During routine maintenance of add-on pollution controls an owner or operator of a glass melting furnace subject to the provisions of sub. (3) (a) is exempt from the provisions of this subsection if:

1. Routine maintenance in each calendar year does not exceed 6 days;

2. Routine maintenance is conducted in a manner consistent with good air pollution control practices for minimizing emissions; and

3. A report is submitted to the department 10 days before the start of the routine maintenance (if 10 days cannot be provided the report must be submitted as soon as practicable) and the report contains an explanation of the schedule of the maintenance.

(4) STANDARDS FOR PARTICULATE MATTER FROM GLASS MELTING FURNACE WITH MODIFIED-PROCESSES. (a) An owner or operator of a glass melting furnaces with modified-processes is not subject to the provisions of sub. (3) if the affected facility complies with the provision of this subsection.

(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 of a glass melting furnace with modified processes subject to the provisions of this section may cause to be discharged into the atmosphere from the affected facility:

1. Particulate matter at emission rates exceeding 0.50 gram of particulate per kilogram of glass produced (g/kg) as measured according to par. (e) for container glass, flat glass and pressed and blown glass with a soda-lime recipe melting furnace.

2. Particulate matter at emission rates exceeding 1.0 g/kg as measured according to par. (e) for pressed and blown glass with a borosilicate recipe melting furnace.

3. Particulate matter at emission rates exceeding 0.50 g/kg as measured according to par. (e) for textile fiberglass and wool fiberglass melting furnaces.

(c) The owner or operator of an affected facility that is subject to emission limits specified under par. (b) shall:

1. Install, calibrate, maintain and operate a continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from the affected facility.

2. During the performance test required to be conducted by s. NR 440.08 conduct continuous opacity monitoring during each test run.

3. Calculate 6-minute opacity averages from 24 or more data points equally spaced over each 6-minute period during the test runs.

4. Determine, based on the 6-minute opacity averages, the opacity value corresponding to the 97.5% upper confidence level of a normal distribution of average opacity values.

5. For the purposes of s. NR 440.07 report to the department as excess emissions all of the 6-minute periods during which the average opacity, as measured by the continuous monitoring system installed under par. (c) 1., exceeds the opacity value corresponding to the 97.5% upper confidence level determined under par. (c) 4.

(d) 1. After receipt and consideration of written application the department may approve alternative continuous monitoring systems for the measurement of one or more process or operating parameters that is or are demonstrated to enable accurate and representative monitoring of an emission limit specified in par. (b) 1.

2. After the department approves an alternative continuous monitoring system for an affected facility, the requirements of par. (c) 1. to 5. will not apply for that affected facility.

3. An owner or operator may redetermine the opacity value corresponding to the 97.5% upper confidence level as described in par. (c) 4. if the owner or operator:

a. Conducts continuous opacity monitoring during each test run of a performance test that demonstrates compliance with an emission limit of par. (b),

b. Recalculates the 6-minute opacity averages as described in par. (c) 3., and

c. Uses the redetermined opacity value corresponding to the 97.5% upper confidence level for the purposes of par. (c) 5.

(e) Test methods and procedures as specified under sub. (7) shall be used to determine compliance with this section except that to determine compliance for any glass melting furnace using modified processes and fired with either a gaseous fuel or a liquid fuel containing less than 0.50 weight percent sulfur, Method 5 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used with the probe and filter holder heating system in the sampling train set to provide a gas temperature of 120 ± 14°C.

(7) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. part 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 subs. (3) and (4) 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. part 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:

$$E = Q \times C$$

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. part 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:

$$R = (E - A)/P$$

where:

R is the furnace emission 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 for 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.

(g) If an owner or operator changes an affected facility from a glass melting furnace without modified processes or from a glass melting furnace without modified processes to a glass melting furnace with modified processes the owner or operator shall notify the department 60 days before the change is scheduled to occur.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (b), (e), (h) and (k), (7) (a) (intro.), cr. (2) (cm), (dm), (km), (ks), (3) (d) and (e), (4) and (7) (g), Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), (3) (a) 1., 2. and Table, (4) (b), (intro.), 1. and 3., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.47 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, terms not defined in this subsection have the meanings given 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. 0.010 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 administrator'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. part 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. part 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 storage capacity with no increase in hourly grain handling capacity.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am (2) (intro.), (3) (b) 1. and (d) 3., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.48 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.

(c) Any owner or operator of a metal furniture surface coating operation that uses less than 3,842 liters of coating (as applied) per year and keeps purchase or inventory records or other data necessary to substantiate annual coating usage shall be exempt from all other provisions of this section. These records shall be maintained at the source for a period of at least 2 years.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given 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. "Flashoff 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 topcoat operation and includes the coating application station or stations, flashoff 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 (VOCs), expressed as kilograms of VOCs per liter of coating solids.

13. "VOC emissions" means the mass of volatile organic compounds (VOCs), expressed as kilograms of VOCs per liter of applied coating solids, emitted from a metal furniture surface coating operation.

(b) As used in this section, symbols not defined in this paragraph have the meanings given 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 VOCs emitted by an affected facility that enters the control device (fraction).

9. G = the volume-weighted average mass of VOCs 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 VOCs in coatings consumed as received (kilograms).

16. M_r = the mass of VOCs 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 VOCs 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.

(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 VOCs 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. part 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 VOCs 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 VOCs consumed per unit volume of coating solids applied (G) each calendar month shall be determined by the following procedures.

1) Calculate the mass of VOCs used ($M_o + M_d$) during each calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

($\Sigma L_{dj} D_{dj}$ 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 1. 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 1 — Transfer Efficiencies

Application methods	Transfer efficiency (T)
Air atomized spray	0.25
Airless spray	0.25
Manual electrostatic spray	0.60
Nonrotational automatic electrostatic spray	0.70
Rotating head electrostatic spray (manual and automatic)	0.80
Dip coat and flow coat	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:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{p} L_{cik} V_{sik} T_k}{L_s}$$

where:

n is the number of coatings used

p is the number of application methods used

3) Calculate the volume-weighted average mass of VOCs 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 VOCs 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 VOCs (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 VOCs 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:

$$E = \frac{\sum_{i=1}^{n} Q_{bi} \quad C_{bi} - \sum_{j=1}^{m} C_{aj} \quad Q_{aj}}{\sum_{i=1}^{n} Q_{bi} \quad C_{bi}}$$

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 VOCs 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:

$$N = G(1\text{-}R)$$

d. If the volume weighted average mass of VOCs 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 VOCs (e.g., carbon adsorber) to comply with the applicable emission limit specified under sub. (3).

a. Calculate the total mass of VOCs consumed (M_o + M_d) and the volume-weighted average of the total mass of VOCs 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 VOCs recovered (M_r during each calendar month using the following equation:

$$M_r = L_T D_r$$

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 VOCs emitted to the atmosphere (N) for each calendar month for each affected facility using the equation in subd. 2.c.

e. If the weighted average mass of VOCs 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 VOCs 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. part 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 VOCs 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 VOCs 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 VOCs 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. part 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. part 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. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; cr. (1) (c), am. (2) (a) (intro.) and (b) (intro.), Register September, 1990, No. 417, eff. 10-1-90.

NR 440.50 Stationary gas turbines. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) 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.

(b) Any facility under par. (a) which commences construction, modification, or reconstruction after October 3, 1977, is subject to the requirements of this section except as provided in sub. (3) (e) and (j).

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given 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° Kelvin, 60% relative humidity and 101.3 kilopascals pressure.

(k) "Ice fog" means an atmospheric suspension of highly reflective ice crystals.

(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.

(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:

$$STD = 0.0075 \quad \frac{(14.4)}{Y} \quad + F$$

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
$0.015 < N \leq 0.1$	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 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 administrator before the initial performance test required by s. NR 440.08.

Note: The administrator will publish notices of approval of custom ambient condition correction factors in the federal register.

(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 manufacturer's rated base load at ISO conditions of 30 megawatts or less except as provided in par. (b) shall comply with the provisions of par. (a) 2.

(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. part 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:

$$NO_x = NO_{x_{obs}} \left(\frac{P_{ref}}{P_{obs}} \right)^{0.5} e^{19(H_{obs} - 0.00633)} \left(\frac{T_{AMB}}{288K} \right)^{1.53}$$

where:

NO_x is the emissions of NO_x at 15% oxygen and ISO standard day conditions

$NO_{x_{obs}}$ 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 administrator before the initial performance test required by s. NR 440.08.

Note: The administrator will publish notices of approval of custom ambient condition correction factors in the federal register.

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. part 60, Appendix A, incorporated by reference in s. NR 440.17, for the concentration of sulfur dioxide and oxygen or

2. a. ASTM D2880-78 for the sulfur content of liquid fuels and ASTM D1072-80, D3031-81, D4084-82, or D3246-81 for the sulfur content of gaseous fuels. These methods are incorporated by reference in s. NR 440.17. These methods shall also be used to comply with sub. (5) (b).

b. The applicable ranges of some ASTM methods mentioned in subpar. a. are not adequate to measure the levels of sulfur in some fuel gases. Dilution of samples prior to analysis (with verification of the dilution ratio) is allowable subject to the approval of the department.

(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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (3) (d), renum. (6) (b) 2. to be 2. a. and am., cr. (6) (b) 2. b., Register, September, 1986, No. 369, eff. 10-1-86; renum. (1) to be (1) (a), cr. (1) (b), am. (2) (intro.), (3) (a) 3., (6) (a) 1. b. and (b) 2. a., r. (2) (o), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.51 Lime manufacturing plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to each rotary lime kiln used in the manufacture of lime.

(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, terms not defined in this subsection have the meanings given in s. NR 440.02.

(a) "Lime manufacturing plant" means any plant which uses a rotary lime kiln to produce lime product from limestone by calcination.

(b) "Lime product" means the product of the calcination process including, but not limited to, calcitic lime, dolomitic lime and dead-burned dolomite.

(c) "Positive-pressure fabric filter" means a fabric filter with the fans on the upstream side of the filter bags.

(d) "Rotary lime kiln" means a unit with an inclined rotating drum which is used to produce a lime product from limestone by calcination.

(e) "Stone feed" means limestone feedstock and millscale or other iron oxide additives that become part of the product.

(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 rotary lime kiln any gases which:

1. Contain particulate matter in excess of 0.30 kilogram per megagram of stone feed (0.60 lb/ton).

2. Exhibit greater than 15% opacity when exiting from a dry emission control device.

(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 pars. (b) and (c), 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 having a control device with a multiple stack exhaust or a roof monitor may, in lieu of the continuous opacity monitoring requirements of par. (a), monitor visible emissions at least once per day of operation by using a certified visible emissions observer who, for each site where visible emissions are observed, will perform 3 Reference Method 9 tests and record the results. (Reference Method 9 of 40 C.F.R. part 60, Appendix A, is incorporated by reference in s. NR 440.17). Visible emission observation shall occur during normal operation of the rotary lime kiln at least once per day. For at least 3 6-minute periods, the opacity shall be recorded for any points where visible emissions are observed, and the corresponding feed rate of the kiln shall also be recorded. Records shall be maintained of any 6-minute average that is in excess of the emissions specified in sub. (3) (a).

(c) 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.

(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 stone feed to any affected rotary lime kiln. 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 greater than 15% or, in the case of wet scrubbers, any period in which the scrubber pressure drop is greater than 30% below the rate established during the performance test. Reports of excess emissions recorded during observations made as required by sub. (5) (c) shall be submitted semi-annually.

(5) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. part 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 1 for sample and velocity traverses,

2. Method 2 for velocity and volumetric flow rate,

3. Method 3 for gas analysis,

4. Method 4 for stack gas moisture,

5. Method 5 or 5D for the measurement of particulate matter; and

6. Method 9 for visible emissions.

(b) For Method 5 or 5D of 40 C.F.R. part 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^3a/hr, dry basis, (0.53 dscf/min). Shorter sampling times, when necessitated by process variables or other factors, may be approved by the department.

(c) Visible emission observations of a control device with a multiple stack exhaust or a roof monitor shall occur during normal operation of the rotary lime kiln at least once per day of operation. For at least 3 6-minute periods, the opacity shall be recorded for any point(s) where visible emissions are observed and the corresponding feed rate of the kiln shall also be recorded. These observations shall be taken in accordance with Method 9 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17. Records shall be maintained of any 6-minute average that is in excess of the emissions limit specified in sub. (3) (a).

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (1) (a), (2), (3) (a), (4) and (5), Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), (4) (b) and (5) (c), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.52 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, terms not defined in this subsection have the meanings given 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. part 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. part 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:

$$S_e = \sum_{a=1}^{N} S_a \left(Q_{sd_a}/Q_{sd_T}\right)$$

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_a} 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. part 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. part 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.

(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)

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.525 Metallic mineral processing plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities in metallic mineral processing plants: each crusher and screen in open-pit mines; each crusher, screen, bucket elevator, conveyor belt transfer point, thermal dryer, product packaging station, storage bin, enclosed storage area, truck loading station, truck unloading station, railcar loading station and railcar unloading station at the mill or concentrator with the following exceptions. All facilities located in underground mines are exempted from the provisions of this section. At uranium ore processing plants all facilities subsequent to and including the beneficiation of uranium ore are exempted from the provisions of this section.

(b) An affected facility under par. (a) that commences construction or modification after August 24, 1982, is subject to the requirements of this section.

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

(a) "Bucket elevator" means a conveying device for metallic minerals consisting of a head and foot assembly that supports and drives an endless single or double strand chain or belt to which buckets are attached.

(b) "Capture system" means the equipment used to capture and transport particulate matter generated by one or more affected facilities to a control device.

(c) "Control device" means the air pollution control equipment used to reduce particulate matter emissions released to the atmosphere from one or more affected facilities at a metallic mineral processing plant.

(d) "Conveyor belt transfer point" means a point in the conveying operation where the metallic mineral or metallic mineral concentrate is transferred to or from a conveyor belt except where the metallic mineral is being transferred to a stockpile.

(e) "Crusher" means a machine used to crush any metallic mineral and includes feeders or conveyors located immediately below the crushing surfaces. Crushers include, but are not limited to, the following types: jaw, gyratory, cone and hammermill.

(f) "Enclosed storage area" means any area covered by a roof under which metallic minerals are stored prior to future processing or loading.

(g) "Metallic mineral concentrate" means a material containing metallic compounds in concentrations higher than naturally occurring in ore but requiring additional processing if pure metal is to be isolated. A metallic mineral concentrate contains at least one of the following metals in any of its oxidation states and at a concentration that contributes to the concentrate's commercial value: aluminum, copper, gold, iron, lead, molybdenum, silver, titanium, tungsten, uranium, zinc and zirconium. This definition may not be construed as requiring that material containing metallic compounds be refined to a pure metal in order for the material to be considered a metallic mineral concentrate to be covered by the standards.

(h) "Metallic mineral processing plant" means any combination of equipment that produces metallic mineral concentrates from ore. Metallic mineral processing commences with the mining of ore and includes all operations either up to and including the loading of wet or dry concentrates or solutions of metallic minerals for transfer to facilities at nonadjacent locations that will subsequently process metallic concentrates into purified metals (or other products) or up to and including all material transfer and storage operations that precede the operations that produce refined metals (or other products) from metallic mineral concentrates at facilities adjacent to the metallic mineral processing plant. This definition may not be construed as requiring that mining of ore be conducted in order for the combination of equipment to be considered a metallic mineral processing plant. (See also the definition of "metallic mineral concentrate.")

(i) "Process fugitive emissions" means particulate matter emissions from an affected facility that are not collected by a capture system.

(j) "Product packaging station" means the equipment used to fill containers with metallic compounds or metallic mineral concentrates.

(k) "Railroad loading station" means that portion of a metallic mineral processing plant where metallic minerals or metallic mineral concentrates are loaded by a conveying system into railcars.

(l) "Railcar unloading station" means that portion of a metallic mineral processing plant where metallic ore is unloaded from a railcar into a hopper, screen or crusher.

(m) "Screen" means a device for separating material according to size by passing undersize material through one or more mesh surfaces (screens) in series and retaining oversize material on the mesh surfaces (screens).

(n) "Stack emissions" means the particulate matter captured and released to the atmosphere through a stack, chimney, or flue.

(o) "Storage bin" means a facility for storage (including surge bins and hoppers) or metallic minerals prior to further processing or loading.

(p) "Surface moisture" means water that is not chemically bound to a metallic mineral or metallic mineral concentrate.

(q) "Thermal dryer" means a unit in which the surface moisture content of a metallic mineral or a metallic mineral concentrate is reduced by direct or indirect contact with a heated gas system.

(r) "Truck loading station" means that portion of a metallic mineral processing plant where metallic minerals or metallic mineral concentrates are loaded by a conveying system into trucks.

(s) "Truck unloading station" means that portion of a metallic mineral processing plant where metallic ore is unloaded from a truck into a hopper, screen, or crusher.

(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 affected facility any stack emissions that:

1. Contain particulate matter in excess of 0.050 grams per dry standard cubic meter.

2. Exhibit greater than 7% opacity unless the stack emissions are discharged from an affected facility using a wet scrubbing emission control device.

(b) On and after the sixtieth day after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial start-up, no owner or operator subject to the provisions of this section may cause to be discharged into the atmosphere from an affected facility any process fugitive emissions that exhibit greater than 10% opacity.

(4) RECONSTRUCTION. (a) The cost of replacement of ore-contact surfaces on processing equipment may not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital cost that would be required to construct a comparable new facility" under s. NR 440.15. Ore-contact surfaces are: crushing surfaces; screen meshes; bars, and plates; conveyor belts; elevator buckets; and pan feeders.

(b) Under s. NR 440.15 the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components (except components specified in par. (a) that are or will be replaced pursuant to all continuous programs of component replacement commenced within any 2-year period following August 24, 1982.

(5) MONITORING OF OPERATIONS. (a) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device for the continuous measurement of the change in pressure of the gas stream through the scrubber for any affected facility using a wet scrubber emission control device. The monitoring device must be certified by the manufacturer to be accurate within ± 250 pascals (± 1 inch water) gauge pressure and must be calibrated on an annual basis in accordance with manufacturer's instructions.

(b) The owner or operator subject to the provisions of this section shall install, calibrate, maintain and operate a monitoring device for the continuous measurement of the scrubbing liquid flow rate to a wet scrubber for any affected facility using any type of wet scrubbing emission control device. The monitoring device must be certified by the manufacturer to be accurate within ± 5% of design scrubbing liquid flow rate and must be calibrated on at least an annual basis in accordance with manufacturer's instructions.

(6) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) The owner or operator subject to the provisions of this section shall conduct a performance test and submit to the department a written report of the results of the test as specified in s. NR 440.08 (1).

(b) During the initial performance test of a wet scrubber, and at least weekly thereafter, the owner or operator shall record the measurements of both the change in pressure of the gas stream across the scrubber and the scrubbing liquid flow rate.

(c) After the initial performance test of a wet scrubber the owner or operator shall submit semi-annual reports to the department of occurrences when the measurements of the scrubber pressure loss (or gain) and liquid flow rate differ by more than ± 30% from those measurements recorded during the most recent performance test.

(d) The reports required under par. (c) shall be postmarked within 30 days following the end of the second and fourth calendar quarters.

(7) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. part 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 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;

5. Method 9 for measuring opacity from stack emissions and process fugitive emissions.

(b) For Method 5 the following stipulations shall apply:

1. The sampling probe and filter holder may be operated without heaters if the gas stream being sampled is at ambient temperature;

2. For gas streams above ambient temperature the sampling train shall be operated with a probe and filter temperature slightly above the effluent temperature (up to a minimum filter temperature of 121°C (250°F) in order to prevent water condensation on the filter;

3. The minimum sample volume shall be 1.7 dscm (60 dscf).

(c) For Method 9 the following stipulation shall apply: the observer shall read opacity only when emissions are clearly identified as emanating solely from the affected facility being observed.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; renum. to be NR 440.525 and r. (6) (e), am. (2) (intro.), (g), (h), (3) (a) (intro.), 1. and (b), (4) (a), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.53 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 exempart

(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 AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given 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.

6e. "Flashoff area" means the structure on automobile and light-duty truck assembly lines between the coating application system (dip tank or spray booth) and the bake oven.

6g. "Guide coat operation" means the guide coat spray booth, flashoff area and bake ovens which are used to apply and dry or cure a surface coating between the prime coat and topcoat operation on the components of automobile and light-duty truck bodies.

6k. "Light-duty truck" means any motor vehicle rated at 3,850 kilograms gross vehicle weight or less, designed mainly to transport property.

6p. "Plastic body" means an automobile or light-duty truck body constructed of synthetic organic material.

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, flashoff 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, flashoff 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) As used in this section, symbols not defined in this paragraph have the meanings given in s. NR 440.03.

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_{cil} = 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

$$\frac{\text{kilograms of VOC}}{\text{liter of applied solids.}}$$

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

$$\frac{\text{liter solids}}{\text{liter coating.}}$$

25. W_{oi} = proportion of VOC by weight in each coating (i), as received

$$\frac{\text{kilograms VOC}}{\text{kilograms coating.}}$$

(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. part 60, Appendix A, incorporated by reference in s. NR 440.17. The dpartment 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 o f 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:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

($\Sigma L_{dj} D_{dj}$ 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

Note: Under 40 C.F.R. s. 60.393 (c) (1) (i) (C), if the owner or operator can justify to the administrator's satisfaction that other values for transfer efficiencies are appropriate, the administrator will approve their use on a case-by-case basis.

a) When more than one application method (l) 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:

$$T = \frac{\sum_{i=1}^{n} \sum_{l=1}^{p} T_l \quad V_{si} \, L_{cil}}{L_s}$$

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:

$$N = G[1\text{-}FE]$$

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:

$$E = \frac{\sum_{i=1}^{n} Q_{bi} \quad C_{bi} - \sum_{j=1}^{m} Q_{aj} C_{aj}}{\sum_{i=1}^{n} Q_{bi} C_{bi}}$$

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. 1.a.

b. Calculate the total volume of coating solids (L_s) used in each calendar month for each affected facility as described under subd. 1.a.

c. Calculate the mass of VOC recovered (M_r) each calendar month for each affected facility by the following equation: $M_r = L_T D_r$.

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. part 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. part 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 administrator 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 administrator as an alternative method to Method 24. In the event of dispute, Reference Method 24 shall be the referee method.

2. Reference Method 25 or an equivalent or alternative method approved by the administrator 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. part 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. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (a) (intro.), (b) (intro.), (4) (c) 1. a. 3), (7) (a) 1. and 2., cr. (2) (a) 6 e., 6 g., 6 k and 6 p., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.54 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, terms not defined in this subsection have the meanings given 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 (0.060 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. Contain 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.

(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. part 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. part 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:

$$E = \frac{(C_s Q_s)\ 10^{-6}}{M}$$

where:

E is the emissions of particulates in kg/Mg of phosphate rock feed

C_s is the concentration of particulates in mg/dscm as measured by Method 5 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17

Q_s 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

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.) and (3) (a) 1. a., Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.55 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, terms not defined in this subsection have the meanings given 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. part 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. part 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:

$$E = \frac{Q_{sd} \times C_s}{1000}$$

where:

E is the particulate emission rate (kg/hr)

Q_{sd} is the average volumetric flow rate (dscm/hr) as determined by Method 2 of 40 C.F.R. part 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/hr), 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 (kg/hr) from par. (c)

P is the rate of ammonium sulfate production (Mg/hr) from par. (d)

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am (2) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.56 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, terms not defined in this paragraph have the meanings given 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_B = 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_{oi} = 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:

$$(M_w)_a = \sum_{i=1}^{k} (M_{ci})_a (W_{wi})_a + \sum_{i=1}^{m} (L_{ci})_a (D_{ci})_a (W_{wi})_a + \sum_{i=1}^{n} (L_{ci})_a (V_{wi})_a (D_{wi})_a$$

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:

$$P_a = \frac{(M_t)_a - (M_r)_a}{(M_t)_a + (M_v)_a} \times 100$$

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:

$$P_a = \left[\frac{(M_t)_b - (M_r)_b - \frac{P_e}{100}\left[(M_t)_e + (M_v)_e\right]}{(M_t)_a + (M_v)_a}\right] \times 100$$

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:

$$P_f = \left[\frac{(L_t)_f - (L_r)_a - (L_r)_e - (L_r)_b}{(L_t)_f} \right] \times 100$$

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. part 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. part 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).

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (a) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.565 Pressure sensitive tape and label surface coating operations. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each coating line used in the manufacture of pressure sensitive tape and label materials.

(b) Any affected facility which inputs to the coating process 45 Mg of VOC or less per 12 month period is not subject to the emission limits of sub. (3) (a) however, the affected facility is subject to the requirements of all other applicable subsections of this section. If the amount of VOC input exceeds 45 Mg per 12 month period the coating line will become subject to sub. (3) (a) and all other subsections of this section.

(c) This section applies to any affected facility which begins construction, modification, or reconstruction after December 30, 1980.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02, unless the context requires otherwise.

1. "Coating line" means any number or combination of adhesive, release, or precoat coating applicators, flashoff areas and ovens which coat a continuous web, located between a web unwind station and a web rewind station, to produce pressure sensitive tape and label materials.

3. "Coating solids applied" means the solids content of the coated adhesive, release, or precoat as measured by Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

4. "Flashoff area" means the portion of a coating line after the coating applicator and usually before the oven entrance.

5. "Fugitive volatile organic compounds" means any volatile organic compounds which are emitted from the coating applicator and flashoff areas and are not emitted in the oven.

6. "Hood or enclosure" means any device used to capture fugitive volatile organic compounds.

7. "Oven" means a chamber which uses heat or irradiation to bake, cure, polymerize, or dry a surface coating.

8. "Precoat" means a coating operation in which a coating other than an adhesive or release is applied to a surface during the production of a pressure sensitive tape or label product.

9. "Solvent applied in the coating" means all organic solvent contained in the adhesive, release and precoat formulations that is metered into the coating applicator from the formulation area.

10. "Total enclosure" means a structure or building around the coating applicator and flashoff area or the entire coating line for the purpose of confining and totally capturing fugitive VOC emissions.

11. "VOC" means volatile organic compound.

(b) As used in this section, symbols not defined in this subsection have the meanings given in s. NR 440.03.

1. "a" means the gas stream vents exiting the emission control device.

2. "b" means the gas stream vents entering the emission control device.

3. "C_{aj}" means the concentration of VOC (carbon equivalent) in each gas stream (j) exiting the emission control device, in parts per million by volume.

4. "C_{bi}" means the concentration of VOC (carbon equivalent) in each gas stream (i) entering the emission control device, in parts per million by volume.

5. "C_{fk}" means the concentration of VOC (carbon equivalent) in each gas stream (k) emitted directly to the atmosphere, in parts per million by volume.

6. "G" means the calculated weighted average mass (kg) of VOC per mass (kg) of coating solids applied each calendar month.

7. "M_{ci}" means the total mass (kg) of each coating (i) applied during the calendar month as determined from facility records.

8. "M_r" means the total mass (kg) of solvent recovered for a calendar month.

9. "Q_{aj}" means the volumetric flow rate of each affluent gas stream (j) exiting the emission control device, in dry standard cubic meters per hour.

10. "Q_{bi}" means the volumetric flow rate of each effluent gas stream (i) entering the emission control device, in dry standard cubic meters per hour.

11. "Q_{fk}" means the volumetric flow rate of each effluent gas stream (k) emitted to the atmosphere, in dry standard cubic meters per hour.

12. "R" means the overall VOC emission reduction achieved for a calendar month (in percent).

13. "R_q" means the required overall VOC emission reduction (in percent).

14. "W_{oi}" means the weight fraction of organics applied of each coating (i) applied during a calendar month as determined from Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, or coating manufacturer's formulation data.

15. "W_{si}" means the weight fraction of solids applied of each coating (i) applied during a calendar month as determined from Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, or coating manufacturer's formulation data.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. (a) On and after the date on which the performance test required by s. NR 440.08 has been completed each owner or operator subject to this section may:

1. Cause the discharge into the atmosphere from an affected facility not more than 0.20 kg VOC/kg of coating solids applied as calculated on a weighted average basis for one calendar month; or

2. Demonstrate for each affected facility;

a. A 90% overall VOC emission reduction as calculated over calendar months; or

b. The percent overall VOC emission reduction specified in sub. (4) (b) as calculated over a calendar month.

(4) COMPLIANCE PROVISIONS. (a) To determine compliance with sub. (3) the owner or operator of the affected facility shall calculate a weighted average of the mass of solvent used per mass of coating solids applied for one calendar month period according to the following procedures:

1. Determine the weight fraction of organics and the weight fraction of solids of each coating applied by using Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, or by the coating manufacturer's formulation data.

2. Compute the weighted average by the following equation:

$$G = \frac{\sum_{i=1}^{n} W_{oi} M_{ci}}{\sum_{i=1}^{n} W_{si} M_{ci}}$$

3. For each affected facility where the value of G is less than or equal to 0.20 kg VOC per kg of coating solids applied the affected facility is in compliance with sub. (3) (a) 1.

(b) To determine compliance with sub. (a) 2. the owner or operator shall calculate the required overall VOC emission reduction according to the following equation:

$$R_q = \frac{G - 0.20}{G} \times 100$$

If R_q is less than or equal to 90% the required overall VOC emission reduction is R_q. If R_q is greater than 90% the required overall VOC emission reduction is 90%.

(c) Where the compliance with the emission limits specified in sub. (3) (a) 2. is achieved through the use of a solvent recovery system the owner or operator shall determine the overall VOC emission reduction for a one calendar month period by the following equation:

$$R = \frac{M_r}{\sum_{i=1}^{n} W_{oi} \; M_{ci}} \times 100$$

If the R value is equal to or greater than the R_q value specified in par. (b) compliance with sub. (3) (a) 2. is demonstrated.

(d) Where compliance with the emission limit specified in sub. (3) (a) 2. is achieved through the use of a solvent destruction device the owner or operator shall determine calendar monthly compliance by comparing the monthly required overall VOC emission reduction specified in par. (b) to the overall VOC emission reduction demonstrated in the most recent performance test which complied with sub. (3) (a) 2. If the monthly required overall VOC emission reduction is less than or equal to the overall VOC reduction of the most recent performance test the affected facility is in compliance with sub. (3) (a) 2.

(e) Where compliance with sub. (3) (a) 2. is achieved through the use of a solvent destruction device the owner or operator shall continuously record the destruction device combustion temperature during coating operations for thermal incineration destruction devices or the gas temperature upstream and downstream of the incinerator catalyst bed during coating operations for catalytic incineration destruction devices. For thermal incineration destruction devices the owner or operator shall record all 3-hour periods (during actual coating operations) during which the average temperature of the device is more than 28°C (50°F) below the average temperature of the device during the most recent performance test complying with sub. (3) (a) 2. For catalytic incineration destruction devices the owner or operator shall record all 3-hour periods (during actual coating operations) during which the average temperature of the device immediately before the catalyst bed is more than 38°C (100°F) below the average temperature of the device during the most recent performance test complying with sub. (3) (a) 2. and all 3-hour periods (during actual coating operations) during which the average temperature difference across the catalyst bed is less than 80% of the average temperature difference of the device during the most recent test complying with sub. (3) (a) 2.

(f) After the initial performance test required for all affected facilities under s. NR 440.08, compliance with the VOC emission limitation and percentage reduction requirements under sub. (3) is based on the average emission reduction for one calendar month. A separate compliance test is completed at the end of each calendar month after the initial performance test and a new calendar month's average VOC emission reduction is calculated to show compliance with the standard.

(g) If a common emission control device is used to recover or destroy solvent from more than one affected facility the performance of that control device is assumed to be equal for each of the affected facilities. Compliance with sub. (3) (a) 2. is determined by the methods specified in pars. (c) and (d) and is performed simultaneously on all affected facilities.

(h) If a common emission control device is used to recover solvent from an existing facility (or facilities) as well as from an affected facility (or facilities) the overall VOC emission reduction for the affected facility (or facilities) for the purpose of compliance, shall be determined by the following procedures:

1. The owner or operator of the existing facility (or facilities) shall determine the mass of solvent recovery for a calendar month period from the existing facility (or facilities) prior to the connection of the affected facility (or facilities) to the emission control device.

2. The affected facility (or facilities) shall then be connected to the emission control device.

3. The owner or operator shall determine the total mass of solvent recovery from both the existing and affected facilities over a calendar month period. The mass of solvent determined in subd. 1. from the existing facility shall be subtracted from the total mass of recovery solvent to obtain the mass of solvent recovery from the affected facility (or facilities). The overall VOC emission reduction of the affected facility (or facilities) can then be determined as specified in par. (c).

(i) If a common emission control device is used to destruct solvent from an existing facility (or facilities) as well as from an affected facility (or facilities) the overall VOC emission reduction for the affected facility (or facilities), for the purpose of compliance, shall be determined by the following procedures:

1. The owner or operator shall operate the emission control device with both the existing and affected facilities connected.

2. The concentration of VOC (in parts per million by volume) after the common emission control device shall be determined as specified in sub. (5) (c).

(j) Startups and shutdowns are normal operation for this source category. Emissions from these operations are to be included when determining if the standard specified at sub. (3) (a) 2. is being attained.

(5) PERFORMANCE TEST PROCEDURES. (a) The performance test for affected facilities complying with sub. (3) without the use of add-on controls shall be identical to the procedures specified in sub. (4) (a).

(b) The performance test for affected facilities controlled by a solvent recovery device shall be conducted as follows:

1. The performance test shall be a one calendar month test and not the average of three runs as specified in s. NR 440.08 (6).

2. The weighted average mass of VOC per mass of coating solids applied for a one calendar month period shall be determined as specified in sub. (4) (a) 2.

3. Calculate the required percent overall VOC emission reduction as specified in sub. (4) (b).

4. Inventory VOC usage and VOC recovery for a one calendar month period.

5. Determine the percent overall VOC emission reduction as specified in sub. (4) (c).

(c) The performance test for affected facilities controlled by a solvent destruction device shall be conducted as follows:

1. The performance of the solvent destruction device shall be determined by averaging the results of three test runs as specified in s. NR 440.08 (6).

2. Determine for each affected facility prior to each test run the weighted average mass of VOC per mass of coating solids applied being used at the facility. The weighted average shall be determined as specified in sub. (4) (a). In this application the quantities of Wof, Wsi and Mci shall be determined for the time period of each test run and not a calendar month as specified in sub. (2).

3. Calculate the required percent overall VOC emission reduction as specified in sub. (4) (b).

4. Determine the percent overall VOC emissions reduction of the solvent destruction device by the following equation and procedures:

$$R = \frac{\sum_{i=1}^{n} Q_{bi}\ C_{bi} - \sum_{j=1}^{m} Q_{aj}\ C_{aj}}{\sum_{i=1}^{n} Q_{bi}\ C_{bi} + \sum_{k=1}^{p} Q_{fk}\ C_{fk}} \times 100$$

a. The owner or operator of the affected facility shall construct the overall 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) (b).

b. The owner or operator of an affected facility shall construct a temporary total enclosure around the coating line applicator and flashoff area during the performance test for the purpose of capturing fugitive VOC emissions. If a permanent total enclosure exists in the affected facility prior to the performance test and the department is satisfied that the enclosure is totally capturing fugitive VOC emissions then no additional total enclosure will be required for the performance test.

c. For each affected facility where the value of R is greater than or equal to the value R_q calculated in sub. (4) (b) compliance with sub. (3) (a) 2. is demonstrated.

(6) MONITORING OF OPERATIONS AND RECORDKEEPING. (a) The owner or operator of an affected facility subject to this section shall maintain a calendar month record of all coatings used and the results of the reference test methods specified in sub. (7) (a) or the manufacturer's formulation data used for determining the VOC content of those coatings.

(b) The owner or operator of an affected facility controlled by a solvent recovery device shall maintain a calendar month record of the amount of solvent applied in the coating at each affected facility.

(c) The owner or operator of an affected facility controlled by a solvent recovery device shall install, calibrate, maintain and operate a monitoring device for indicating the cumulative amount of solvent recovery by the device over a calendar month period. The monitoring device shall be accurate within ± 2.0%. The owner or operator shall maintain a calendar month record of the amount of solvent recovery by the device.

(d) The owner or operator of an affected facility operating at the conditions specified in sub. (1) (b) shall maintain a 12 month record of the amount of solvent applied in the coating at the facility.

(e) The owner or operator of an affected facility controlled by a thermal incineration solvent destruction device shall install, calibrate, maintain and operate a monitoring device which continuously indicates and records the temperature of the solvent destruction device's exhaust gases. The monitoring device shall have an accuracy of the greater of ± p0.75% of the temperature being measured expressed in degrees Celsius or ± 2.5°C.

(f) The owner or operator of an affected facility controlled by a catalytic incinerator solvent destruction device shall install, calibrate, maintain, and operate a monitoring device which continuously indicates and records the gas temperature both upstream and downstream of the catalyst bed.

(g) The owner or operator of an affected facility controlled by a solvent destruction device which uses a hood or enclosure to capture fugitive VOC emissions shall install, calibrate, maintain and operate a monitoring device which continuously indicates that the hood or enclosure is operating. No continuous monitor is required if the owner or operator can demonstrate that the hood or enclosure system is interlocked with the affected facility's oven recirculation air system.

(h) Records of the measurements required in subs. (4) and (6) must be retained for at least two years following the date of the measurements.

(7) TEST METHODS AND PROCEDURES. (a) The VOC contents per unit of coating solids applied and compliance with sub. (3) (a) 1. shall be determined by either Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, and the equations specified in sub. (4) or by manufacturer's formulation data. In the event of any inconsistency between a Method 24 test and manufacturer's formulation data the Method 24 test will govern. The department may require an owner or operator to perform Method 24 tests during such months as it deems appropriate. For Reference Method 24 the coating sample must be a one liter sample taken into a one liter container at a point where the sample will be representative of the coating applied to the web substrate.

(b) Reference Method 25 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine the VOC concentration, in parts per million by volume, of each effluent gas stream entering and exiting the solvent destruction device or its equivalent and each effluent gas stream emitted directly to the atmosphere. Reference Methods 1, 2, 3, and 4 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine the sampling location, volumetric flow rate, molecular weight and moisture of all sampled gas streams. For Reference Method 25 the sampling time for each of three runs must be at least 1 hour. The minimum sampling volume must 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.

(c) If the owner or operator can demonstrate to the department's satisfaction that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks the department will approve testing of representative stacks on a case-by-case basis.

(8) REPORTING REQUIREMENTS. (a) For all affected facilities subject to compliance with sub. (3) the performance test data and results from the performance test shall be submitted to the department as specified in s. NR 440.08 (1).

(b) The owner or operator of each affected facility shall submit semiannual reports to the department of exceedances of the following:

1. The VOC emission limits specified in sub. (4); and

2. The incinerator temperature drops as defined under sub. (4) (e). The reports required under par. (b) shall be postmarked within 30 days following the end of the second and fourth calendar quarters.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; renum. to be NR 440.665 and am. (2) (a) (intro.) and (b) (intro.), (5) (b) 1. and (c) 1. and (6) (g), r. (8) (c), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.57 Industrial surface coating: large appliances. (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 AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meaning given 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 topcoat 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 (VOCs), expressed as kilograms of VOCs per liter of coating solids.

15. "VOC emissions" means the mass of volatile organic compounds (VOCs),expressed as kilograms of VOCs per liter of applied coating solids, emitted from a surface coating operation.

(b) As used in this section, symbols not defined in this paragraph have the meanings given in s. NR 440.03.

1. C_a = the concentration of VOCs 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 VOCs in a gas stream entering a control device (parts per million by volume, as carbon).

3. C_f = the concentration of VOCs 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 VOCs emitted by an affected facility that enters a control device (fraction).

9. G = the volume-weighted average mass of VOCs 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 VOCs in coatings consumed, as received (kilograms).

16. M_r = the mass of VOCs 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 VOCs 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 com-

pleted, 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 VOCs 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. part 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 VOCs consumed per unit volume of coatings solids applied each calendar month shall be determined as follows:

1) Calculate the mass of VOCs consumed ($M_o + M_d$) during the calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{i=1}^{m} L_{dj} D_{dj}$$

($\Sigma L_{dj} D_{dj}$ 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 1. 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 1 — 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:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{m} L_{cik} V_{sik} T_k}{L_s}$$

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 VOCs 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 VOCs discharged to the atmosphere 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 VOCs 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 VOCs (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 VOCs emitted by an affected facility that enters the control device using the following equation:

$$F = \frac{\sum_{i=1}^{n} C_{bi} \quad Q_{bi}}{\sum_{i=1}^{n} C_{bi}Q_{bi} + \sum_{k=1}^{p} C_{fk}Q_{fk}}$$

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 VOCs 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 VOCs 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 VOCs assumed ($M_o + M_d$) and the volume-weighted average of the total mass of VOCs 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 VOCs recovered (M_r) during each calendar month using the following equation:

$$M_r = L_r D_r$$

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 VOCs 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 VOCs 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.

(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 VOCs 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. part 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 VOCs 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 VOCs 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 VOCs 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 METHODS AND PROCEDURES. (a) The reference methods in 40 C.F.R. part 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. part 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. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (a) (intro.) and (b) (intro.), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.58 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 AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given 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 (VOCs) in a coating.

(b) As used in this section, symbols not defined in this paragraph have the meanings given 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 VOCs emitted by an affected facility that enters the control device (fraction).

9. G = volume-weighted average mass of VOCs 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 VOCs in coatings consumed, as received (kilograms).

16. M_r = the mass of VOCs 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 VOCs 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 VOCs 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 at the most recently demonstrated overall efficiency.

(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 VOCs 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. part 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 VOCs 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 VOCs used per unit volume of coating solids applied each calendar month shall be determined by the following procedures.

1) Calculate the mass of VOCs used ($M_o + M_d$) during each calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

($\Sigma L_{dj} D_{dj}$ 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 VOCs 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 VOCs 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 VOCs 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 VOCs (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 VOCs 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 is 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 VOCs 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 VOCs 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 VOCs (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 VOCs consumed (M_o + M_d) during each calendar month for each affected facility using the equation in subd. 1.a.1).

b. Calculate the total mass of VOCs recovered (M_r) during each calendar month using the following equation:

$$M_r = L_r D_r$$

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 VOCs per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in subd. 1.a.2) and 3).

e. Calculate the volume-weighted average mass of VOCs 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 VOCs 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 VOCs used without the control device in operation ($M_{on} + M_{dn}$) during each calendar month for each affected facility using the following equation:

$$M_{on} + M_{dn} = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

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 VOCs 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 VOCs used with the control device in operation (M_{oc} + M_{dc}) during each calendar month for each affected facility using the following equation:

$$M_{oc} + M_{dc} = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

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 VOCs 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:

$$N = \frac{G_n L_{sn} + G_c L_{sc}(1\text{-}R)}{L_{sn} + L_{sc}}$$

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 VOCs 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 VOCs, 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. part 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. part 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. part 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.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (a) (intro.), (b) (intro.) and (4) (c) 2. a. 2), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.59 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, terms not defined in this subsection have the meanings given 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. 0.040 kilograms of particulate per megagram of asphalt shingle or mineral-surfaced roll roofing produced, or

b. 0.40 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. part 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. part 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)$sp) totaling 60 minutes. A performance test shall consist of one run.

(c) For Method 5A of 40 C.F.R. part 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:

$$E = Q_{sd} \times C_s$$

where:

E is the particulate emission rate (kg/hr)

Q_{sd} is the average volumetric flow rate (dscm/hr) 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. part 60, Appendix A, incorporated by reference in s. NR 440.17

(e) The asphalt roofing production rate, P (Mg/hr), 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/hr), 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/hr) from par. (c)

P is the asphalt roofing production rate (Mg/hr)

P_s is the asphalt charging rate (Mg/hr).

(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. part 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 request the department to determine opacity during an initial, or subsequent, performance test when fuel oil is being 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 notify the owner or operator and advise him or her of the right to petition the administrator under 40 C.F.R. s. 60.11 (e), incorporated by reference in s. NR 440.17, to 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 shall remain the applicable opacity standard.

History: Cr. Register, January, 1984, No. 337, eff. 2-1-84; am. (2) (intro.), (3) (a) 1. a. and b. and (5) (k), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.62 Equipment leaks of VOC in the synthetic organic chemicals manufacturing industry. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) 1. The provisions of this section apply to affected facilities in the synthetic organic chemicals manufacturing industry.

2. The group of all equipment (defined in sub. (2)) within a process unit is an affected facility.

(b) Any affected facility under par. (a) that commences construction or modification after January 5, 1981, shall be subject to the requirements of this section.

(c) Addition or replacement of equipment for the purpose of process improvement which is accomplished without a capital expenditure is not by itself considered a modification under this section.

(d) 1. If an owner or operator applies for one of the exemptions in this paragraph the owner or operator shall maintain records as required in sub. (7) (i).

2. Any affected facility that has the design capacity to produce less than 1,000 Mg/yr is exempt from sub. (3).

3. If an affected facility produces heavy liquid chemicals only from heavy liquid feed or raw materials it is exempt from sub. (3).

4. Any affected facility that produces beverage alcohol is exempt from sub. (3).

5. Any affected facility that has no equipment in VOC service is exempt from sub. (3).

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

(a) "Capital expenditure" means, in addition to the definition in s. NR 440.02 (6), an expenditure for a physical or operational change to an existing facility that:

1. Exceeds P, the product of the facility's replacement cost, R, and an adjusted annual asset guideline repair allowance, A, as reflected by the following equation: $P = R \times A$, where

a. The adjusted annual asset guideline repair allowance, A, is the product of the percent of the replacement cost, Y, and the applicable basic annual asset guideline repair allowance, B, as reflected by the following equation: $A = Y \times (B \div 100)$;

b. The percent Y is determined from the following equation: $Y = 1.0 - 0.575 \log X$, where X is 1982 minus the year of construction; and

c. The applicable basic annual asset guideline repair allowance, B, is selected from the following table consistent with the applicable section:

Table for Determining Applicable Value of B

Section applicable to facility	Value of B to be used in equation
This section	12.5
NR 440.66	7.0
NR 440.682	4.5

(b) "Closed vent system" means a system that is not open to the atmosphere and that is composed of piping, connections and, if necessary, flow inducing devices that transport gas or vapor from a piece or pieces of equipment to a control device.

(c) "Connector" means flanged, screwed, welded, or other joined fittings used to connect two pipe lines or a pipe line and a piece of process equipment.

(d) "Control device" means an enclosed combustion device, vapor recovery system, or flare.

(e) "Distance piece" means an open or enclosed casing through which the piston rod travels, separating the compressor cylinder from the crankcase.

(f) "Double block and bleed system" means two blocks valves connected in series with a bleed valve or line that can vent the line between the two block valves.

(g) "Equipment" means each pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve and flange or other connection in VOC service and any devices or systems required by this section.

(h) "First attempt at repair" means to take rapid action for the purpose of stopping or reducing leakage of organic material to atmosphere using best practices.

(i) "In gas/vapor service" means that the piece of equipment contains process fluid that is in the gaseous state at operating conditions.

(j) "In heavy liquid service" means that the piece of equipment is not in gas vapor service or in light liquid service.

(k) "In light liquid service" means that the piece of equipment contains a liquid that meets the conditions specified in sub. (6) (e).

(l) "Liquids dripping" means any visible leakage from the seal including spraying, misting, clouding and ice formation.

(m) "Open-ended valve or line" means any valve, except safety relief valves, having one side of the valve seat in contact with process fluid and one side open to the atmosphere, either directly or through open piping.

(n) "Pressure release" means the emission of materials resulting from system pressure being greater than set pressure of the pressure relief device.

(o) "Process improvement" means routine changes made for safety and occupational health requirements, for energy savings, for better utility, for ease of maintenance and operation, for correction of design deficiencies, for bottleneck removal, for changing product requirements, or for environmental control.

(p) "Process unit" means components assembled to produce, as intermediate or final products, one or more of the chemicals listed in Table A of sub. (10). A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product.

(q) "Process unit shutdown" means a work practice or operational procedure that stops production from a process unit or part of a process unit. An unscheduled work practice or operational procedure that stops production from a process unit or part of a process unit for less than 24 hours is not a process unit shutdown. The use of spare equipment and technically feasible bypassing of equipment without stopping production are not process unit shutdowns.

(r) "Quarter" means a 3-month period; the first quarter concludes on the last full month during the 180 days following initial startup.

(s) "Repaired" means that equipment is adjusted, or otherwise altered, in order to eliminate a leak as indicated by one of the following: an instrument reading of 10,000 ppm or greater, indication of liquids dripping, or indication by a sensor that a seal or barrier fluid system has failed.

(t) "Replacement cost" means the capital needed to purchase all the depreciable components in a facility.

(u) "Sensor" means a device that measures a physical quantity such as temperature, pressure, flow rate, pH, or liquid level.

(v) "In-situ sampling systems" means nonextractive samplers or in-line samplers.

(w) "Synthetic organic chemicals manufacturing industy" means the industry that produces, as intermediates or final products, one or more of the chemicals listed in Table A of sub. (10).

(x) "In-vacuum service" means that equipment is operating at an internal pressure which is at least 5 kilopascals (kPa) below ambient pressure.

(y) "Volatile organic compounds" or "VOC" means, for the purpose of this section, any reactive organic compounds as defined in s. NR 440.02 (35).

(z) "In VOC service" means that the piece of equipment contains or contacts a process fluid that is at least 10% VOC by weight. (The provisions of sub. (6) (d) specify how to determine that a piece of equipment is not in VOC service.)

(3) STANDARDS. (a) General. 1. Each owner or operator subject to the provisions of this section shall demonstrate compliance with the requirements of pars. (a) to (j) for all equipment within 180 days of initial startup.

2. Compliance with pars. (a) to (j) will be determined by review of records and reports, review of performance test results and inspection using the methods and procedures specified in sub. (6).

3. An owner or operator may apply to the administrator for a determination of equivalence of a means of emission limitation to the requirements of par. (b), (c), (e), (f), (g), (h) or (j) under 40 C.F.R. s. 60.484, incorporated by reference in s. NR 440.17. If the administrator makes a determination that a means of emission limitation is at least equivalent, the owner or operator shall notify the department of that determination and comply with its requirements rather than the requirements of par. (b), (c), (e), (f), (g), (h) or (j).

4. Equipment that is in vacuum service is excluded from the requirements of pars. (b) to (j) if it is identified as required in sub. (7) (e) 5.

(b) Pumps in light liquid. 1. a. Each pump in light liquid service shall be monitored monthly to detect leaks by the methods specified in sub. (6) (b), except as provided in par. (a) 3. and subds. 4., 5. and 6.

b. Each pump in light liquid service shall be checked by visual inspection each calendar week for indications of liquids dripping from the pump seal.

2. a. If an instrument reading of 10,000 ppm or greater is measured a leak is detected.

b. If there are indications of liquids dripping from the pump seal a leak is detected.

3. a. When a leak is detected it shall be repaired as soon as practicable but not later than 15 calendar days after it is detected, except as provided in par. (i).

b. A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

4. Each pump equipped with a dual mechanical seal system that includes a barrier fluid system is exempt from the requirements of subd. 1. provided the following requirements are met:

a. Each dual mechanical seal system is:

1) Operated with the barrier fluid at a pressure that is at all times greater than the pump stuffing box pressure; or

2) Equipment with a barrier fluid degassing reservoir that is connected by a closed vent system to a control device that complies with the requirements of par. (j); or

3) Equipped with a system that purges the barrier fluid into a process stream with a zero VOC emissions to the atmosphere.

b. The barrier fluid system is in heavy liquid service or is not in VOC service.

c. Each barrier fluid system is equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both.

d. Each pump is checked by visual inspection each calendar week for indications of liquids dripping from the pump seals.

e. 1) Each sensor as described in subpar. c. is checked daily or is equipped with an audible alarm, and

2) The owner or operator determines, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both.

f. 1) If there are indications of liquids dripping from the pump seal or the sensor indicates failure of the seal system, the barrier fluid system, or both based on the criterion determined in subpar. e. 2) a leak is detected.

2) When a leak is detected it shall be repaired as soon as practicable but no later than 15 calendar days after it is detected, except as provided in par. (i).

3) A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

5. Any pump that is designated as described in subs. (7) (e) 1. and 2. for no detectable emission, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of subds. 1., 3. and 4. if the pump:

a. Has no externally actuated shaft penetrating the pump housing,

b. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 ppm above ground as measured by the methods specified in sub. (6) (c), and

c. Is tested for compliance with sub. (6) (e) 2. Initially upon designation, annually and at other times requested by the department.

6. If any pump is equipped with a closed vent system capable of capturing and transporting any leakage from the seal or seals to a control device that complies with the requirements of par. (j) it is exempt from the requirements of subds. 1. to 5.

(c) Compressors. 1. Each compressor shall be equipped with a seal system that includes a barrier fluid system that prevents leakage of VOC to the atmosphere, except as provided in par. (a) 3. and subds. 8. and 9.

2. Each compressor seal system as required in subd. 1. shall be:

a. Operated with a barrier fluid at a pressure that is greater than the compressor stuffing box pressure; or

b. Equipped with a barrier fluid system that is connected by a closed vent system to a control device that complies with the requirements of par. (j); or

c. Equipped with a system that purges the barrier fluid into a process stream with zero VOC emissions to the atmosphere.

3. The barrier fluid system shall be in heavy liquid service or may not be in VOC service.

4. Each barrier fluid system as described in subd. 1. shall be equipped with a sensor that will detect failure of the seal system, barrier fluid system, or both.

5. a. Each sensor as required in subd. 4. shall be checked daily or shall be equipped with an audible alarm.

b. The owner or operator shall determine, based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both.

6. If the sensor indicates failure of the seal system, the barrier system, or both based on the criterion determined under subd. 5. b. a leak is detected.

7. a. When a leak is detected it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected, except as provided in par. (i).

b. A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

8. A compressor is exempt from the requirements of subds. 1. and 2. if it is equipped with a closed vent system capable of capturing and transporting any leakage from the seal to a control device that complies with the requirements of par. (j), except as provided in subd. 9.

9. Any compressor that is designated as described in sub. (7) (e) 1. and 2. for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of subds. 1. to 8. if the compressor:

a. Is demonstrated to be operating with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background, as measured by the methods specified in sub. (6) (c); and

b. Is tested for compliance with sub par. a. initially upon designation, annually and at other times requested by the department.

10. Any existing reciprocating compressor in a process unit which becomes an affected facility under provisions of s. NR 440.14 or 440.15 is exempt from subds. 1., 2., 3., 4., 5. and 8. provided the owner or operator demonstrates that recasting the distance piece or replacing the compressor are the only options available to bring the compressor into compliance with the provisions of subds. 1., 2., 3., 4., 5. and 8.

(d) Pressure relief devices in gas/vapor service. 1. Except during pressure releases, each pressure relief device in gas/vapor service shall be operated with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background, as determined by the methods specified in sub. (6) (c).

2. a. After each pressure release the pressure relief device shall be returned to a condition of no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, as soon as practicable but no later than 5 calendar days after the pressure release, as provided in par. (i).

b. No later than 5 calendar days after the pressure release the pressure relief device shall be monitored to confirm the conditions of no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, by the methods specified in sub. (6) (c).

3. Any pressure relief device that is equipped with a closed vent system capable of capturing and transporting leakage through the pressure relief device to a control device as described in par. (j) is exempted from the requirements of this paragraph.

(e) Sampling connection systems. 1. Each sampling connection system shall be equipped with a closed purge system or closed vent system, except as provided in par. (a) 3.

2. Each closed purge system or closed system as required in subd. 1. shall:

a. Return the purged process fluid directly to the process line with zero VOC emissions to the atmosphere; or

b. Collect and recycle the purged process fluid with zero VOC emissions to the atmosphere; or

c. Be designed and operated to capture and transport all the purged process fluid to a control device that complies with the requirements of par. (j).

3. In situ-sampling systems are exempt from subd. 1. and 2.

(f) Open-ended valves or lines. 1. a. Each open-ended valve or line shall be equipped with a cap, blind flange, plug, or a second valve, except as provided in par. (a) 3.

b. The cap, blind flange, plug, or second valve shall seal the open end at all times except during operations requiring process fluid flow through the open-ended valve or line.

2. Each open-ended valve or line equipped with a second valve shall be operated with a second valve shall be operated in a manner such that the valve on the process fluid end is closed before the second valve is closed.

3. When a double block-and-bleed system is being used the bleed valve or line may remain open during operations that require venting the line between the block valves but shall comply with subd. 1. at all times.

(g) Valves in gas/vapor service in light liquid service. 1. Each valve shall be monitored monthly to detect leaks by the methods specified in sub. (6) (b) and shall comply with subds. 2. to 5., except as provided in subds. 6., 7. and 8., subs. (4) (a) and (b) and par. (a) 3.

2. In an instrument reading of 10,000 ppm or greater is measured a leak is detected.

3. a. Any valve for which a leak is not detected for 2 successive months may be monitored the first month of every quarter, beginning with the next quarter, until a leak is detected.

b. If a leak is detected the valve shall be monitored monthly until a leak is not detected for 2 successive months.

4. a. When a leak is detected it shall be repaired as soon as practicable, but no later than 15 calendar days after the leak is detected, except as provided in par. (i).

b. A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

5. First attempts at repair include, but are not limited to, the following best practices where practicable:

a. Tightening of bonnet bolts;

b. Replacement of bonnet bolts;

c. Tightening of packing gland nuts;

d. Injection of lubricant into lubricated packing.

6. Any valve that is designated as described in sub. (7) (e) 2. for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, is exempt from the requirements of subd. 1. if the valve:

a. Has no external actuating mechanism in contact with the process fluid;

b. Is operated with emission less than 500 ppm above background as determined by the method specified in sub. (6) (c), and

c. Is tested for compliance with subd. 6. b. initially upon designation, annually, and at other times requested by the department.

7. Any valve that is designated as described in sub. (7) (f) 2. as a difficult-to-monitor valve is exempt from the requirements of subd. 1. if:

a. The owner or operator of the valve demonstrates that the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with subd. 1., and

b. The owner or operator of the valve adheres to a written plan that requires monitoring of the valve as frequently as practicable during safe-to-monitor times.

8. Any valve that is designated as described in sub. (7) (f) 2. as a difficult-to-monitor valve, is exempt from the requirements of subd. 1. if:

a. The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than 2 meters above a support surface.

b. The process unit within which the valve is located either becomes an affected facility through s. NR 440.14 or 440.15, or the owner or operator designates less than 3.0% of the total number of valves as difficult-to-monitor, and

c. The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.

(h) Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service and flanges and other connectors. 1. Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service and flanges and other connectors shall be monitored within 5 days by the method specified in sub. (6) (b) if evidence of a potential leak is found by visual, audible, olfactory, or any other detection method.

2. If an instrument reading of 10,000 ppm or greater is measured a leak is detected.

3. a. When a leak is detected it shall be repaired as soon as practicable but not later than 15 calendar days after it is detected, except as provided in par. (i).

b. The first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

4. First attempts at repair include, but are not limited to, the best practices described under par. (g) 5.

(i) Delay of repair. 1. Delay of repair of equipment for which leaks have been detected will be allowed if the repair is technically infeasible without a process unit shutdown. Repair of this equipment shall occur before the end of the next process unit shutdown.

2. Delay of repair of equipment will be allowed for equipment which is isolated from the process and which does not remain in VOC service.

3. Delay of repair for valves will be allowed if:

a. The owner or operator demonstrates that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay of repair, and

b. When repair procedures are effected, the purged material is collected and destroyed or recovered in a control device complying with par. (j).

4. Delay of repair for pumps will be allowed if:

a. Repair requires the use of a dual mechanical seal system that includes a barrier fluid system, and

b. Repair is completed as soon as practicable but not later than 6 months after the leak was detected.

5. Delay of repair beyond a process unit shutdown will be allowed for a valve if valve assembly replacement is necessary during the process unit shutdown, valve assembly supplies have been depleted and valve assembly supplies had been sufficiently stocked before the supplies were depleted. Delay of repair beyond the next process unit shutdown will not be allowed unless the next process unit shutdown occurs sooner than 6 months after the first process unit shutdown.

(j) Closed vent systems and control devices. 1. Owners or operators of closed vent systems and control devices used to comply with provisions of this section shall comply with the provisions of this paragraph.

2. Vapor recovery systems (e.g., condensers and adsorbers) shall be designed and operated to recover the VOC emissions vented to them with an efficiency of 95% or greater.

3. Enclosed combustion devices shall be designed and operated to reduce the VOC emissions vented to them with an efficiency of 95% or greater or to provide a minimum residence time of 0.75 seconds at a minimum temperature of 816°C.

4. Flares used to comply with this section shall comply with the requirements of s. NR 440.18.

5. Owners or operators of control devices used to comply with the provisions of this section shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs.

6. a. Closed vent system shall be designed and operated with no detectable emissions, as indicated by an instrument reading of less than 500

ppm above background and visual inspections, as determined by the methods specified in sub. (6) (c).

b. Closed vent systems shall be monitored to determine compliance with this section initially in accordance with s. NR 440.08, annually and at other times requested by the department.

7. Closed vent systems and control devices used to comply with provisions of this section shall be operated at all times when emissions may be vented to them.

(4) ALTERNATIVE STANDARDS FOR VALVES. (a) Allowable percentage of valves leaking. 1. An owner or operator may elect to comply with an allowable percentage of valves leaking of equal to or less than 2.0%.

2. The following requirements shall be met if an owner or operator wishes to comply with an allowable percentage of valves leaking:

a. An owner or operator shall notify the department that the owner or operator has elected to comply with the allowable percentage of valves leaking before implementing this alternative standard, as specified in sub. (8) (d).

b. A performance test as specified in subd. 3. shall be conducted initially upon designation, annually, and at other times requested by the department.

c. If a valve leak is detected it shall be repaired in accordance with subs. (3) (g) 4. and 5.

3. Performance tests shall be conducted in the following manner:

a. All valves in gas/vapor and light liquid service within the affected facility shall be monitored within 1 week by the methods specified in sub. (6) (b).

b. If an instrument reading of 10,000 ppm or greater is measured a leak is detected.

c. The leak percentage shall be determined by dividing the number of valves for which leaks are detected by the number of valves in gas/vapor and light liquid service within the affected facility.

4. Owners and operators who elect to comply with this alternative standard may not have an affected facility with a leak percentage greater than 2.0%.

(b) Skip period leak detection and repair. 1. a. An owner or operator may elect to comply with one of the alternative work practices specified in subd. 2. b. and c.

b. An owner or operator shall notify the department before implementing one of the alternative work practices, as specified in sub. (8) (d).

2. a. An owner or operator shall comply initially with the requirements for valves in gas/vapor service and valves in light liquid service, as described in sub. (3) (g).

b. After 2 consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0 an owner or operator may begin to skip 1 of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

c. After 5 consecutive quarterly leak detection periods with the percent of valves leaking equal to or less than 2.0 an owner or operator may begin to skip 3 of the quarterly leak detection periods for the valves in gas/vapor and light liquid service.

d. If the percent of valves leaking is greater than 2.0 the owner or operator shall comply with the requirements as described in sub. (3) (g) but can again elect to use this subsection.

e. The percent of valves leaking shall be determined by dividing the sum of valves found leaking during current monitoring and valves for which repair has been delayed by the total number of valves subject to the requirements of this paragraph.

f. An owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.

(6) TEST METHODS AND PROCEDURES. (a) Each owner or operator subject to the provisions of this section shall comply with the test method and procedure requirements provided in this subsection.

(b) Monitoring as required in subs. (3) and (4), or required pursuant to an application to the administrator for a determination of equivalence under 40 C.F.R. 60.484, incorporated by reference in s. NR 440.17, shall comply with the following requirements:

1. Monitoring shall comply with Reference Method 21 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

2. The detection instrument shall meet the performance criteria of Reference Method 21 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

3. The instrument shall be calibrated before use on each day of its use by the methods specified in Method 21 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

4. Calibration gases shall be:

a. Zero air (less than 10 ppm of hydrocarbon in air); and

b. A mixture of methane or n-hexane and air at a concentration of approximately, but less than 10,000 ppm methane or n-hexane.

5. The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Reference Method 21 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

(c) When equipment is tested for compliance with no detectable emissions as required in subs. (3) (b) 5., (c) 9., (d), (g) 6. and (j) 5. the test shall comply with the following requirements:

1. The requirements of pars. (b) 1. to 4. shall apply.

2. The background level shall be determined as set forth in Reference Method 21 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

3. The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Reference Method 21 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

4. The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared with 500 ppm for determining compliance.

(d) 1. Each piece of equipment within a process unit is presumed to be in VOC service unless an owner or operator demonstrates that the piece of equipment is not in VOC service. For a piece of equipment to be considered not in VOC service it must be determined that the percent VOC content can be reasonably expected never to exceed 10% by weight. For purposes of determining the percent VOC content in the process fluid that is contained in or contacts a piece of equipment, procedures that conform to the general methods described in ASTM E260-73, E168-67 or E169-63 shall be used. These ASTM methods are incorporated by reference in s. NR 440.17.

2. If an owner or operator decides to exclude nonreactive organic compounds from the total quantity of organic compounds in determining the percent of VOC content of the process fluid the exclusion will be allowed if:

a. Those substances excluded are those considered as having negligible photochemical reactivity by the department, and

b. The owner or operator demonstrates that the percent organic content, excluding nonreactive organic compounds, can be reasonably expected never to exceed 10% by weight.

3. a. An owner or operator may use engineering judgment rather than the procedures in subds. 1 and 2. to demonstrate that the percent VOC content clearly does not exceed 10% by weight provided that the engineering judgment demonstrates that the VOC content clearly does not exceed 10% by weight. When an owner or operator and the department do not agree on whether a piece of equipment is not in VOC service however, the procedures in subds. 1 and 2 shall be used to resolve the agreements.

b. If an owner or operator determines that a piece of equipment is in VOC service, the determination can be revised only after following the procedures in subds. 1. and 2.

(e) Equipment is in light liquid service if the following conditions apply:

1. The vapor pressure of one or more of the components is greater than 0.3 kPa at 20°C. Vapor pressures may be obtained from standard reference texts or may be determined by ASTM D2879-83. This ASTM method is incorporated by reference in s. NR 440.17.

2. The total concentration of the pure components having a vapor pressure greater than 0.3 kPa at 20°C is equal to or greater than 20% by weight; and

3. The fluid is a liquid at operating conditions.

(f) Samples used in conjunction with pars. (d), (e) and (g) shall be representative of the process fluid that is contained in or contacts the equipment or the gas being combusted in the flare.

(g) 1. Reference Method 22 in 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used to determine the compliance of flares with the visible emission provisions of this section.

2. The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

3. The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = \left(K \sum_{i=1}^{n} C_i \; H_i \right)$$

where:

H_T = net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg but the standard temperature for determining the volume corresponding to one mole is 20°

$$K = \text{constant, } 1.740 \times 10^{-7} \left(\frac{1}{\text{ppm}}\right)\left(\frac{\text{g mole}}{\text{scm}}\right)\left(\frac{\text{MJ}}{\text{kcal}}\right)$$

where:

standard temperature for $\frac{\text{g mole}}{\text{scm}}$ is 20°C

C_i = concentration of sample component i in ppm, as measured by Reference Method 18 in 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17 and ASTM D2504-67, incorporated by reference in s. NR 440.17

H_i = net heat of combustion of sample component i, kcal/g mole. The heats of combustion may be determined using ASTM D2382-76, incorporated by reference in s. NR 440.17, if published values are not available or cannot be calculated

4. The actual exit velocity of a flare shall be determined by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by Reference Method 2, 2A, 2C, or 2D of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

5. The maximum permitted velocity, V_{max}, for air-assisted flares shall be determined by the following equation:

$$V_{max} = 8.706 + 0.7084\,(H_T)$$

where:

V_{max} = maximum permitted velocity, m/sec

8.706 = constant

0.7084 = constant

H_T = the net heating value as determined in subd. 3.

(7) RECORDKEEPING REQUIREMENTS. (a) 1. Each owner or operator subject to the provisions of this section shall comply with the recordkeeping requirements of this section.

2. An owner or operator of more than one affected facility subject to the provisions of this section may comply with the recordkeeping requirements for these facilities in one recordkeeping system if the system identifies each record by each facility.

(b) When each leak is detected as specified in subs. (3) (b), (c), (g), (h) and (4) (b) the following requirements apply:

1. A weather proof and readily visible identification, marked with the equipment identification number, shall be attached to the leaking equipment.

2. The identification on a value may be removed after it has been monitored for 2 successive months as specified in sub. (3) (g) 3. and no leak has been detected during those 2 months.

3. The identification on equipment except on valve may be removed after it has been repaired.

(c) When each leak is detected as specified in subs. (3) (b), (c), (g), (h) and (4) (b) the following information shall be recorded in a log and shall be kept for 2 years in a readily accessible location:

1. The instrument and operator identification numbers and the equipment identification number.

2. The date the leak was detected and the dates each attempt to repair the leak.

3. Repair methods applied in each attempt to repair the leak.

4. "Above 10,000" if the maximum instrument reading measured by the methods specified in sub. (6) (a) after each repair attempt is equal to or greater than 10,000 ppm.

5. "Repair delayed" and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak.

6. The signature of the owner or operator (or designate) whose decision it was that repair could not be affected without a process shutdown.

7. The expected date of successful repair of the leak if a leak is not repaired within 15 days.

8. Dates of process unit shutdown that occur while the equipment is unrepaired.

9. The date of successful repair of the leak.

(d) The following information pertaining to the design requirements for closed vent systems and control devices described in sub. (3) (j) shall be recorded and kept in a readily accessible location:

1. Detailed schematics, design specifications and piping and instrumentation diagrams.

2. The dates and descriptions of any changes in the design specifications.

3. A description of the parameter or parameters monitored as required in sub. (3) (j) 5., to ensure that control devices are operated and maintained in conformance with their design and an explanation of why that parameter (or parameters) was selected for the monitoring.

4. Periods when the closed vent systems and control devices required in sub. (3) (b), (c), (d) and (e) are not operated as designed, including periods when a flare pilot light does not have a flame.

5. Dates of startups and shutdowns of the closed vent systems and control devices required in sub. (3) (b), (c), (d) and (e).

(e) The following information pertaining to all equipment subject to the requirements in sub. (3) (a) to (j) shall be recorded in a log that is kept in a readily accessible location:

1. A list of identification numbers for equipment subject to the requirements of this section.

2. a. A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of sub. (3) (b) 5., (c) 9. and (g) 6.

b. The designation of equipment as subject to the requirements of sub. (3) (b) 5., (c) 9., or (g) 6. shall be signed by the owner or operator.

3. A list of equipment identification numbers for pressure relief devices required to comply with sub. (3) (d).

4. a. The dates of each compliance test as required in sub. (3) (b) 5., (c) 9., (d) and (g) 6.

b. The background level measured during each compliance test.

c. The maximum instrument reading measured at the equipment during each compliance test.

5. A list of identification numbers for equipment in vacuum service.

(f) The following information pertaining to all valves subject to the requirements of sub. (3) (g) 7. and 8. shall be recorded in a log that is kept in a readily accessible location:

1. A list of identification numbers for valves that are designated as unsafe-to-monitor, an explanation for each valve stating why the valve is unsafe-to-monitor and the plan for monitoring each valve.

2. A list of identification numbers for valves that are designated as difficult-to-monitor, an explanation for each valve stating why the valve is difficult-to-monitor and the schedule for monitoring each valve.

(g) The following information shall be recorded for valves complying with sub. (4) (b).

1. A schedule of monitoring.

2. The percent of valves found leaking during each monitoring period.

(h) The following information shall be recorded in a log that is kept in a readily accessible location.

1. Design criterion required in sub. (3) (b) 4. e. and (c) 5. b. and explanation of the design criterion; and

2. Any changes to this criterion and the reasons for the changes.

(i) The following information shall be recorded in a log that is kept in a readily accessible location for use in determining exemptions as provided in sub. (1) (d):

1. An analysis demonstrating the design capacity of the affected facility,

2. A statement listing the feed or raw materials and products from the affected facilities and an analysis demonstrating whether these chemicals are heavy liquids or beverage alcohol, and

3. An analysis demonstrating that equipment is not VOC service.

(j) Information and data used to demonstrate that a piece of equipment is not in VOC service shall be recorded in a log that is kept in a readily accessible location.

(k) The provisions of s. NR 440.07 (2) and (4) do not apply to affected facilities subject to this section.

(8) REPORTING REQUIREMENTS. (a) Each owner or operator subject to the provisions of this section shall submit semi-annual reports to the department beginning six months after the initial start up date.

(b) The initial semi-annual report to the department shall include the following information:

1. Process unit identification.

2. Number of valves subject to the requirements of sub. (3) (g), excluding those valves designated for no detectable emissions under the provisions of sub. (3) (g) 6.

3. Number of pumps subject to the requirements of sub. (3) (b), excluding those pumps designated for no detectable emissions under the provisions of sub. (3) (b) 5. and those pumps complying with sub. (3) (b) 6.

4. Number of compressors subject to the requirements of sub. (3) (c), excluding those compressors designated for no detectable emissions under the provisions of sub. (3) (c) 9. and those compressors complying with sub. (3) (c) 8.

(c) All semi-annual reports to the department shall include the following information summarized from the information in sub. (7):

1. Process unit identification.

2. For each month during the semi-annual reporting period.

a. Number of valves for which leaks were detected as described in sub. (3) (g) 2. or (4) (b),

b. Number of valves for which leaks were not repaired as required in sub. (3) (g) 4. a.,

c. Number of pumps for which leaks were detected as described in sub. (3) (b) 2. and 4. f. 1),

d. Number of pumps for which leaks were not repaired as required in sub. (3) (b) 3. a. and 4. f. 2),

e. Number of compressors for which leaks were detected as described in sub. (3) (c) 6.,

f. Number of compressors for which leaks were not repaired as required in sub. (3) (c) 7. a., and

g. The facts that explain each delay of repair and, where appropriate, why a process unit shutdown was technically infeasible.

3. Dates of process unit shutdowns which occurred within the semi-annual reporting period.

4. Revisions to items reported according to par. (b) if changes have occurred since the initial report or subsequent revisions to the initial report.

(d) An owner or operator electing to comply with the provisions of sub. (4) (a) and (b) shall notify the department of the alternative standard selected 90 days before implementing either of the provisions.

(e) An owner or operator shall report the results of all performance tests in accordance with s. NR 440.08. The provisions of s. NR 440.08 (4) do not apply to affected facilities subject to the provisions of this section except that an owner or operator must notify the department of the schedule for the initial performance tests at least 30 days before the initial performance tests.

(9) RECONSTRUCTION. For the purpose of this section:

(a) The cost of the following frequently replaced components of the facility may not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital costs that would be required to construct a comparable new facility" under s. NR 440.15: pump seals, nuts and bolts, rupture disks and packings.

(b) Under s. NR 440.15 the "fixed capital cost of new components" includes the fixed capital cost of all depreciable components (except components specified in par. (a) which are or will be replaced pursuant to all continuous programs of component replacement which are commenced within any 2-year period following the applicability date for the appropriate section. (See the "applicability and designation of affected facility" subsection of the appropriate section.) For purposes of this paragraph "commenced" means that an owner or operator has undertaken a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of component replacement.

(10) LIST OF CHEMICALS PRODUCED BY AFFECTED FACILITIES. (a) The chemicals listed in Table A are produced, as intermediates or final products, by process units covered under this section. The applicability date for process units producing one or more of these chemicals is January 5, 1981.

TABLE A.

CAS No.[a]	Chemical
105-57-7	Acetal
75-07-0	Acetaldehyde
107-89-1	Acetaldol
60-35-5	Acetamide
103-84-4	Acetanilide
64-19-7	Acetic acid
108-24-7	Acetic anhydride
67-64-1	Acetone
75-86-5	Acetone cyanohydrin
75-05-8	Acetonitrile
98-86-2	Acetophenone
75-36-5	Acetyl chloride
74-86-2	Acetylene
107-02-8	Acrolein
79-06-1	Acrylamide
79-10-7	Acrylic acid
107-13-1	Acrylonitrile
124-04-9	Adipic acid
111-69-3	Adiponitrile
(b)	Alkyl naphthalenes
107-18-6	Allyl alcohol
107-05-1	Allyl chloride
1321-11-5	Aminobenzoic acid
111-41-1	Aminoethylethanolamine
123-30-8	p-Aminophenol
628-63-7, 123-92-2	Amyl acetates
71-41-0[c]	Amyl alcohols
110-58-7	Amyl amine
543-59-9	Amyl chloride
110-66-7[c]	Amyl mercaptans
1322-06-1	Amyl phenol
62-53-3	Aniline
142-04-1	Aniline hydrochloride
29191-52-4	Anisidine
100-66-3	Anisole
118-92-3	Anthranilic acid
84-65-1	Anthraquinone
100-52-7	Benzaldehyde
55-21-0	Benzamide
71-43-2	Benzene
98-48-6	Benzenedisulfonic acid
98-11-3	Benzenesulfonic acid
134-81-6	Benzil
76-93-7	Benzilic acid
65-85-0	Benzoic acid
119-53-9	Benzoin
100-47-0	Benzonitrile
119-61-9	Benzophenone
98-07-7	Benzotrichloride
98-88-4	Benzoyl chloride
100-51-6	Benzyl alcohol
100-46-9	Benzylamine
120-51-4	Benzyl benzoate
100-44-7	Benzyl chloride
98-87-3	Benzyl dichloride
92-52-4	Biphenyl
80-05-7	Bisphenol A
10-86-1	Bromobenzene
27497-51-4	Bromonaphthalene
106-99-0	Butadiene
106-98-9	1-Butene
123-86-4	n-Butyl acetate
141-32-2	n-Butyl acrylate
71-36-3	n-Butyl alcohol
78-92-2	s-Butyl alcohol
75-65-0	t-Butyl alcohol
109-73-9	n-Butylamine
13952-84-6	s-Butylamine
75-64-9	t-Butylamine
98-73-7	p-tert-Butyl benzoic acid
107-88-0	1,3-Butylene glycol
123-72-8	n-Butyraldehyde
107-92-6	Butyric acid
106-31-0	Butyric anhydride
109-74-0	Butyronitrile
105-60-2	Caprolactam
75-1-50	Carbon disulfide
558-13-4	Carbon tetrabromide
56-23-5	Carbon tetrachloride
9004-35-7	Cellulose acetate
79-11-8	Chloroacetic acid
108-42-9	m-Chloroaniline
95-51-2	o-Chloroaniline
106-47-8	p-Chloroaniline
35913-09-8	Chlorobenzaldehyde
108-90-7	Chlorobenzene
118-91-2, 535-80-8, 74-11-3[c]	Chlorobenzoic acid
2136-81-4, 2136-89-2, 5216-25-1[c]	Chlorobenzotrichloride
1321-03-5	Chlorobenzoyl chloride
25497-29-4	Chlorodifluoromethane
75-45-6	Chlorodifluorethane
67-66-3	Chloroform
25586-43-0	Chloronaphthalene
88-73-3	o-Chloronitrobenzene
100-00-5	p-Chloronitrobenzene
25167-80-0	Chlorophenols
126-99-8	Chloroprene
7790-94-5	Chlorosulfonic acid
108-41-8	m-Chlorotoluene
95-49-8	o-Chlorotoluene
106-43-4	p-Chlorotoluene
75-72-9	Chlorotrifluoromethane
108-39-4	m-Cresol
95-48-7	o-Cresol
106-44-5	p-Cresol
1319-77-3	Mixed cresols
1319-77-3	Cresylic acid
4170-30-0	Crotonal dehyde
3724-65-0	Crotonic acid
98-82-8	Cumene
80-15-9	Cumene hydroperoxide
372-09-8	Cyanoacetic acid
506-77-4	Cyanogen chloride
108-80-5	Cyanuric acid
108-77-0	Cyanuric chloride
110-82-7	Cyclohexane
108-93-0	Cyclohexanol
108-94-1	Cyclohexanone
110-83-8	Cyclohexene
108-91-8	Cyclohexylamine
111-78-4	Cyclooctadiene
112-30-1	Decanol
123-42-2	Diacetone alcohol
27576-04-1	Diaminobenzoic acid
95-76-1,	Dichloroaniline

CAS No.[a]	Chemical
95-82-9, 554-00-7, 608-27-5, 608-31-1, 626-43-7, 27134-27-6, 57311-92-9[c]	
541-73-1	m-Dichlorobenzene
95-50-1	o-Dichlorobenzene
106-46-7	p-Dichlorobenzene
75-71-8	Dichlorodifluoromethane
111-44-4	Dichloroethyl ether
107-06-2	1,2-Dichloroethane (EDC)
96-23-1	Dichlorohydrin
26952-23-8	Dichloropropene
101-83-7	Dicyclohexylamine
109-89-7	Diethylamine
111-46-6	Diethylene glycol
112-36-7	Diethylene glycol diethyl ether
111-96-6	Diethylene glycol dimethyl ether
112-34-5	Diethylene glycol monobutyl ether
124-17-7	Diethylene glycol monobutyl ether acetate
111-90-0	Diethylene glycol monoethyl ether
112-15-2	Diethylene glycol monoethyl ether acetate
111-77-3	Diethylene glycol monomethyl ether
64-67-5	Diethyl sulfate
75-37-6	Difluoroethane
25167-70-8	Diisobutylene
26761-40-0	Diisodecyl phthalate
27554-26-3	Diisooctyl phthalate
674-82-8	Diketene
124-40-3	Dimethylamine
121-69-7	N,N-Dimethylaniline
115-10-6	N,N-Dimethyl ether
68-12-2	N,N-Dimethylformamide
57-14-7	Dimethylhydrazine
77-78-1	Dimethyl sulfate
75-18-3	Dimethyl sulfide
67-68-5	Dimethyl sulfoxide
120-61-6	Dimethyl terephthalate
99-34-3	3,5-Dinitrobenzoic acid
51-28-5	Dinitrophenol
25321-14-6	Dinitrotoluene
123-91-1	Dioxane
646-06-0	Dioxilane
122-39-4	Diphenylamine
101-84-8	Diphenyl oxide
102-08-9	Diphenyl thiourea
25265-71-8	Dipropylene glycol
25378-22-7	Dodecene
28675-17-4	Diodecylaniline
27193-86-8	Dodecylphenol
106-89-8	Epichlorohydrin
64-17-5	Ethanol
141-43-5[c]	Ethanolamines
141-78-6	Ethyl acetate
141-97-9	Ethyl acetoacetate
140-88-5	Ethyl acrylate
75-04-7	Ethylamine
100-41-4	Ethylbenzene
74-96-4	Ethyl bromide

CAS No.[a]	Chemical
9004-57-3	Ethylcellulose
75-00-3	Ethyl chloride
105-39-5	Ethyl chloroacetate
105-56-6	Ethylcyanoacetate
74-85-1	Ethylene
96-49-1	Ethylene carbonate
107-07-3	Ethylene chlorohydrin
107-15-3	Ethylenediamine
106-93-4	Ethylene dibromide
107-21-1	Ethylene glycol
111-55-7	Ethylene glycol diacetate
110-71-4	Ethylene glycol dimethyl ether
111-76-2	Ethylene glycol monobutyl ether
112-07-2	Ethylene glycol monobutyl ether acetate
110-80-5	Ethylene glycol monoethyl ether
111-15-9	Ethylene glycol monoethyl ether acetate
109-86-4	Ethylene glycol monomethyl ether
110-49-6	Ethylene glycol monomethyl ether acetate
122-99-6	Ethylene glycol monophenyl ether
2807-30-9	Ethylene glycol monopropyl ether
75-21-8	Ethylene oxide
60-29-7	Ethyl ether
104-76-7	2-Ethylhexanol
122-51-0	Ethyl orthoformate
95-92-1	Ethyl oxalate
41892-71-1	Ethyl sodium oxalacetate
50-00-0	Formaldehyde
75-12-7	Formamide
64-18-6	Formic acid
110-17-8	Fumaric acid
98-01-1	Furfural
56-81-5	Glycerol
26545-73-7	Glycerol dichlorohydrin
25791-96-2	Glycerol triether
56-40-6	Glycine
107-22-2	Glyoxal
118-74-1	Hexachlorobenzene
67-72-1	Hexachloroethane
36653-82-4	Hexadecyl alcohol
124-09-4	Hexamethylenediamine
629-11-8	Hexamethylene glycol
100-97-0	Hexamethylenetetramine
74-90-8	Hydrogen cyanide
123-31-9	Hydroquinone
99-96-7	p-Hydroxybenzoic acid
26760-64-5	Isoamylene
78-83-1	Isobutanol
110-19-0	Isobutyl acetate
115-11-7	Isobutylene
78-84-2	Isobutyraldehyde
79-31-2	Isobutyric acid
25339-17-7	Isodecanol
26952-21-6	Isooctyl alcohol
78-78-4	Isopentane
78-59-1	Isophorone
121-91-5	Isophthalic acid
78-79-5	Isoprene
67-63-0	Isopropanol
108-21-4	Isopropyl acetate

CAS No.[a]	Chemical
75-31-0	Isopropylamine
75-29-6	Isopropyl chloride
25168-06-3	Isopropylphenol
463-51-4	Ketene
([b])	Linear alkyl sulfonate
123-01-3	Linear alkylbenzene (linear dodecylbenzene)
110-16-7	Maleic acid
108-31-6	Maleic anhydride
6915-15-7	Malic acid
141-79-7	Mesityl oxide
121-47-1	Metanilic acid
79-41-4	Methacrylic acid
563-47-3	Methallyl chloride
67-56-1	Methanol
79-20-9	Methyl acetate
105-45-3	Methyl acetoacetate
74-89-5	Methylamine
100-61-8	n-Methylaniline
74-83-9	Methyl bromide
37365-71-2	Methyl butynol
74-87-3	Methyl chloride
108-87-2	Methylcyclohexane
1331-22-2	Methylcyclohexanone
75-09-2	Methylene chloride
101-77-9	Methylene dianiline
101-68-8	Methylene diphenyl diisocyanate
78-93-3	Methyl ethyl ketone
107-31-3	Methyl formate
108-11-2	Methyl isobutyl carbinol
108-10-1	Methyl isobutyl ketone
80-62-6	Methyl methacrylate
77-75-8	Methylpentynol
98-83-9	a-Methylstyrene
110-91-8	Morpholine
85-47-2	a-Naphthalene sulfonic acid
120-18-3	b-Naphthalene sulfonic acid
90-15-3	a-Naphthol
135-19-3	b-Naphthol
75-98-9	Neopentanoic acid
88-74-4	o-Nitroaniline
100-01-6	p-nitroaniline
91-23-6	o-nitroanisole
100-17-4	p-nitroanisole
98-95-3	Nitrobenzene
27178-83-2[c]	Nitrobenzoic acid (o,m, and p)
79-24-3	Nitroethane
75-52-5	Nitromethane
88-75-5	2-Nitrophenol
25322-01-4	Nitropropane
1321-12-6	Nitrotoluene
27215-95-8	Nonene
25154-52-3	Nonylphenol
27193-28-8	Octylphenol
123-63-7	Paraldehyde
115-77-5	Pentaerythritol
109-66-0	n-Pentane
109-67-1	1-pentene
127-18-4	Perchloroethylene
594-42-3	Perchloromethyl mercaptan
94-70-2	o-Phenetidine
156-43-4	p-Phenetidine
108-95-2	Phenol
98-67-9,	Phenolsulfonic acids
585-38-6,	
609-46-1,	
1333-39-7[c]	
91-40-7	Phenyl anthranilic acid
([b])	Phenylenediamine
75-44-5	Phosgene
85-44-9	Phthalic anhydride
85-41-6	Phthalimide
108-99-6	b-Picoline
110-85-0	Piperazine
9003-29-6	Polybutenes
25036-29-7[c]	
25322-68-3	Polyethylene glycol
25322-69-4	Polypropylene glycol
123-38-6	Propionaldehyde
79-09-4	Propionic acid
71-23-8	n-Propyl alcohol
107-10-8	Propylamine
540-54-5	Propyl chloride
115-07-1	Propylene
127-00-4	Propylene chlorohydrin
78-87-5	Propylene dichloride
57-55-6	Propylene glycol
75-56-9	Propylene oxide
110-86-1	Pyridine
106-51-4	Quinone
108-46-3	Resorcinol
27138-57-4	Resorcylic acid
69-72-7	Salicylic acid
127-09-3	Sodium acetate
532-32-1	Sodium benzoate
9004-32-4	Sodium carboxymethyl cellulose
3926-62-3	Sodium chloroacetate
141-53-7	Sodium formate
139-02-6	Sodium phenate
110-44-1	Sorbic acid
100-42-5	Styrene
110-15-6	Succinic acid
110-61-2	Succinonitrile
121-57-3	Sulfanilic acid
126-33-0	Sulfolane
1401-55-4	Tannic acid
100-21-0	Terephthalic acid
79-34-5[c]	Tetrachloroethanes
117-08-8	Tetrachlorophthalic anhydride
78-00-2	Tetraethyl lead
119-64-2	Tetrahydronaphthalene
85-43-8	Tetrahydrophthalic anhydride
75-74-1	Tetramethyl lead
110-60-1	Tetramethylenediamine
110-18-9	Tetramethylethylenediamine
108-88-3	Toluene
95-80-7	Toluene-2,3-diamine
584-84-9	Toluene-2,4-diisocyanate
26471-62-5	Toluene diisocyanates (mixture)
1333-07-9	Toluenesulfonamide
104-15-4[c]	Toluenesulfonic acids
98-59-9	Toluenesulfonyl chloride
26915-12-8	Toluidines
87-61-6,	Trichlorobenzenes
108-70-3,	
120-82-1[c]	
71-55-6	1,1,1-Trichloroethane

CAS No.[a]	Chemical
79-00-5	1,1,2-Trichloroethane
79-01-6	Trichloroethylene
75-69-4	Trichlorofluoromethane
96-18-4	1,2,3-Trichloropropane
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane
121-44-8	Triethylamine
112-27-6	Triethylene glycol
112-49-2	Triethylene glycol dimethyl ether
7756-94-7	Triisobutylene
75-50-3	Trimethylamine
57-13-6	Urea
108-05-4	Vinyl acetate
75-01-4	Vinyl chloride
75-35-4	Vinylidene chloride
25013-15-4	Vinyl toluene
1330-20-7	Xylenes (mixed)
95-47-6	o-Xylene
106-42-3	p-Xylene
1300-71-6	Xylenol
1300-73-8	Xylidine

[a]CAS numbers refer to the Chemical Abstracts Registry numbers assigned to specific chemicals, isomers, or mixtures or chemicals. Some isomers or mixtures that are covered by the standards do not have CAS numbers assigned to them. The standards apply to all of the chemicals listed, whether CAS numbers have been assigned or not.

[b]No CAS number(s) have been assigned to this chemical, its isomers, or mixtures containing these chemicals.

[c]CAS numbers for some of the isomers are listed; the standards apply to all of the isomers and mixture, even if CAS numbers have not been assigned.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. (1) (c), (2) (intro.) and (a) 1. c., (3) (a) 3., (b) 4. a. and (c) 3., (4) (a) 2. intro., a. and 4., (6) (b) (intro.), (d) 1., (e) 1., (g) 5. and (9) (a), renum. (4) (b) 1. b. to g. to be 2.a. to f. and am. e. and f., r. and recr. (3) (j) 4., cr. (4) (b) 1. b., r. (5) and (8) (f), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.63 Beverage can surface coating industry. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to the following affected facilities in beverage can surface coating lines: each exterior base coat operation, each overvarnish coating operation and each inside spray coating operation.

(b) The provisions of this section apply to each affected facility which is identified in par. (a) and commences construction, modification, or reconstruction after November 26, 1980.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings diven in s. NR 440.02.

1. "Beverage can" means any two-piece steel or aluminum container in which soft drinks or beer, including malt liquor, are packaged. The definition does not include containers in which fruit or vegetable juices are packaged.

2. "Exterior base coating operation" means the system on each beverage can surface coating line used to apply a coating to the exterior of a two piece beverage can body. The exterior base coat provides corrosion resistance and a background for lithography or printing operations. The exterior base coat operation consists of the coating application station, flashoff area and curing oven. The exterior base coat may be pigmented or clear (unpigmented).

3. "Inside spray coating operation" means the system on each beverage can surface coating line used to apply a coating to the interior of a two-piece beverage can body. This coating provides a protective film between the contents of the beverage can and the metal can body. The inside spray coating operation consists of the coating application station, flashoff area and curing oven. Multiple applications of an inside spray coating are considered to be a single coating operation.

4. "Overvarnish coating operation" means the system on each beverage can surace coating line used to apply a coating over ink which reduces friction for automated beverage can filling equipment, provides gloss and protects the finished beverage can body from abrasion and corrosion. The overvarnish coating is applied to two-piece beverage can bodies. The overvarnish coating operation consists of the coating application station, flashoff area and curing oven.

5. "Two-piece can" means any beverage can that consists of a body manufactured from a single piece of steel or aluminum and a top. Coatings for a two-piece can are usually applied after fabrication of the can body.

6. "VOC content" means all volatile organic compounds (VOCs) that are in a coating. VOC content is expressed in terms of kilograms of VOC per liter of coating solids.

(b) Symbols used in sub. (4) are defined as follows:

1. C_a = the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million as carbon).

2. C_b = the VOC concentration in each gas stream entering the control device (parts per million as carbon)

3. D_c = density of each coating, as received (kilograms per liter).

4. D_d = density of each VOC-solvent added to coatings (kilograms per liter).

5. D_r = density of VOC-solvent recovered by an emission control device (kilograms per liter).

6. E = VOC destruction efficiency of the control device (fraction).

7. F = the proportion of total VOC emitted by an affected facility which enters the control device to total emissions (fraction).

8. G = the volume-weighted average of VOC in coatings assumed in a calendar month per volume of coating solids applied (kilograms per liter of coating solids).

9. H_e = the fraction of VOC emitted at the coater and flashoff areas captured by a collection system.

10. H_h = the fraction of VOC emitted at the cure oven captured by a collection system.

11. L_c = the volume of each coating consumed, as received (liters).

12. L_d = the volume of each VOC-solvent added to coatings (liters).

13. L_r = the volume of VOC-solvent recovered by an emission control device (liters).

14. L_s = the volume of coating solids consumed (liters).

15. M_d = the mass of VOC-solvent added to coatings (kilograms).

16. M_o = the mass of VOC-solvent in coatings consumed, as received (kilograms).

17. M_r = the mass of VOC-solvent recovered by emission control device (kilograms).

18. N = the volume-weighted average mass of VOC emissions to atmosphere per unit volume of coating solids applied (kilograms per liter of coating solids).

19. Q_a = the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour).

20. Q_b = the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour).

21. R = the overall emission reduction efficiency for an affected facility (fraction).

22. S_e = the fraction of VOC in coating and diluent VOC-solvent emitted at the coater and flashoff area for a coating operation.

23. S_h = the fraction of VOC in coating and diluent solvent emitted at the cure oven for a coating operation.

24. V_s = the proportion of solids in each coating, as received (fraction by volume).

25. W_o = the proportion of VOC in each coating, as received (fraction by weight).

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. On or after the date on which the initial performance test required by s. NR 440.08 (1) is completed, no owner or operator subject to the provisions of this section may discharge or cause the discharge of VOC emissions to the atmosphere that exceed the following volume-weighted calendar-month average emissions:

(a) 0.29 kilogram of VOC per liter of coating solids (2.4 pounds per gallon) from each two-piece can exterior base coating operation, except clear base coat;

(b) 0.46 kilogram of VOC per liter of coating solids (3.8 pounds per gallon) from each two-piece can clear base coating operation and from each overvarnish coating operation; and

(c) 0.89 kilogram of VOC per liter of coating solids (7.4 pounds per gallon) from each two-piece can inside spray coating operation.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) does not apply to monthly performance tests and s. NR 440.08 (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.

1. The owner or operator shall use the following procedures for each affected facility that does not use a capture system and a control device to comply with the emission limit specified under sub. (3). The owner or operator shall determine the VOC-content of the coatings from formulation data supplied by the manufacturer of the coating or by an analy-

sis of each coating as received, using Reference Method 24 of 40 C.F.R. part 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 coatings using Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, or an equivalent or alternative method. The owner or operator shall determine from company records the volume of coating and the mass of VOC-solvent added to coatings. 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, number of cans and size of cans being processed 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 per volume of coating solids used during the calendar month for each affected facility, except as provided under subpar. d. The volume-weighted average of the total mass of VOC per volume of coating solids used each calendar month will be determined by the following procedures.

1) Calculate the mass of VOC used ($M_o + M_d$) during the calendar month for the affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} \quad D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} \quad D_{dj}$$

($\Sigma L_{dj} D_{dj}$ 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 and

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 the calendar month for the 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) Calculate the volume-weighted average mass of VOC per volume of solids used (G) during the calendar month for the affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s}$$

b. Calculate the volume-weighted average of VOC emissions discharged to the atmosphere (N) during the calendar month for the affected facility by the following equation:

$N = G$

c. Where the value of the volume-weighted average of mass of VOC per volume of solids discharged to the atmosphere (N) is equal to or less than the applicable emission limit specified under sub. (3) the affected facility is in compliance.

d. If each individual coating used by an affected facility has a VOC content equal to or less than the limit specified under sub. (3) the affected facility is in compliance provided no VOC-solvents are added to the coating during distribution or application.

2. An owner or operator shall use the following procedures for each affected facility that uses a capture system and a contol device that destroys VOC (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 by this subparagraph. In subsequent months the owner or operator may use the most recently determined overall reduction efficiency 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 used by the affected facility that enters the control device using the following equation:

$$F = S_e H_e + S_h H_h$$

where H_e and H_h shall be determined by a method that has been previously approved by the administrator. The owner or operator may use the values of S_e and S_h specified in Table 1 or other values determined by a method that has been previously approved by the administrator.

Table 1. DISTRIBUTION OF VOC EMISSIONS

Coating Operation	Emission Distribution	
	Coater/ flashoff (S_e)	Curing Oven (S_h)
Two-piece aluminum or steel can:		
Exterior base coat operation	0.75	0.25
Overvarnish coating operation	0.75	0.25
Inside spray coating operation	0.80	0.20

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 vents before the control device and m is the number of vents after the control device.

3) Determine overall reduction efficiency (R) using the following equation:

$$R = EF$$

b. Calculate the volume-weighted average of the total mass of VOC per volume of coating solids (G) used during the calendar month for the affected facility using the equations presented in subd. 1.a.

c. Calculate the volume-weighted average of VOC emissions discharged to the atmosphere (N) during the calendar month by the following equation:

$$N = G \times (1 - R)$$

d. If the volume-weighted average of mass of VOC emitted to the atmosphere for the calendar month (N) is equal to or less than the applicable emission limit specified under sub. (3) the affected facility is in compliance.

3. An owner or operator shall use the following procedure for each affected facility that 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 volume-weighted average of the total mass of VOC per unit volume of coating solids applied (G) used during the calendar month for the affected facility using the equations presented in subd. 1.

b. Calculate the total mass of VOC recovered (M_r) during each calendar month using the following equation: $M_r = L_r D_r$

c. Calculate overall reduction efficiency of the control device (R) for the calendar month for the affected facility using the following equation:

$$R = \frac{M_r}{M_o + M_d}$$

d. Calculate the volume-weighted average mass of VOC discharged to the atmosphere (N) for the calendar month for the affected facility using the equation presented in subd. 2.c.

e. If the weighted average of VOC emitted to the atmosphere for the calendar month (N) is equal to or less than the applicable emission limit specified under sub. (3) the affected facility is in compliance.

(5) MONITORING OF EMISSIONS AND OPERATIONS. 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.

(a) Where thermal incineration is used a temperature measure device shall be installed in the firebox. Where catalytic incineration is used temperature measurement devices 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 the manufacturer's specifications. The device shall have an accuracy the greater of ± 0.75% of the temperature being measured expressed in degrees Celsius or ± 2.5°C.

(c) Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(6) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The owner or operator of an affected facility shall include the following data in the initial compliance report required under s. NR 440.08 (1).

1. Where only coatings which individually have a VOC content equal to or less than the limits specified under sub. (3) are used, and no VOC is added to the coating during the application or distribution process, the owner or operator shall provide a list of coatings used for each affected facility and the VOC content of each coating calculated from data determined using Reference Method 24 or C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, or supplies by the manufacturers of the coatings.

2. Where one or more coating which individually have a VOC content greater than the limits specified under sub. (3) are used or where VOC are added or used in the coating process the owner or operator shall report for each affected facility the volume-weighted average of the total mass of VOC per volume of coating solids.

3. Where the compliance is achieved through the use of incineration the owner or operator shall include in the initial performance test required under s. NR 440.08 (1) the combustion temperature (or the gas temperature upstream and downstream of the catalyst bed), the total mass of VOC per volume of coating solids before and after the incinerator, the capture efficiency and the destruction efficiency of the incinerator used to attain compliance with the applicable emission limit specified under sub. (3). The owner or operator shall also include a description of the method used to establish the amount of VOC captured by the capture system and sent to the control device.

(b) Following the initial performance test each owner or operator shall submit for each semi-annual period ending June 30 and December 31 a written report to the department of exceedances of VOC content and incinerator operating temperatures when compliance with sub. (3) is achieved through the use of incineration. All semi-annual reports shall be postmarked by the 30th day following the end of each semi-annual period. For the purposes of these reports exceedances are defined as:

1. Each performance period in which the volume-weighted average of the total mass of VOC per volume of coating solids, after the control device, if capture devices and control systems are used, 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 cans are processed, 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 incinerator, each 3-hour period when cans are being processed, 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) and all 3-hour periods, when cans are being processed 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).

(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 in the initial and monthly performance tests. 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 incinerator 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 of 40 C.F.R. part 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, an equivalent or alternative method approved by the administrator, or manufacturer's formulation for data from which the VOC content of the coatings used for each affected facility can be calculated. In the event of dispute, Reference Method 24 shall be the referee method. When VOC content of waterborne coatings, determined from data generated by Reference Method 24, is used to determine compliance of affected facilities, the results of the Method 24 analysis shall be adjusted as described in section 4.4 of Method 24.

2. Reference Method 25 or an equivalent or alternative method for the determination of the VOC concentration in the effluent gas entering and leaving the control device for each stack equipped with an emission control device. The owner or operator shall notify the department 30 days in advance when performing a test using Reference Method 25. The following reference methods are to be used in conjunction with Reference Method 25:

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, the coating sample must be a 1-liter sample collected in a 1-liter container at a point where the sample will be representative of the coating material.

(c) For Reference Method 25, the sampling time for each of three runs must be at least 1 hour. The minimum sample volume must 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 will 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.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (a) (intro.), (b) (intro.) (3) (intro.), (4) (b) 2. a. and (7) (a) 1., r. (6) (d), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.64 Bulk gasoline terminals. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is the total of all the loading racks at a bulk gasoline terminal which deliver liquid product into gasoline tank trucks.

(b) Each facility under par. (a), the construction or modification of which is commenced after December 17, 1980, is subject to the provisions of this section.

(c) For purposes of this section any replacement of components of an existing facility described in par. (a), commenced before August 18, 1983 in order to comply with any emission standard adopted by the department, will not be considered a reconstruction under the provisions of s. NR 440.15.

Note: The intent of these standards is to minimize the emissions of VOC through the application of best demonstrated technologies (BDT). The numerical emission limits in this standard are expressed in terms of total organic compounds. The emission limit reflects the performance of BDT.

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

(a) "Bulk gasoline terminal" means any gasoline facility which receives gasoline by pipeline, ship or barge and has a gasoline throughput greater than 75,700 liters per day. Gasoline throughput shall be the maximum calculated design throughput as may be limited by compliance with an enforceable condition under Federal, State or local law and discoverable by the department and any other person.

(b) "Continuous vapor processing system" means a vapor processing system that treats total organic compounds vapors collected from gasoline tank trucks on a demand basis without intermediate accumulation in a vapor holder.

(c) "Existing vapor processing system" means a processing system (capable of achieving emissions to the atmosphere no greater than 80 milligrams of total organic compounds per liter of gasoline loaded), the construction or refurbishment of which was commenced before December 17, 1980, and which was not constructed or refurbished after that date.

(e) "Gasoline tank truck" means a delivery tank truck used at bulk gasoline terminals which is loading gasoline or which has loaded gasoline on the immediately previous load.

(f) "Intermittent vapor processing system" means a vapor processing system that employs an intermediate vapor holder to accumulate total organic compounds vapors collected from gasoline tank trucks and treats the accumulated vapors only during automatically controlled cycles.

(g) "Loading rack" means the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill delivery tank trucks.

(h) "Refurbishment" means, with reference to a vapor processing system, replacement of components of, or addition of components to, the system within any 2-year period such that the fixed capital cost of the new components required for such component replacement or addition exceeds 50% of the cost of a comparable entirely new system.

(i) "Total organic compounds" means those compounds measured according to the procedures in sub. (4).

(j) "Vapor collection system" means any equipment used for containing total organic compounds vapors displaced during the loading of gasoline tank trucks.

(k) "Vapor processing system" means all equipment used for recovering or oxidizing total organic compounds vapors displaced from the affected facility.

(l) "Vapor-tight gasoline tank truck" means a gasoline tank truck which has demonstrated within the 12 preceding months that its product delivery tank will sustain a pressure change of not more than 750 pascals (75 mm of water) within 5 minutes after it is pressurized to 4,500 pascals (450 mm of water). This capability is to be demonstrated using the pressure test procedure specified in Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS (VOC) EMISSIONS FROM BULK GASOLINE TERMINALS. On and after the date on which s. NR 440.08 (1) requires a performance test to be completed the owner or operator of each bulk gasoline teminal containing an affected facility shall comply with the requirements of this subsection.

(a) Each affected facility shall be equipped with a vapor collection system designed to collect the total organic compounds vapors displaced from tank trucks during product loading.

(b) The emissions to the atmosphere from the vapor collection system due to the loading of liquid product into gasoline tank trucks are not to exceed 35 milligrams of total organic compounds per liter of gasoline loaded, except as noted in par. (c).

(c) For each affected facility equipped with an existing vapor processing system the emissions to the atmosphere from the vapor collection system due to the loading of liquid product into gasoline tank trucks are not to exceed 80 milligrams of total organic compounds per liter of gasoline loaded.

(d) Each vapor collection system shall be designed to prevent any total organic compounds vapors collected at one loading rack from passing to another loading rack.

(e) Loadings of liquid product into gasoline tank trucks shall be limited to vapor-tight gasoline tank trucks using the following procedures:

1. The owner or operator shall obtain the vapor tightness documentation described in sub. (6) (b) for each gasoline tank truck which is to be loaded at the affected facility.

2. The owner or operator shall require the tank identification number to be recorded as each gasoline tank truck is loaded at the affected facility.

3. The owner or operator shall cross-check each tank identification number obtained in subd. 2. with the file of tank vapor tightness documentation within 2 weeks after the corresponding tank is loaded.

4. The terminal owner or operator shall notify the owner or operator of each nonvapor-tight gasoline tank truck loaded at the affected facility within 3 weeks after the loading has occurred.

5. The teminal owner or operator shall take steps assuring that the nonvapor-tight gasoline tank truck will not be reloaded at the affected facility until vapor tightness documentation for that tank is obtained.

6. Alternate procedures to those described in subds. 1. to 5. for limiting gasoline tank truck loadings may be used upon application to an approval by the department.

(f) The owner or operator shall act to assure that loadings of gasoline tank trucks at the affected facility are made only into tanks equipped with vapor collection equipment that is compatible with the terminal's vapor collection system.

(g) The owner or operator shall act to assure that the terminal's and the tank truck's vapor collection systems are connected during each loading of a gasoline tank truck at the affected facility. Examples of actions to accomplish this include training drivers in the hookup procedures and posting visible reminder signs at the affected loading racks.

(h) The vapor collection and liquid loading equipment shall be designed and operated to prevent gauge pressure in the delivery tank from exceeding 4,500 pascals (450 mm of water) during product loading. This level is not to be exceeded when measured by the procedures specified in sub. (4) (b).

(i) No pressure-vacuum vent in the bulk gasoline terminal's vapor collection system may begin to open at a system pressure less than 4,500 pascals (450 mm of water).

(j) Each calendar month the vapor collection system, the vapor processing system and each loading rack handling gasoline shall be inspected during the loading of gasoline tank trucks for total organic compounds liquid or vapor leaks. For purposes of this paragraph detection methods incorporating sight, sound, or smell are acceptable. Each detection of a leak shall be recorded and the source of the leak repaired within 15 calendar days after it is detected.

(4) TEST METHODS AND PROCEDURES. (a) Section NR 440.08 (6) does not apply to the performance test procedures required by this section.

(b) For the purpose of determining compliance with sub. (3) (h) the following procedures shall be used:

1. Calibrate and install a pressure measurement device (liquid manometer, magnehelic gauge, or equivalent instrument), capable of measuring up to 500 mm of water gauge pressure with $\pm$ 2.5 mm of water precision.

2. Connect the pressure measurement device to a pressure tap in the terminal's vapor collection system. It should be located as close as possible to the connection with the gasoline tank truck.

3. During the performance test record the pressure every 5 minutes while a gasoline tank truck is being loaded and record the highest instantaneous pressure that occurs during each loading. Every loading position must be tested at least once during the performance test.

(c) For the purpose of determining compliance with the mass emission limitations of sub. (3) (b) and (c) the following reference methods in 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used:

1. For the determination of volume at the exhaust vent:

a. Method 2B for combustion vapor processing systems.

b. Method 2A for all other vapor processing systems.

2. Method 25A or 25B for the determination of total organic compounds concentration at the exhaust vent. The calibration gas shall be either propane or butane.

(d) Immediately prior to a performance test required for determination of compliance with subs. (3) (b), (c) and (h) all potential sources of vapor leakage in the terminal's vapor collection system equipment shall be monitored for leaks using Method 21. The monitoring shall be conducted only while a gasoline tank truck is being loaded. A reading of 10,000 ppmv or greater as methane shall be considered a leak. All leaks shall be repaired prior to conducting the performance test.

(e) The test procedure for determining compliance with sub. (3) (b) and (c) is as follows:

1. All testing equipment shall be prepared and installed as specified in the appropriate test methods.

2. The time period for a performance test shall be not less than 6 hours during which at least 300,000 liters of gasoline are loaded. If the throughput criterion is not met during the initial 6 hours the test may be either continued until the throughput criteria is met or resumed the next day with another complete 6 hours of testing. Testing should be

conducted during the 6-hour period in which the highest throughput normally occurs as much as possible.

3. For intermittent vapor processing systems:

a. The vapor holder level shall be recorded at the start of the performance test. The end of the performance test shall coincide with a time when the vapor holder is at its original level.

b. At least two startups and shutdowns of the vapor processor shall occur during the performance test. If this does not occur under automatically controlled operation the system shall be manually controlled.

4. The volume of gasoline dispensed during the performance test period at all loading racks whose vapor emissions are controlled by the processing system being tested shall be determined. This volume may be determined from terminal records or from gasoline dispensing meters at each loading rack.

5. An emission testing interval shall consist of each 5-minute period during the performance test. For each interval:

a. The reading from each measurement instrument shall be recorded, and

b. The volume exhausted and the average total organic compounds concentration in the exhaust vent shall be determined as specified in the appropriate test method. The average total organic compounds concentration shall correspond to the volume measurement by taking into account the sampling system response time.

6. The mass emitted during each testing interval shall be calculated as follows:

$$M_{ei} = 10^{-6}\, K\, V_{es}\, C_e$$

where:

M_{ei} = mass of total organic compounds emitted during testing interval i, mg

V_{es} = volume of air-vapor mixture exhausted, m^3, at standard conditions

C_e = total organic compounds concentration (as measured) at the exhaust vent, ppmv

K = density of calibration gas, mg/m^3, at standard conditions

= 1.83×10^6, for propane

= 2.41×10^6, for butane

s = standard conditions, 20°C and 760 mm Hg

7. The total organic compounds mass emissions shall be calculated as follows:

$$E = \frac{\sum_{i=1}^{n} M_{ei}}{L}$$

where:

E = mass of total organic compounds emitted per volume of gasoline loaded, mg/liter.

M_{ei} = mass of total organic compounds emitted during testing interval i, mg.

L = total volume of gasoline loaded, liters.

n = number of testing intervals.

(f) The owner or operator may adjust the emission results to exclude the methane and ethane content in the exhaust vent by any method approved by the department.

(6) REPORTING AND RECORDKEEPING. (a) The tank truck vapor tightness documentation required under sub. (3) (e) 1. shall be kept on file at the terminal in a permanent form available for inspection.

(b) The documentation file for each gasoline tank shall be updated at least once per year to reflect current test results as determined by Reference Method 27 in 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17. This documentation shall include, as a minimum, the following information:

1. Test Title: Gasoline Delivery Tank Pressure Test - EPA Reference Method 27.

2. Tank Owner and Address.

3. Tank Identification Number.

4. Testing Location.

5. Date of Test.

6. Tester Name and Signature.

7. Witnessing Inspector, if any: Name, Signature and Affiliation.

8. Test Results: Actual Pressure Change in 5 minutes, mm of water (average for 2 runs).

(c) A record of each monthly leak inspection required under sub. (3) (j) shall be kept on file at the terminal for at least 2 years. Inspection records shall include, as a minimum, the following information:

1. Date of Inspection.

2. Findings (may indicate no leaks discovered; or location, nature, and severity of each leak).

3. Leak determination method.

4. Corrective Action (date each leak repaired; reasons for any repair interval in excess of 15 days).

5. Inspector Name and Signature.

(d) The terminal owner or operator shall keep documentation of all notifications required under sub. (3) (e) 4. on file of the terminal for at least 2 years.

(f) The owner or operator of an affected facility shall keep records of all replacements or additions of components performed on an existing vapor processing system for at least 3 years.

(7) RECONSTRUCTION. For purposes of this section:

(a) The cost of the following frequently replaced components of the affected facility may not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital costs that would be required to construct a comparable entirely new facility" under s. NR 440.15: pump seals, loading arm gaskets and swivels, coupler gaskets, overfill sensor couplers and cables, flexible vapor hoses and grounding cables and connectors.

(b) Under s. NR 440.15, the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components, except components specified in par. (a), which are or will be replaced pursuant to all continuous programs of component replacement which are commenced within 2-year period following December 17, 1980. For purposes of this paragraph "commenced" means that an owner or operator has undertaken a continuous program of component replacement or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of component replacement.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), (3) (i) and (7) ()a), renum. (2) (d) to NR 400.02 (43), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.642 New residential wood heaters. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each wood heater manufactured on or after July 1, 1988, or sold at retail on or after July 1, 1990. The provisions of this section do not apply to wood heaters constructed prior to July 1, 1988, that are or have been owned by a noncommercial owner for personal use.

(b) Each affected facility shall comply with the applicable emission limits in sub. (3) unless exempted under par. (c), (d), (e), (f), (g) or (h).

(c) Within a model line, an affected facility manufactured prior to July 1, 1990 is exempt from the emission limits under sub. (3) if that model line has been issued a valid certificate of compliance by the Oregon department of environmental quality prior to January 1, 1988, and meets the Oregon 1988 standards for particulate matter emissions, provided that:

a. The manufacturer requests that exemption in writing from the administrator and certifies that the information used in obtaining Oregon certification satisfied applicable requirements of the Oregon law;

b. The certification test included at least one test run at a burn rate of less than 1.25 kg/hr.

c. No changes in components that may affect emissions have been made to the model line that would require recertification under sub. (4) (k);

d. The manufacturer complies with application requirements contained in sub. (4) (b) 1., 2., 5., 6. a. and 11., (c), (m) and (o) 2.; and

e. The manufacture submits a copy of the certificate issued by the state of Oregon, a complete set of engineering drawings, and, at a minimum, those portions of the test report that include the emissions summary, the burn rates and the laboratory's description of how the wood heater operates.

2. Affected facilities exempted under this paragraph may not be sold at retail on or after July 1, 1992.

3. Any certificate issued under this paragraph prior to January 1, 1988, shall be modified to reflect any modifications in Oregon certification approved by the Oregon department of environmental quality prior to that date. The manufacturer shall notify the administrator of any such modifications within 30 days of the approval by the Oregon department of environmental quality.

4. Upon denying a certificate under this paragraph the administrator shall give written notice setting forth the basis for this determination to the manufacturer involved.

5. The administrator may revoke a certificate issued under this paragraph if he or she determines that any of the conditions or determinations listed in sub. (4) (l) 1. c., d., e., and f. exists, or if the state of Oregon revokes its certification.

(d) An affected facility is exempt from the applicable emission limits of sub. (3), provided that:

1. It was manufactured between July 1, 1988, and June 30, 1989;

2. The manufacturer was a manufacturer of wood heaters as of January 1, 1987, and manufactured (or, in the case of a foreign manufacturer, exported to the United States) fewer than 2,000 wood heaters between July 1, 1987, and June 30, 1988;

3. The manufacturer manufactured no more uncertified wood heaters between July 1, 1988 and June 30, 1989, than manufactured (or, in the case of a foreign manufacturer, exported to the United States) between July 1, 1987 and June 30, 1988; and

4. The affected facility is sold at retail before July 1, 1991.

5. For the purposes of this paragraph, the term "manufacturer" does not include importers of wood heaters.

(e) Affected facilities manufactured in the U.S. for export are exempt from the applicable emission limits of sub. (3) and the requirements of sub. (4).

(f) A wood heater used for research and development purposes that is never offered for sale or sold is exempt from the applicable emission limits of sub. (3) and the requirements of sub. (4). No more than 50 wood heaters manufactured per model line may be exempted for this purpose.

(g) A coal-only heater is exempt from the applicable emission limits of sub. (3) and the requirements of sub. (4).

(h) The following are not affected facilities and are not subject to this section:

1. Open masonry fireplaces constructed on site.

2. Boilers,

3. Furnaces, and

4. Cookstoves.

(i) Modification or reconstruction, as defined in ss. NR 440.14 and 440.15, does not, by itself, make a wood heater an affected facility under this section.

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

(a) "At retail" means the sale by a commercial owner of a wood heater to the ultimate purchaser.

(b) "Boiler" means a solid burning appliance used primarily for heating spaces, other than the space where the appliance is located, by the distribution through pipes of a gas or fluid heated in the appliance. The appliance shall be tested and listed as a boiler under accepted American or Canadian safety testing codes. A manufacturer may request an exemption in writing from the administrator by stating why the testing and listing requirement is not practicable and by demonstrating that this appliance is otherwise a boiler.

(c) "Coal-only heater" means an enclosed, coal-burning appliance capable of space heating, or domestic water heating, which has all of the following characteristics:

1. An opening for emptying ash that is located near the bottom or the side of the appliance.

2. A system that admits air primarily up and through the fuel bed.

3. A grate or other similar device for shaking or disturbing the fuel bed or power-driven mechanical stoker.

4. Installation instructions that state that the use of wood in stove, except for coal ignition purposes, is prohibited by law, and

5. The model is listed by a nationally recognized safety-testing laboratory for use of coal only, except for coal ignition purposes.

(d) "Commercial owner" means any person who owns or controls a wood heater in the course of the manufacture, importation, distribution, or sale of the wood heater.

(e) "Cookstove" means a wood-fired appliance that is designed primarily for cooking food and that has the following characteristics:

1. An oven, with a volume of 0.028 cubic meters (1 cubic foot) or greater, and an oven rack,

2. A device for measuring oven temperatures,

3. A flame path that is routed around the oven,

4. A shaker grate,

5. An ash pan,

6. An ash clean-out door below the oven, and

7. The absence of a fan or heat channels to dissipate heat from the appliance.

(f) "Furnace" means a solid fuel burning appliance that is designed to be located outside of ordinary living areas and that warms spaces other than the space where the appliance is located by the distribution of air heated in the appliance through ducts. The appliance shall be tested and listed as a furnace under accepted American or Canadian safety testing codes unless exempted from this provision by the administrator. A manufacturer may request an exemption in writing from the administrator by stating why the testing and listing requirement is not practicable and by demonstrating that the appliance is otherwise a furnace.

(g) "Manufactured" means completed and ready for shipment (whether or not packaged).

(h) "Manufacturer" means any person who constructs or imports a wood heater.

(i) "Model line" means all wood heaters offered for sale by a single manufacturer that are similar in all material respects.

(j) "Representative affected facility" means an individual wood heater that is similar in all material respects to other wood heaters within the model line it represents.

(k) "Sale" means the transfer of ownership or control, except that transfer of control may not constitute a sale for purposes of sub. (1) (f).

(l) "Similar in all material respects" means that the construction materials, exhaust and inlet air system and other design features are within the allowed tolerances for components identified in sub. (4) (k).

(m) "Wood heater" means an enclosed woodburning appliance capable of and intended for space heating or domestic water heating that meets all of the following criteria:

1. An air-to-fuel ratio in the combustion chamber averaging less than 35-to-1 as determined by the test procedure prescribed in sub. (5), performed at an accredited laboratory,

2. A usable firebox volume of less than 20 cubic feet,

3. A minimum burn rate less than 5 kg/hr as determined by the test procedure prescribed in sub. (5) performed at an accredited laboratory, and

4. A maximum weight of 800 kg. In determining the weight of an appliance for these purposes, fixtures and devices that are normally sold separately, such as flue pipe, chimney, and masonry components that are not an integral part of the appliance or heat distribution ducting, may not be included.

(3) STANDARDS FOR PARTICULATE MATTER. Unless exempted under sub. (1), each affected facility: (a) Manufactured on or July 1, 1988, or sold at retail on or after July 1, 1990, shall comply with the following particulate matter emission limits as determined by the test methods and procedures in sub. (5):

1. An affected facility equipped with a catalytic combustor may not discharge into the atmosphere any gases which contain particulate matter in excess of a weighted average of 5.5 g/hr.

2. An affected facility not equipped with a catalytic combustor may not discharge into the atmosphere any gases which contain particulate matter in excess of a weighted average of 8.5 g/hr.

(b) Manufactured on or after July 1, 1990, or sold at retail on or after July 1, 1992, shall comply with the following particulate matter emission limits as determined by the test methods and procedures in sub. (5):

1. An affected facility equipped with a catalytic combustor may not discharge into the atmosphere any gases which contain particulate matter in excess of a weighted average of 4.1 g/hr. Particulate emissions during any test run at any burn rate that is required to be used in the weighted average may not exceed the value calculated for "C" (rounded to 2 significant figures) calculated using the following equation:

a. At burn rates less than or equal to 2.82 kg/hr,

$C = 3.55 \text{ g/kg} \times BR + 4.98 \text{ g/hr}$,

where BR = burn rate in kg/hr

b. At burn rates greater than 2.82 kg/hr,

$C = 15 \text{ g/hr}$.

2. An affected facility not equipped with a catalytic combustor may not discharge into the atmosphere any gases which contain particulate matter in excess of a weighted average of 7.5 g/hr. Particulate emissions may not exceed 15 g/hr during any test run at a burn rate less than or equal to 1.5 kg/hr that is required to be used in the weighted average, and particulate emissions may not exceed 18 g/hr during any test burn at a burn rate greater than 1.5 kg/hr that is required to be used in the weighted average.

(4) COMPLIANCE AND CERTIFICATION. (a) For each model line, compliance with applicable emission limits may be determined based on testing of representative affected facilities within the model line.

(b) Any manufacturer of an affected facility may apply to the administrator for a certificate of compliance for a model line. The application shall be in writing to: Stationary Source Compliance Division (EN-341), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington D.C., 20460, Attention: Wood Heater Program. The manufacturer shall submit 2 complete copies of the application and attachments. The application shall be signed by the manufacturer, or an authorized representative, and shall contain the following:

1. The model name and/or design number,

2. Two color photographs of the tested unit (or, for models being certified under sub. (1) (c), photographs of a representative unit), one showing a front view and the other, a side view.

3. a. Engineering drawings and specifications of components that may affect emissions, including specifications for each component listed

in par. (k). Manufacturers may use complete assembly or design drawings that have been prepared for other purposes, but should designate on the drawings the dimensions of each component listed in par. (k). Manufacturers shall identify tolerances of components of the tested unit listed in par. (k) 2. that are different from those specified in that paragraph, and show that such tolerances may not reasonably be anticipated to cause wood heaters in the model line to exceed the applicable emission limits.

b. A statement whether the firebox or any firebox component (other than one listed in par. (k) 3.) will be composed of different material from the material used for the firebox or firebox component in the wood heater on which certification testing was performed and a description of any such differences.

c. For applications to certify a model line of catalytic wood heaters to meet the emission limits in sub. (3) (b), a statement describing the manufacturer's program to ensure consistency in the size of any gap in the catalyst bypass mechanism. The statement shall describe, in narrative form, the components of the system that affect the size of the gap, any specifications for critical dimensions of any such components, and the procedure the manufacturer will use to ensure consistency in the size of the catalyst bypass gap.

4. All documentation pertaining to a valid certification test, including the complete test report and, for all test runs: raw data sheets, laboratory technician notes, calculations, and test results. Documentation shall include the items specified in the applicable test methods. Recommended formats and guidance materials are available from the administrator.

5. For catalytic wood heaters, a copy of the catalytic combustor warranty,

6. A statement that the manufacturer will conduct a quality assurance program for the model line which satisfies the requirements of par. (o).

7. A statement describing how the tested unit was sealed by the laboratory after the completion of certification testing, and

8. A statement that the manufacturer will notify the accredited laboratory if the application for certification is granted, within 30 days of receipt of notification from the U.S. environmental protection agency.

9. Statements that the wood heaters manufactured under this certificate will be:

a. Similar in all material respects to the wood heater submitted for certification testing, and

b. Will be labeled as prescribed in sub. (7).

10. For catalytic wood heaters, a statement that the warranty, access and inspection, and temperature monitoring provisions in pars. (c), (d), and (m) will be met.

11. A statement that the manufacturer will comply with the recordkeeping and reporting requirements in sub. (8).

12. A written estimate of the number of wood heaters that the manufacturer anticipates will be produced annually for the first 2 production years. Compliance with this provision may be obtained by designating one of the following ranges:

a. Less than 2,500,

b. 2,500 to 4,999,

c. 5,000 to 9,999,

d. 10,000 to 49,999,

e. 50,000 or greater; and

13. At the beginning of each test run in a certification test series, 2 photographs of the fuel load: One before and one after it is placed in the wood heater. One of the photographs shall show the front view of the wood load and the other shall show the side view.

14. For manufacturers seeking certification of model lines under sub. (4) (e) to meet the emission limits in sub. (3) (b), a statement that the manufacturer has entered into a contract with an accredited laboratory which satisfied the requirements of par. (g).

(c) If the affected facility is a catalytic wood heater, the warranty for the catalytic combustor shall include the replacement of the combustor and any prior replacement combustor without charge to the consumer for:

1. Two years from the date the consumer purchased the heater for any defects in workmanship or materials that prevent the combustor from functioning when installed and operated properly in the wood heater, and

2. Three years from the date the consumer purchased the heater for thermal crumbling or disintegration of the substrate material for heaters manufactured after July 1, 1990.

(d) The manufacturer of an affected facility equipped with a catalytic combustor shall provide for a means to allow the owner to gain access readily to the catalyst for inspection or replacement purposes and shall document in the application for certification how the catalyst is replaced.

(e) 1. The administrator shall issue a certificate of compliance for a model line if he or she determines, based on all information submitted by the applicant and any other relevant information available, that:

a. A valid certification test has demonstrated that the wood heater representative of the model line complies with the applicable particulate emission limits in sub. (3),

b. Any tolerances or materials for components listed in pars. (k) 2. or 3. that are different from those specified in those paragraphs may not reasonably be anticipated to cause wood heaters in the model line to exceed the applicable emission limits, and

c. The requirements of pars. (b), (c), (d), and (m) have been met. The program described under par. (b) 3. c. shall be deemed a tolerance specified in the certified design.

2. Upon denying certification under this paragraph, the administrator shall give written notice to the manufacturer setting forth the basis for the determination.

(f) To be valid, a certification test shall be:

1. Announced to the administrator in accordance with sub. (5) (e),

2. Conducted by a testing laboratory accredited by the administrator pursuant to sub. (6),

3. Conducted on a wood heater similar in all material respects to other wood heaters of the model line that is to be certified, and

4. Conducted in accordance with the test methods and procedure specified in sub. (5).

(g) To have a wood heater model certified under sub. (4) (e) to meet the emission limits in sub. (3) (b), a manufacturer shall enter into a contract with the accredited laboratory that performed the certification test, under which the laboratory will:

1. Conduct the random compliance audit test at no cost to the manufacturer if the U.S. environmental protection agency selects that laboratory to conduct the test, or

2. Pay the manufacturer the reasonable cost of a random compliance audit test (as determined by the U.S. environmental protection agency) if the U.S. environmental protection agency selects any other laboratory to conduct the test.

(h) 1. a. The administrator on a monthly basis between April 1, 1987, and July 1, 1990, shall determine whether an undue certification delay exists, pursuant to subd. 2. Such determinations shall be made on or about the 20th day of the month.

b. Any failure of the administrator to make a required determination under subpar a. by the 30th day of any month shall constitute a determination that an undue certification delay exists.

c. Any determination under subpar. a. or b. shall remain in effect until superseded by a subsequent determination, except that a determination under subpar. b. shall remain in effect for at least 30 days.

d. The administrator shall mail notice of all determinations under subpar. a. or b. to all persons who have requested in writing to receive notification.

2. An undue certification delay exists when the sum of the average testing lead time and the certification lead time is greater than 6 months.

a. The average testing lead time shall be determined from the information submitted by accredited laboratories pursuant to sub. (8) (b). The average testing lead time is the simple average of lead times reported under sub. (8) (b) 2. for the current month.

b. The certification lead time shall be an estimate, as of the date of the determination, of the time likely to be required to determine whether to issue a certificate of compliance for a complete application received on that date. This estimate shall be based on factors such as past experience, the number of applications to be processed, and the resources available for processing.

3. a. While any determination under subd. 1. that any undue certification delay exists is in effect, a manufacturer may submit an application for alternative certification.

b. An application for alternative certification shall be in writing to: Stationary Source Compliance Division (EN-341), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Wood Heater Program. The application shall be in duplicate copies and signed by the manufacturer, or an authorized representative, and contain the following:

1) The documentation required under par. (b) 1. to 6. and 9. to 12., except that in applying par. (b) 4., par. (f) 1. and 2. does not apply,

2) Evidence of compliance with pars. (c), (d) and (m),

3) A statement that a representative affected facility for the model line in question has been tested in accordance with sub. (5) (a), and meets applicable emission limits in sub. (3). Such testing may be conducted in any laboratory of the manufacturer's choice.

4) A statement identifying the month which will be the end of the manufacturer's production year for that model,

5) Evidence that the manufacturer has scheduled with an accredited laboratory the testing required for full certification under this section at the earliest feasible date,

6) Evidence that the manufacturer has notified the accredited laboratory that the manufacturer intends to apply for alternative certification, and

7) A commitment to report the results of all valid certification tests to the administrator.

c. Test results not obtained under pressurized conditions may be adjusted for altitude according to the following formula:

$$E_A = \frac{E}{AAF}$$

where:

E_A = adjusted emissions in g/hr

E = measured emissions in g/hr at ALT_L

AAF = altitude adjustment factor where

$$AAF = \frac{ALT_L - 300}{6{,}600} + 1.0$$

ALT_L = altitude above mean sea level of laboratory in feet

4. a. Submission of an application for alternative certification pursuant to subd. 3. automatically renders a model line certified 30 days after receipt of the application for alternative certificate by the administrator, unless alternative certification is denied sooner, on the basis that the application is not complete, or that the test results do not show

compliance with the applicable emission limits in sub. (3). Except as provided in subpars. b. to d., alternative certification shall expire on the earlier of:

1) The completion of the manufacturer's production year during which the administrator takes action under par. (e) on an application for certification, or

2) Twelve months after such action.

b. If, in any certification tests performed pursuant to the commitment in subd. 3. b. 5), emissions from the affected facility exceed the applicable emission limits in sub. (3) by greater than 50%, alternative certification pursuant to this paragraph shall expire 72 hours after the manufacturer receives notification from the laboratory of the test results, in accordance with subpar. e.

c. If, in any certification test performed under subd. 3.b., emissions from the affected facility exceed the applicable emission limits in sub. (3), alternative certification pursuant to this paragraph shall expire 72 hours after manufacturer received notification satisfying subpar. e. from the laboratory of the test results, if such notification is received within 100 days of the date on which the manufacturer scheduled the certification test.

d. Alternative certification shall expire 72 hours after the manufacturer receives notification from the administrator that the manufacturer has:

1) Failed to meet a scheduled commitment for certification testing,

2) Failed to complete the testing, or

3) Delayed completion of the testing by more than 14 days after certification testing began by ordering additional testing.

e. Any notification under subpar. b. or c. shall include a copy of a preliminary test report from the accredited laboratory. The accredited laboratory shall provide a preliminary test report to the manufacturer and to the administrator within 10 days of the completion of testing, if a wood heater exceeds the applicable emission limits in sub. (3) in certification testing.

(i) An applicant for certification may apply for a waiver of the requirement to submit the results of a certification test pursuant to par. (b) 4., if the wood heaters of the model line are similar in all material respects to another model line that has already been issued a certificate of compliance. A manufacturer that seeks a waiver of certification testing shall identify the model line that has been certified, and shall submit a copy of an agreement with the owner of the design permitting the applicant to produce wood heaters of that design.

(j) 1. Unless revoked sooner by the administrator, a certificate of compliance shall be valid:

a. Through June 30, 1990, for a model line certified as meeting emissions limits in sub. (3) (a), and

b. For 5 years from the date of issuance, for a model line certified as meeting emission limits in sub. (3) (b).

2. Upon application for renewal of certification by the manufacturer, the administrator may waive the requirement for certification testing upon determining that the model line continues to meet the requirements for certification in par. (e), or that a waiver of certification is otherwise appropriate.

3. Upon waiving certificate testing under sub. 2., the administrator shall give written notice to the manufacturer setting forth the basis for the determination.

(k) 1. A model line shall be recertified whenever any change is made in the design submitted pursuant to par. (b) 3. that is presumed to affect the particulate emission rate for that model line. The administrator may waive this requirement upon written request by the manufacturer, if he or she determines that the change may not reasonably be anticipated to cause wood heaters in the model line to exceed the applicable emission limits. The grant of such a waiver does not relieve the manufacturer of any compliance obligations under this section.

2. Any change in the indicated tolerances of any of the following components (where such components are applicable) is presumed to affect particulate emissions if that change exceeds ± 5% for any cross-sectional area relating to air introduction systems and catalyst bypass gaps unless other dimensions and cross-sectional areas are previously approved by the administrator under par. (e) 1. b.

a. Firebox: Dimensions,

b. Air introduction systems: Cross-sectional area of restrictive air inlets, outlets, and location, and method of control,

c. Baffles: Dimensions and locations,

d. Refractory/insulation: Dimensions and location,

e. Catalyst: Dimensions and location,

f. Catalyst bypass mechanism and, for model lines certified to meet the emissions limits in sub. (3) (b) catalyst bypass gap tolerances (when bypass mechanism is in closed position): Dimensions, cross-sectional area, and location,

g. Flue gas exit: Dimensions and location,

h. Door and catalyst bypass gaskets: Dimensions and fit,

i. Outer shielding and coverings: Dimensions and location,

j. Fuel feed system: For wood heaters that are designed primarily to burn wood pellets and other wood heaters equipped with a fuel feed system, the fuel feed rate, auger motor design and power rating, and the angle of the auger to the firebox, and

k. Forced air combustion system: For wood heaters so equipped, the location and horsepower of blower motors and the fan blade size.

3. Any change in the materials used for the following components is presumed to affect emissions:

a. Refractory/insulation or

b. Door and catalyst bypass gaskets.

4. A change in the make, model, or composition of a catalyst is presumed to affect emissions, unless the change has been approved in advance by the administrator, based on test data that demonstrate that the replacement catalyst is equivalent to or better than the original catalyst in terms of particulate emission reduction.

(l) The administrator may revoke certification if he or she determines that the wood heaters being produced in that model line do not comply with the requirements of this section or sub. (3). Such a determination shall be based on all available evidence, including:

a. Test data from a retesting of the original unit on which the certification test was conducted,

b. A finding that the certification test was not valid,

c. A finding that the labeling of the wood heater does not comply with the requirements of par. (f),

d. Failure by the manufacturer to comply with reporting and recordkeeping requirements under sub. (8),

e. Physical examination showing that a significant percentage of production units inspected are not similar in all material respects to the representative affected facility submitted for testing, or

f. Failure of the manufacturer to conduct a quality assurance program in conformity with par. (o).

2. Revocation of certification under this paragraph may not take effect until the manufacturer concerned has been given written notice by the administrator setting forth the basis for the proposed determination and an opportunity to request a hearing under sub. (10).

3. Determination to revoke certification based upon audit testing shall be made only in accordance with par. (p).

(m) A catalytic wood heater shall be equipped with a permanent provision to accommodate a commercially available temperature sensor which can monitor combustor gas stream temperatures within or immediately downstream, i.e. within 2.54 centimeters (1 inch), of the combustor surface.

(n) Any manufacturer of an affected facility subject under sub. (1) (b) to the applicable emission limits of this section that does not belong to a model line certified under this section shall cause that facility to be tested in an accredited laboratory in accordance with par. (f) 1., 2. and 4. before it leaves the manufacturer's possession and shall report the results to the administrator.

(o) 1. For each certified model line, the manufacturer shall conduct a quality assurance program which satisfies the following requirements:

2. Except as provided in sub. 5., the manufacturer or authorized representative shall inspect at least one from every 150 units produced within a model line to determine that the wood heater is within applicable tolerances for all components that affect emissions as listed in par. (k) 2.

3. a. Except as provided in subpar. c. or subd. 5., the manufacturer or authorized representative shall conduct an emission test on a randomly

selected affected facility produced within a model line certified under par. (e) or (h) on the following schedule:

If weighted average certification test results were—	If yearly production per model is—	
	< 2500	≥ 2500
70% or less of std	When directed by EPA, not to exceed once every 10,000 stoves.	Every 10,000 stoves or triennially (which-ever is more frequent).
Within 30% of std	Every 5,000 stoves.	Every 5,000 stoves or annually (which-ever is more frequent).

b. Emission tests shall be conducted in conformity with sub. (5) (a) using either approved method for measuring particulate matter as provided in sub. (5). The manufacturer shall notify the U.S. environmental protection agency by U.S. mail that an emissions test required pursuant to this paragraph will be conducted within one week of the mailing of the notification.

c. If the manufacturer stated pursuant to par. (b) 3. that the firebox or any firebox component would be composed of a different material than the material used in the wood heater on which certification testing was performed, the first test shall be performed before 1,000 wood heaters are produced. The manufacturer shall submit a report of the results of this emission test to the administrator within 45 days of the completion of testing.

4. The manufacturer shall take remedial measures, as appropriate, when inspection or testing pursuant to this paragraph indicates that affected facilities within the model line are not within applicable tolerances or do not comply with applicable emission limits. Manufacturers shall record the problem identified, the extent of the problem, the remedial measures taken, and the effect of such remedial measures as projected by the manufacturer or determined by any additional testing.

5. a. If 2 consecutive passing tests are conducted under either subd. 2. or 3., the required frequency of testing under the applicable paragraph shall be modified as follows: Skip every other required test.

b. If 5 consecutive passing tests are conducted under the modified schedule provided for in subpar. a., the required frequency of testing under the applicable paragraph shall be further modified as follows: Skip 3 consecutive required tests after each required test that is conducted.

c. Testing shall resume on the frequency specified in subd. 2. or 3. as applicable, if a test failure results during any test conducted under a modified schedule.

6. If emissions tests under this paragraph are conducted at an altitude different from the altitude at which certification tests were conducted, and are not conducted under pressurized conditions, the results shall be adjusted for altitude in accordance with par. (h) 3. c.

(p) 1. a. The administrator shall after July 1, 1990, select for random compliance audit testing certified wood heater model lines that have not already been subject to a random compliance audit under this paragraph. The administrator may not select more than one model line under this program for every 5 model lines for which certification is granted under par. (e) to meet the emission limits in sub. (3) (b). No accredited laboratory may test or bear the expense of testing, as provided in the contract described in par. (g), more than one model line from every 5 model lines tested by the laboratory for which certification was granted. The administrator shall use a procedure that ensures that the selection process is random.

b. The administrator may, by means of a neutral selection scheme, select model lines certified under par. (b) or (e), for selective enforcement audit testing under this paragraph. Prior to July 1, 1990, the administrator shall only select a model line for a selective enforcement audit on the basis of information indicating that affected facilities within the model line may exceed the applicable emission limit in sub. (3).

2. The administrator shall randomly select for audit testing 5 production wood heaters from each model line selected under this paragraph. These wood heaters shall be selected from completed units ready for shipment from the manufacturer's facility (whether or not the units are in a package or container). The wood heaters shall be sealed upon selection and remain sealed until they are tested or until the audit is completed. The wood heaters shall be numbered in the order that they were selected.

3. a. The administrator shall test, or direct the manufacturer to test, the first of the 5 wood heaters selected under subd. 2. in a laboratory accredited under sub. (6) that is selected pursuant to subd. 4.

b. The expense of the random compliance audit test shall be the responsibility of the wood heater manufacturer. A manufacturer may require the laboratory that performed the certification test to bear the expense of a random compliance audit test by means of the contract required under par. (g). If the laboratory with which the manufacturer had a contract has ceased business due to bankruptcy or is otherwise legally unable to honor the contract, the administrator may not select any of that manufacturer's model lines for which certification testing has been conducted by that laboratory for a random compliance audit test.

c. The test shall be conducted using the same test method and procedure used to obtain certification. If the certification test consisted of more than one particulate sampling test method, the administrator may use either one of these methods for the purpose of audit testing. If the test is performed in a pressure vessel, air pressure in the pressure vessel shall be maintained within 1% of the average of the barometric pressures recorded for each individual test run used to calculate the weighted average emission rate for the certification test. The administrator shall notify the manufacturer at least one week prior to any test under this paragraph, and allow the manufacturer or authorized representatives to observe the test.

4. a. Except as provided in this paragraph, the administrator may select any accredited laboratory for audit testing.

b. 1) The administrator shall select the accredited laboratory that performed the test used to obtain certification for audit testing, until the administrator has amended this section based upon a determination pursuant to subpar. b. 2) to allow testing at another laboratory. If another laboratory is selected pursuant to this subdivision, and the overall precisions of the test method and procedure is greater than ± 1 gram per hour of the weighted average at laboratories below 304 meters (1,000 feet) elevation (or equivalent), the interlaboratory component of the precision shall be added to the applicable emissions standard for the purposes of this subdivision.

2) With respect to each test method and procedure set out in sub. (5) (a), the administrator shall, by July 1, 1990, publish a decision, after notice of an opportunity for comment, which either:

a) Amends this section based on a determination of the overall precision of the method and procedure, and the interlaboratory component thereof, or

b) Sets forth a determination that the available data are insufficient to determine the overall precision of the method and procedure, and the interlaboratory component thereof.

c. The administrator may not select an accredited laboratory that is located at an elevation more than 152 meters (500 feet) higher than the elevation of the laboratory which performed the test used to obtain certification, unless the audit test is performed in a pressure vessel.

5. a. If emissions from a wood heater tested under subd. 3. exceed the applicable weighted average emission limit by more than 50%, the administrator shall so notify the manufacturer that certification for that model line is suspended effective 72 hours from the receipt of the notice, unless the suspension notice is withdrawn by the administrator. The suspension shall remain in effect until withdrawn by the administrator, or 30 days from its effective date if a revocation notice under subpar. b. is not issued within that period, or the date of final agency action on revocation, whichever occurs earlier.

b. 1) If emissions from a wood heater tested under subd. 3. exceed the applicable weighted average emission limit, the administrator shall notify the manufacturer that certification is revoked for that model line.

2) A revocation notice under subpar. b. 1) shall become final and effective 60 days after receipt by the manufacturer, unless it is withdrawn, a hearing is requested under sub. (10) or the deadline for requesting a hearing is extended.

3) The administrator may extend the deadline for requesting a hearing for up to 60 days for good cause.

4) A manufacturer may extend the deadline for requesting a hearing for up to 6 months, by agreeing to a voluntary suspension of certification.

c. Any notification under subpar. a. or b. shall include a copy of a preliminary test report from the accredited laboratory. The accredited laboratory shall provide a preliminary test report to the administrator within 10 days of the completion of testing, if a wood heater exceeds the applicable emission limit in sub. (3). The laboratory shall provide the administrator and the manufacturer, within 30 days of the completion of testing, all documentation pertaining to the test, including the complete test report and raw data sheets, laboratory technician notes, and test results for all test runs.

d. Upon receiving notification of a test failure under subpar. b. the manufacturer may submit some or all of the remaining 4 wood heaters selected under sub. 2. for testing at the manufacturer's own expense, in the order they were selected by the administrator, at the laboratory that performed the emissions test for the administrator.

e. Whether or not the manufacturer proceeds under subpar. d., the manufacturer may submit any relevant information to the administrator, including any other test data generated pursuant to this section. The manufacturer shall pay the expense of any testing performed for him or her.

f. The administrator shall withdraw any notice issued under subpar. b. if tests under subpar. d. show either:

1) That all 4 wood heaters tested for the manufacturer met the applicable weighted average emission limits, or

2) That the second and third wood heaters selected met the applicable weighted average emission limits and the average of all 3 weighted averages, including the original audit test, was below the applicable weighted average emission limits.

g. The administrator may withdraw any proposed revocation, if the administrator finds that an audit test failure has been rebutted by information submitted by the manufacturer under subpar. d. or e. or by any other relevant information available to the administrator.

h. Any withdrawal of a proposed revocation shall be accompanied by a document setting forth its basis.

(5) TEST METHODS AND PROCEDURES. Test methods and procedures in 40 C.F.R. part 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 and requirements for certification under subs. (3) and (4) as follows:

(a) Method 28 shall be used to establish the certification test conditions and the particulate matter weighted emission values.

(b) Emission concentrations may be measured with either:

1. Method 5G if a dilution tunnel sampling location is used, or

2. Method 5H if a stack location is used.

(c) Method 28A shall be used to determine that a wood combustion unit qualifies under the definition of wood heater in sub. (2) (a). If such a determination is necessary, this test shall be conducted by an accredited laboratory.

(e) 1. The manufacturer of an affected facility shall notify the administrator of the date that certification testing is scheduled to begin. A notice from the testing lab containing the information required in sub. (4) (f) 1. may be used to satisfy this requirement. This notice shall be submitted at least 30 days before the start of testing. The notification of testing shall be in writing, and include the manufacturer's name and address, the testing laboratory's name, the model name and number or, if unavailable, some other way to distinguish between models, and the dates of testing.

2. Any emission testing conducted on the wood heater for which notice was delivered shall be presumed to be certification testing if such testing occurs on or after the scheduled date of testing and before a test report is submitted to the administrator. If certification testing is interrupted for more than 24 hours, the laboratory shall notify the administrator by telephone, as soon as practicable, and also by letter, stating why the testing was interrupted and when it is expected to be resumed.

3. A manufacturer or laboratory may change the date that testing is scheduled to begin by notifying the administrator at least 14 days before the start of testing. Notification of schedule change shall be made at least 2 working days prior to the originally scheduled test date. This notice of rescheduling shall be made by telephone or other expeditious means and shall be documented in writing and sent concurrently.

4. A model line may be withdrawn from testing before the certification test is complete, provided the wood heater is sealed in accordance with sub. (6) (g). The manufacturer shall notify the administrator 30 days before the resumption of testing.

5. The manufacturer or laboratory shall notify the administrator if a test is not completed within the time allotted as set forth in the notice of testing. The notification shall be made by the end of the allotted testing period by telephone or other expeditious means, and documented in writing sent concurrently, and shall contain the dates when the test will be resumed. Unless otherwise approved by the administrator, failure to conduct a certification test as scheduled without notifying the administrator of any schedule change 14 days prior to the schedule or revised test dates will result in voiding the notification. In the case of a voided notification, the manufacturer shall provide the administrator with a second notification at least 30 days prior to the new test dates. The administrator may waive the requirement for advance notice for test resumptions.

(f) The testing laboratory shall allow the manufacturer to observe certification testing. However, manufacturers may not involve themselves in the conduct of the test after the pretest burn (as defined by Method 28) has begun. Communications between the manufacturer and laboratory personnel regarding operation of the wood heater shall be limited to written communications transmitted prior to the first pretest burn of the certification series. Written communications between the manufacturer and laboratory personnel may be exchanged during the certification test only if deviations from the test procedures are observed that constitute improper conduct of the test. All communications shall be included in the test documentation required to be submitted under sub. (4) (b) 4. and shall be consistent with instructions provided in the owner's manual required under sub. (7) (k), except to the extent that they address details of the certification tests that would not be relevant to owners.

(6) LABORATORY ACCREDITATION. (a) 1. A laboratory may apply for accreditation by the administrator to conduct wood heater certifications tests pursuant to sub. (4). The application shall be in writing to: Emission Measurement Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attn: Wood Heater Laboratory Accreditation.

2. If accreditation is denied under this section, the administrator shall give written notice to the laboratory setting forth the basis for the determination.

(b) In order for a test laboratory to qualify for accreditation the laboratory shall:

1. Submit its written application providing the information related to laboratory equipment and management and technical experience of laboratory personnel. Applications from laboratories shall establish that:

a. Laboratory personnel have a total of one year of relevant experience in particulate measurement, including at least 3 months experience in measuring particulate emissions from wood heaters,

b. The laboratory has the equipment necessary to perform testing in accordance with either sub. (5) (b) 1. or 2., and

c. Laboratory personnel have experience in test management or laboratory management.

2. Have no conflict of interest and receive no financial benefit from the outcome of certification testing conducted pursuant to sub. (4).

3. Agree to enter into a contract as described in sub. (4) (g) with each wood heater manufacturer for whom a certification test has been performed.

5. Demonstrate proficiency to achieve reproducible results with at least one test method and procedure in sub. (5) (b) by:

a. Performing a test consisting of at least 8 test runs (2 in each of the 4 burn rate categories) on a wood heater identified by the administrator,

b. Providing the administrator at least 30 days prior notice of the test to afford the administrator the opportunity to have an observer present, and

c. Submitting to the administrator all documentation pertaining to the test including a complete test report and raw data sheets, laboratory technical notes, and test results for all test runs.

6. Be located in the continental United States.

7. Agree to participate annually in a proficiency testing program conducted by the administrator.

8. Agree to allow the administrator access to observe certification testing.

9. Agree to comply with a reporting and recordkeeping requirement that affect testing laboratories, and

10. Agree to accept the reasonable cost of a random compliance audit test (as determined by the administrator) if it is selected to conduct the random compliance audit test of a model line originally tested for certification at another laboratory.

(c) Laboratories accredited by the state of Oregon prior to January 1, 1988, may be accredited by the administrator without regard to the requirements in par. (b) 1. and 5., provided that the laboratory requests the accreditation in writing and, in addition to other applicable requirements, certifies under penalty of law that the information used in obtaining Oregon accreditation satisfied applicable requirements of Oregon law.

(e) 1. The administrator may revoke the U.S. environmental protection agency laboratory accreditation if he or she determines that the laboratory:

a. No longer satisfies the requirements for accreditation in par. (b) or (c),

b. Does not follow required procedures or practices,

c. Had falsified data or otherwise misrepresented emission data,

e. Failed to participate in a proficiency testing program, in accordance with its commitment under par. (b) 5., or

f. Failed to seal the wood heater in accordance with par. (g).

2. Revocation of accreditation under this paragraph may not take effect until the laboratory concerned has been given written notice by the administrator setting forth the basis for the proposed determination and an opportunity for a hearing under sub. (10). However, if revocation is ultimately upheld, all tests conducted by the laboratory after written notice was given may, at the discretion of the administrator, be declared invalid.

(f) Unless revoked sooner, a certificate of accreditation granted by the administrator shall be valid:

1. For 5 years from the date of issuance, for certificates issued under par. (b), or

2. Until July 1, 1990, for certificates issued under par. (c).

(g) A laboratory accredited by the administrator shall seal any wood heater on which it performed certification tests, immediately upon completion or suspension of certification testing, by using a laboratory-specific seal.

(7) PERMANENT LABEL, TEMPORARY LABEL AND OWNER'S MANUAL. (a) 1. Each affected facility manufactured on or after July 1, 1988, or of-

fered for sale at retail on or after July 1, 1990, shall have a permanent label affixed to it that meets the requirements of this subsection.

2. Except for wood heaters subject to sub. (1) (e), (f) or (g), the permanent label shall contain the following information:

a. Month and year of manufacture,

b. Model name or number, and

c. Serial number.

3. The permanent label shall:

a. Be affixed in a readily visible or accessible location,

b. Be at least 3½ inches long and 2 inches wide,

c. Be made of a material expected to last the lifetime of the wood heater,

d. Present required information in a manner so that it is likely to remain legible for the lifetime of the wood heater, and

e. Be affixed in such a manner that it cannot be removed from the appliance without damage to the label.

4. The permanent label may be combined with any other label, as long as the required information is displayed, and the integrity of the permanent label is not compromised.

(b) If the wood heater belongs to a model line certified under sub. (4) and has not been found to exceed the applicable emission limits or tolerances through quality assurance testing, one of the following statements, as appropriate, shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Certified to comply with July, 1988,
particulate emission standards
Not approved for sale after June 30, 1992,

or

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Certified to comply with July, 1990,
particulate emission standards.

(c) 1. If compliance is demonstrated under sub. (1) (c), the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Certified under s. NR 440.642 (1) (c), Wis. Adm. Code.
Not approved for sale after June 30, 1992.

2. If compliance is demonstrated under sub. (4) (h) one of the following statements, as appropriate, shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES.

Certified under s. NR 440.642 (4) (h), Wis. Adm. Code,
to comply with July, 1988 particulate emissions standards.
Not approved for sale after June 30, 1992.

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Certified under s. NR 440.642 (4) (h), Wis. Adm. Code,
to comply with July, 1990 particulate emissions standards.

(d) Any label statement under par. (b) or (c) constitutes a representation by the manufacturer as to any wood heater that bears it that:

1. Certification was in effect at the time the wood heater left the possession of the manufacturer,

2. The manufacturer was, at the time the label was affixed, conducting a quality assurance program in conformity with sub. (4) (o),

3. As to any wood heater individually tested for emissions by the manufacturer under sub. (4) (o) 3., that it met the applicable emissions limits, and

4. As to any wood heater individually inspected for tolerances under sub. (4) (o) 2., that the wood heater is within applicable tolerances.

(e) If an affected facility is exempt from the emission limits in sub. (3) under the provisions of sub. (1) (d), the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Not certified. Approved for sale until June 30, 1991.

(f) 1. If an affected facility is manufactured in the state of Wisconsin for export, the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Export stove. May not be operated
within the United States.

2. If an affected facility is manufactured for use for research and development purposes as provided in sub. (1) (f), the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Not certified. Research Stove.
Not approved for sale.

3. If an affected facility is a coal-only heater as defined in sub. (1), the following statement shall appear on the permanent label:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
This heater is only for burning coal.
Use of any other solid fuel except for
coal ignition purposes is a violation of law.

(g) Any affected facility that does not qualify for labeling under any of pars. (b) through (f), shall bear one of the following labels:

1. If the test conducted under sub. (4) (n) indicates that the facility does not meet applicable emissions limits:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES.
Not certified. Does not meet
DNR particulate emission standards.
IT IS AGAINST THE LAW TO OPERATE THIS WOOD HEATER.

2. If the test conducted under sub. (4) (n) indicates that the facility does meet applicable emissions limits:

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Not certified. Meets DNR particulate emission standards.

3. If the facility has not been tested as required by sub. (4) (e).

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES.
Not certified. Not tested. Not approved for sale.
IT IS AGAINST THE LAW TO OPERATE THIS WOOD HEATER.

(h) For affected facilities equipped with catalytic combustors, the following statement shall appear on the permanent label:

This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. Consult owner's manual for further information. It is against the law to operate this wood heater in a manner inconsistent with operating instructions in the owner's manual or if the catalytic element is deactivated or removed.

(i) An affected facility permanently labeled under par. (b) or (c) shall have attached to it a temporary label that shall contain only the following:

1. A statement indicating the compliance status of the model. The statement shall be one of the statements provided in 40 C.F.R. part 60, Appendix I, Section 2.2.1., incorporated by reference in s. NR 440.17. Instructions on the statement to select are provided in 40 C.F.R. part 60 in Appendix I, incorporated by reference in s. NR 440.17.

2. A graphic presentation of the composite particulate matter emission rate as determined in the certification test, or as determined by the administrator if the wood heater is certified under sub. (1) (c). The method for presenting this information is provided in 40 C.F.R. part 60, Appendix I, Section 2.2.2., incorporated by reference in s. NR 440.17.

3. A graphic presentation of the overall thermal efficiency of the model. The method for presenting this information is provided in 40 C.F.R. part 60, Appendix I, Section 2.2.3., incorporated by reference in s. NR 440.17. At the discretion of the manufacturer, either the actual measured efficiency of the model or its estimated efficiency may be used for purposes of this paragraph. The actual efficiency is the efficiency

measured in tests conducted pursuant to sub. (5) (d). The estimated efficiency shall be 72% if the model is catalyst-equipped and 63% if the model is not catalyst equipped, and 78% if the model is designed to burn wood pellets for fuel. Wood heaters certified under sub. (1) (c) shall use these estimated efficiencies.

4. A numerical expression of the heat output range of the unit, in British thermal units per hour (Btu/hr) rounded to the nearest 100 Btu/hr.

a. If the manufacturer elects to report the overall efficiency of the model based on test results pursuant to par. (l) 3., the manufacturer shall report the heat output range measured during the efficiency test. If an accessory device is used in the certification test to achieve any low burn rate criterion specified in this section, and if this accessory device is not sold as a part of the wood heater, the heat output range shall be determined using the formula in par. (l) 4. b. based upon the lowest sustainable burn rate achieved without the accessory device.

b. If the manufacturer elects to use the estimated efficiency as provided in par. (i) 3., the manufacturer shall estimate the heat output of the model as follows:

$HO_E = (19.140) \times (\text{Estimated overall efficiency}/100) \times BR$

where:

HO_E = Estimated heat output in Btu/hr

BR = Burn rate in dry kilograms of test fuel per hour

5. Statements regarding the importance of operation and maintenance. Instructions regarding which statements shall be used are provided in 40 C.F.R. part 60, Appendix I, Section 2., incorporated by reference in s. NR 440.17; and

6. The manufacturer and the identification of the model.

(j) 1. An affected facility permanently labeled under par. (e), (f) 3. or (g) shall have attached to it a temporary label that shall contain only the information provided for in 40 C.F.R. part 60, Appendix I, section 2.3, 2.4 or 2.5, as applicable, incorporated by reference in s. NR 440.17.

2. The temporary label of an affected facility permanently labeled under par. (b), (c), (e), (f) 3. or (g) shall:

a. Be affixed to a location on the wood heater that is readily seen and accessible when the wood heater is offered for sale to consumers by any commercial owner;

b. Not be combined with any other label or information;

c. Be attached to the wood heater in such a way that it can be easily removed by the consumer upon purchase, except that the label on wood heaters displayed by a commercial owner may have an adhesive backing or other means to preserve the label to prevent its removal or destruction;

d. Be printed on 90 pound bond paper in black ink with a white background except that those for models that are not otherwise exempted which do not meet the applicable emission limits, or have not been tested pursuant to this section, shall be on a red background as described in 40 C.F.R. part 60, Appendix I, Section 2.5, incorporated by reference in s. NR 440.17;

e. Have dimensions of 5 inches by 7 inches as described in 40 C.F.R. part 60, Appendix I, Section 2.1, incorporated by reference in s. NR 440.17;

f. Have wording, presentation of the graphic data, and typography as presented in 40 C.F.R. part 60, Appendix I, incorporated by reference in s. NR 440.17.

(k)1. Each affected facility offered for sale by a commercial owner shall be accompanied by an owner's manual that shall contain the information listed in subds. 2. (pertaining to installation) and 3. (pertaining to operation and maintenance). The information shall be adequate to enable consumers to achieve optimal emissions performance. The information shall also be consistent with the operating instructions provided by the manufacturer to the laboratory for operating the wood heater during certification testing, except for details of the certification test that would not be relevant to the ultimate purchaser.

2. Installation information in the owner's manual shall state the requirements for achieving proper draft.

3. Operation and maintenance information in the owner's manual shall include:

a. Wood loading procedures, recommendations on wood selection, and warnings on what fuels not to use, such as treated wood, colored paper, cardboard, solvents, trash and garbage,

b. Fire starting procedures,

c. Proper use of air controls,

d. Ash removal procedures,

e. Instructions on gasket replacement,

f. For catalytic models, information on the following pertaining to the catalytic combustor:

1) Procedures for achieving and maintaining catalyst activity,

2) Maintenance procedures,

3) Procedures for determining deterioration or failure,

4) Procedures for replacement, and

5) Information on how to exercise warranty rights, and

g. For catalytic models, the following statement:

This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. It is against the law to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.

4. Any manufacturer using the model language contained in 40 C.F.R. part 60, Appendix I, incorporated by reference in s. NR 440.17,

to satisfy any requirement of this paragraph shall be in compliance with that requirement, provided that the particular model language is printed in full, with only such changes as are necessary to ensure accuracy for the particular model line.

(l) Wood heaters that are affected by this section but that have been owned and operated by a noncommercial owner, are not subject to pars. (j) and (k) when offered for resale.

(8) REPORTING AND RECORDKEEPING. (a) Each manufacturer who holds a certificate of compliance under sub. (4) (e) or (h) for a model line shall maintain records containing the information required by this paragraph with respect to that model line. Each manufacturer of a model line certified under sub. (1) (c) shall maintain the information required by subds. 2. and 4. for that model line. The records and information maintained shall include:

1. For certification tests:

a. All documentation pertaining to the certification test used to obtain certification, including the full test report and raw data sheets, laboratory technician notes, calculations, and the test results for all test runs.

b. Where a model line is certified under sub. (4) (h) and later certified under sub. (4) (e), all documentation pertaining to the certification test used to obtain certification in each instance.

2. For parameter inspections conducted pursuant to sub. (4) (o) 2., information indicating the extent to which tolerances for components that affect emissions as listed in sub. (4) (k) 2. were inspected, and at what frequency, the results of such inspections, remedial actions taken, if any, and any follow-up actions such as additional inspections.

3. For emissions tests conducted pursuant to sub. (4) (o) 3., all test reports, data sheets, laboratory technician notes, calculations, and test results for all test runs, the remedial actions taken, if any, and any follow-up actions such as additional testing.

4. The number of affected facilities that are sold each year, by certified model line.

(b) 1. Each accredited laboratory shall maintain records consisting of all documentation pertaining to each certification test, including the full test report and raw data sheets, technician notes, calculations, and the test results for all test runs.

2. Each accredited laboratory shall report to the administrator by the 8th day of each month prior to July 1, 1990:

a. The number and identification of wood heaters scheduled for testing and the type of testing (e.g., U.S. environmental protection agency certification, Oregon certification, research and development testing),

b. The estimated date on which certification testing could commence for a wood heater, if such a test were requested on the first day of that month,

c. The identification of the wood heaters tested during the previous month.

3. Each accredited laboratory shall report to the administrator within 24 hours whenever a manufacturer which has notified the laboratory that it intends to apply for alternative certification for a model line fails to submit on schedule a representative unit of that model line for certification testing.

(c) Any wood heater upon which certification tests were performed based upon which certification was granted under sub. (4) (e) shall be retained (sealed and unaltered) at the manufacturer's facility for as long as the model line in question is manufactured. Any such wood heater shall be made available upon request to the administrator for inspection and testing.

(e) Any manufacturer seeking exemption under sub. (1) (d) shall maintain wood heater production records covering the period July 1, 1987 to July 1, 1989.

(f) Each manufacturer of an affected facility certified under sub. (4) shall submit a report to the administrator every 2 years following issuance of a certificate of compliance for each model line. This report shall certify that no changes in the design or manufacture of this model line have been made that require recertification under sub. (4) (k).

(g) Each manufacturer shall maintain records of the model and number of wood heaters exempted under sub. (1) (f).

(h) Each commercial owner of a wood heater previously owned by a noncommercial owner for personal use shall maintain records of the name and address of the previous owner.

(i) 1. Unless otherwise specified, all records required under this section shall be maintained by the manufacturer or commercial owner of the affected facility for a period of no less than 5 years.

2. Unless otherwise specified, all reports to the administrator required under this section shall be made to: Stationary Source Compliance Division (EN-341), U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460 Attention: Wood Heater Program.

3. A report to the administrator required under this section shall be deemed to have been made when it is properly addressed and mailed, or placed in the possession of a commercial courier service.

(9) PROHIBITIONS. (a) No person may operate an affected facility that does not have affixed to it a permanent label pursuant to sub. (7) (b), (c), (e), (f) 2. or 3., or (g) 2.

(b) No manufacturer may advertise for sale, offer for sale, or sell an affected facility that:

1. Does not have affixed to it a permanent label pursuant to sub. (7), or

2. Has not been tested when required by sub. (4) (n).

(c) On or after July 1, 1990, no commercial owner may advertise for sale, offer for sale, or sell an affected facility that does not have affixed to it a permanent label pursuant to sub. (7) (b), (c), (e), (f) 1. or 3., or

(g) 1. or 2. No person may advertise for sale, offer for sale, or sell an affected facility labeled under sub. (7) (f) 1. except for export.

(d) 1. No commercial owner may advertise for sale, offer for sale or sell an affected facility permanently labeled under sub. (7) (b) or (c) unless:

a. The affected facility has affixed to it a removable label pursuant to sub. (7),

b. Any purchaser or transferee is provided with an owner's manual pursuant to sub. (7) (k), and

c. Any purchaser or transferee is provided with a copy of the catalytic combustor warranty (for affected facilities with catalytic combustors).

2. No commercial owner may advertise for sale, offer for sale, or sell an affected facility permanently labeled under sub. (7) (e), (f) 3., or (g), unless the affected facility has affixed to it a removable label pursuant to sub. (7). This prohibition does not apply to wood heaters affected by this section that have been previously owned and operated by a noncommercial owner.

3. A commercial owner other than a manufacturer complies with the requirements of this paragraph if the commercial owner:

a. Receives the required documentation from the manufacturer or a previous commercial owner, and

b. Provides that documentation unaltered to any person to whom the wood heater that it covers is sold or transferred.

(e) In any case in which the administrator revokes a certificate of compliance for the knowing submission of false or inaccurate information, or other fraudulent acts, the administrator may give notice of that revocation and the grounds for it to all commercial owners. From and after the date of receipt of that notice no commercial owner may sell any wood heater covered by the revoked certificate (other than to the manufacturer) unless:

1. The wood heater has been tested as required by sub. (4) (n) and labeled as required by sub. (7) (g), or

2. The model line has been recertified in accordance with this section.

(f) No person may install or operate an affected facility except in a manner consistent with the instructions on its permanent label and in the owner's manual pursuant to sub. (7) (l).

(g) No person may operate an affected facility which was originally equipped with a catalytic combustor if the catalytic element is deactivated or removed.

(h) No person may operate an affected facility that has been physically altered to exceed the tolerance limits of its certificate of compliance.

(i) No person may alter, deface, or remove any permanent label required to be affixed pursuant to sub. (7).

(10) HEARING AND APPEAL PROCEDURES. (a) 1. Any manufacturer or laboratory affected by an action listed in this subdivision may request a hearing under this subsection within 30 days following receipt of the required notification of the action when the administrator:

a. Denies an application under sub. (1) (c) or (4) (e),

b. Issues a notice of revocation of certification under sub. (4) (l),

c. Denies an application for laboratory accreditation under sub. (6), or

d. Issues a notice of revocation of laboratory accreditation under sub. (6) (e).

2. When the administrator issues a notice of revocation under sub. (4) (p), the manufacturer may request a hearing under this subsection within the time limits in sub. (4) (p) 5.

(b) Any hearing request shall be in writing, shall be signed by an authorized representative of the petitioning manufacturer or laboratory, and shall include a statement setting forth with particularity the petitioner's objection to the administrator's determination or proposed determination.

(c) 1. Upon receipt of a request for a hearing under par. (a), the administrator shall request the chief administrative law judge to designate an administrative law judge as presiding officer for the hearing. If the chief administrative law judge replies that no administrative law judge is available to perform this function, the administrator shall designate a presiding officer who has not had any prior responsibility for the matter under review, and who is not subject to the direct control or supervision of someone who has had such responsibility.

2. The hearing shall commence as soon as practicable at a time and place fixed by the presiding officer.

3. a. A motion for leave to intervene in any proceeding conducted under this section shall set forth the grounds for the proposed intervention, the position and interest of the movant and the likely impact that intervention will have on the expeditious progress of the proceeding. Any person already a party to the proceeding may file an answer to a motion to intervene, making specific reference to the factors in the foregoing sentence and subpar. c. within 10 days after service of the motion for leave to intervene.

b. A motion for leave to intervene in a proceeding shall ordinarily be filed before the first prehearing conference or in the absence of a prehearing conference, prior to the setting of a time and place for a hearing. Any motion filed after that time shall include, in addition to the information in subpar. a., a statement of good cause for the failure to file in a timely manner. The intervenor shall be bound by any agreements, arrangements and other matters previously made in the proceeding.

c. A motion for leave to intervene may be granted only if the movant demonstrates that his or her presence in the proceeding would not unduly prolong or otherwise prejudice the adjudication of the rights of the original parties, and that movant may be adversely affected by a final order. The intervenor shall become a full party to the proceeding upon the granting of leave to intervene.

d. Persons not parties to the proceeding may move for leave to file amicus curiae briefs. The movant shall state his or her interest and the reasons why the proposed amicus brief is desirable. If the motion is granted, the presiding officer or administrator shall issue an order setting the time for filing such brief. An amicus curia may participate in any briefing after his or her motion is granted, and shall be served with all briefs, reply briefs, motions and orders relating to issues to be briefed.

4. In computing any period of time prescribed or allowed in this section, the day of the event from which the designated period begins to run may not be included. Saturdays, Sundays, and federal legal holidays shall be included. When a stated time expires on a Saturday, Sunday or legal holiday, the stated time period shall be extended to include the next business day.

(d) 1. Upon appointment, the presiding officer shall establish a hearing file. The file shall consist of the notice issued by the administrator under sub. (1) (c), (4) (e), (l) or (p), or (6) (a) or (e), together with any accompanying material, the request for a hearing and the supporting data submitted therewith, and all documents relating to the request for certification or accreditation, or the proposed revocation of either.

2. The hearing file shall be available for inspection by any party, to the extent authorized by law, at the office of the presiding officer or other place designated.

(e) Any party may appear in person, or may be represented by counsel or by any other duly authorized representative.

(f) 1. The presiding officer, upon the request of any party, or at his or her discretion, may order a prehearing conference at a time and place specified to consider the following:

a. Simplification of the issues,

b. Stipulations, admissions of fact, and the introduction of documents,

c. Limitation of the number of expert witnesses,

d. Possibility of agreement disposing of all or any of the issues in dispute,

e. Such other matters as may aid in the disposition of the hearing, including such additional tests as may be agreed upon by the parties.

2. The results of the conference shall be reduced to writing by the presiding officer and made part of the record.

(g) 1. Hearings shall be conducted by the presiding officer in an informal but orderly and expeditious manner. The parties may offer oral or written evidence, subject to the exclusion by the presiding officer of irrelevant, immaterial and repetitious evidence.

2. Witnesses will not be required to testify under oath. However, the presiding officer shall call to the attention of witnesses that their statements may be subject to penalties under 18 U.S.C. 1001 for knowingly

making false statements or representations or using false documents in any matter within the jurisdiction of any department or agency of the United States.

3. Any witness may be examined or cross-examined by the presiding officer, the parties, or their representatives.

4. Hearings shall be recorded verbatim. Copies of transcripts of proceedings may be purchased by the applicant from the reporter.

5. All written statements, charts, tabulations, and similar data offered in evidence at the hearings shall, upon a showing satisfactory to the presiding officer of their authenticity, relevancy, and materiality, be received in evidence and shall constitute a part of the record.

(h) 1. The presiding officer shall make an initial decision which shall include a written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law, or discretion presented on the record. The findings, conclusions, and written decision shall be provided to the parties and made a part of the record. The initial decision shall become the decision of the administrator without further proceedings unless there is an appeal to the administrator or motion for review by the administrator. Except as provided in subd. 3., any such appeal shall be taken within 20 days of the date the initial decision was filed.

2. On appeal from or review of the initial decision the administrator shall have all the powers which he or she would have in making the initial decision including the discretion to require or allow briefs, oral argument, the taking of additional evidence or the remanding to the presiding officer for additional proceedings. The decision by the administrator shall include written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law, or discretion presented on the appeal or considered in the review.

3. In any hearing requested under par. (a) 2., the presiding officer shall render his initial decision within 60 days of that request. Any appeal to the administrator shall be taken within 10 days of the initial decision, and the administrator shall render his decision in that appeal within 30 days of the filing of the appeal.

(11) GENERAL PROVISIONS EXCLUSIONS. The following provisions of ch. NR 440 do not apply to this section:

(a) Section NR 440.07

(b) Section NR 440.08 (1), (3), (4), (5) and (6), and

(c) Section NR 440.15 (4).

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.644 Rubber tire manufacturing industry. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITIES. (a) The provisions of this section apply to the following affected facilities in rubber tire manufacturing plants: each undertread cementing operation, each sidewall cementing operation, each tread end cementing operation, each bead cementing operation, each green tire spraying operation, each Michelin-A operation, each Michelin-B operation, and each Michelin-C-automatic operation.

(b) The provisions of this section apply to each facility identified in par. (a) that commences construction or modification after January 20, 1983.

(c) Although the affected facilities listed under par. (a) are defined in reference to the production of components of a "tire", as defined under sub. (2) (a), the percent emission reduction requirements and VOC use cutoffs specified under sub. (3) (a) 1., 2., 6., 7. c. and d., 8., 9. and 10. refer to the total amount of VOC used (the amount allocated to the affected facility), including the VOC used in cements and organic solvent-based green tire spray materials for tire types not listed in the definition of "tire".

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

1. "Bead" means rubber-covered strands of wire, wound into a circular form, which ensure a seal between a tire and the rim of the wheel onto which the tire is mounted.

2. "Bead cementing operation" means the system that is used to apply cement to the bead rubber before or after it is wound into its final circular form. A bead cementing operation consists of a cement application station, such as a dip tank, spray booth and nozzles, cement trough and roller or swab applicator, and all other equipment necessary to apply cement to wound beads or bead rubber and to allow evaporation of solvent from cemented beads.

3. "Component" means a piece of tread, combined tread/sidewall, or separate sidewall rubber, or other rubber strip that is combined into the sidewall of a finished tire.

4. "Drying area" means the area where VOC from applied cement or green tire sprays is allowed to evaporate.

5. "Enclosure" means a structure that surrounds a VOC (cement, solvent, or spray) application area and drying area, and that captures and contains evaporated VOC and vents it to a control device. Enclosures may have permanent and temporary openings.

6. "Green tire" means an assembled, uncured tire.

7. "Green tire spraying operation" means the system used to apply a mold release agent and lubricant to the inside and outside of green tires to facilitate the curing process and to prevent rubber from sticking to the curing press. A green tire spraying operation consists of a booth where spraying is performed, the spray application station, and related equipment such as the lubricant supply system.

8. "Michelin-A operation" means the operation identified as Michelin-A in the emission standards and engineering division confidential file as referenced in Docket A-80-9, Entry II-B-12.

9. "Michelin-B operation" means the operation identified as Michelin-B in the emission standards and engineering division confidential file as referenced in Docket A-80-9, Entry II-B-12.

10. "Michelin-C-automatic operation" means the operation identified as Michelin-C-automatic in the emission standards and engineer-

ing division confidential file as referenced in Docket A-80-9, Entry II-B-12.

11. "Month" means a calendar month or a prespecified period of 28 days or 35 days (utilizing a 4-4-5-week recordkeeping and reporting schedule).

12. "Organic solvent-based green tire spray" means any mold release agent and lubricant applied to the inside or outside of green tires that contains more than 12%, by weight, of VOC, as sprayed.

13. "Permanent opening" means an opening designed into an enclosure to allow tire components to pass through the enclosure by conveyor or other mechanical means, to provide access for permanent mechanical or electrical equipment, or to direct air flow into the enclosure. A permanent opening is not equipped with a door or other means of obstruction of air flow.

14. "Sidewall cementing operation" means the system used to apply cement to a continuous strip of sidewall component or any other continuous strip component (except combined bead/sidewall component) that is incorporated into the sidewall of a finished tire. A sidewall cementing operation consists of a cement application station and all other equipment, such as the cement supply system and feed and takeaway conveyors, necessary to apply cement to sidewall strips or other continuous strip component (except combined tread/sidewall component) and to allow evaporation of solvent from the cemented rubber.

15. "Temporary opening" means an opening into an enclosure that is equipped with a means of obstruction, such as a door, window, or port, that is normally closed.

16. "Tire" means any agricultural, airplane, industrial, mobile home, light-duty truck or passenger vehicle tire that has a bead diameter less than or equal to 0.5 m (19.7 in) and a cross section dimension less than or equal to 0.325 m (12.8 in), and that is mass produced in an assembly-line fashion.

17. "Tread end cementing operation" means the system used to apply cement to one or both ends of the tread or combined tread/sidewall component. A tread end cementing operation consists of a cement application station and all other equipment, such as the cement supply system and feed and takeaway conveyors, necessary to apply cement to tread ends and to allow evaporation of solvent from the cemented tread ends.

18. "Undertread cementing operation" means the system used to apply cement to a continuous strip of tread or combined tread/sidewall component. An undertread cementing operation consists of a cement application station and all other equipment, such as the cement supply system and feed and takeaway conveyors, necessary to apply cement to tread or combined tread/sidewall strips and to allow evaporation of solvent from the cemented tread or combined tread/sidewall.

19. "VOC emission control device" means equipment that destroys or recovers VOC.

20. "VOC emission reduction system" means a system composed of an enclosure, hood, or other device for containment and capture of VOC emissions and a VOC emission control device.

21. "Water-based green tire spray" means any mold release agent and lubricant applied to the inside or outside of green tires that contains 12% or less, by weight, of VOC as sprayed.

(b) As used in this section, symbols not defined in this subsection have the meanings given in s. NR 440.03.

B_o = total number of beads cemented at a particular bead cementing affected facility for a month

C_a = concentration of VOC in gas stream in vents after a control device (parts per million by volume)

C_b = concentration of VOC in gas steam in vents before a control device (parts per million by volume)

C_f = concentration of VOC in each gas stream vented directly to the atmosphere from an affected facility or from a temporary enclosure around an affected facility (parts per million by volume)

D_c = density of cement or spray material (grams per liter)

D_r = density of VOC recovered by an emission control device (grams per liter)

E = emission control device efficiency, inlet versus outlet (fraction)

F_c = capture efficiency, VOC capture and routed to one control device versus total VOC used for an affected facility (fraction)

F_o = fraction of total mass of VOC used in a month by all facilities served by a common cement or spray material distribution system that is used by a particular affected facility served by the common distribution system

G = monthly average mass of VOC used per tire cemented or sprayed with a water-based green tire spray for a particular affected facility (grams per tire)

G_b = monthly average mass of VOC used per bead cemented for a particular bead cementing affected facility (grams per bead)

L_c = volume of cement or spray material used for a month (liters)

L_r = volume of VOC recovered by an emission control device for a month (liters)

M = total mass of VOC used for a month by all facilities served by a common cement or spray material distribution system (grams)

M_o = total mass of VOC used at an affected facility for a month (grams)

M_r = mass of VOC recovered by an emission control device for a month (grams)

N = mass of VOC emitted to the atmosphere per tire cemented or sprayed with a water-based green tire spray for an affected facility for a month (grams per tire)

N_b = mass of VOC emitted per bead cemented for an affected facility for a month (grams per bead)

Q_a = volumetric flow rate in vents after a control device (dry standard cubic meters per hour)

Q_b = volumetric flow rate in vents before a control device (dry standard cubic meters per hour)

Q_r = volumetric flow rate of each stream vented directly to the atmosphere from an affected facility or from a temporary enclosure around an affected facility (dry standard cubic meters per hour)

R = overall efficiency of an emission reduction system (fraction)

T_d = total number of days in monthly compliance period (days)

T_o = total number of tire cemented or sprayed with water-based green tire sprays at a particular affected facility for a month

W_o = weight fraction of VOC in a cement or spray material.

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) On and after the date on which the initial performance test, required by s. NR 440.08, is completed, but no later than 180 days after initial startup, each owner or operator subject to the provisions of this section shall comply with the following conditions:

1. For each undertread cementing operation:

a. Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the following levels, depending upon the duration of the compliance period:

1) 3,870 kilograms of VOC per 28 days,

2) 4,010 kilograms of VOC per 29 days,

3) 4,150 kilograms of VOC per 30 days,

4) 4,280 kilograms of VOC per 31 days, or

5) 4,840 kilograms of VOC per 35 days.

2. For each sidewall cementing operation:

a. Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the following levels, depending upon the duration of the compliance period:

1) 3,220 kilograms of VOC per 28 days,

2) 3,3450 kilograms of VOC per 29 days,

3) 3,450 kilograms of VOC per 30 days,

4) 3,570 kilograms of VOC per 31 days, or

5) 4,030 kilograms of VOC per 35 days.

3. For each tread end cementing operation: Discharge into the atmosphere no more than 10 grams of VOC per tire (g/tire) cementing for each month.

4. For each bead cementing operation: Discharge into the atmosphere no more than 5 grams of VOC per bead (g/bead) cemented for each month.

5. For each green tire spraying operation where only water-based sprays are used:

a. Discharge into the atmosphere no more than 1.2 grams of VOC per tire sprayed with an inside green tire spray for each month; and

b. Discharge into the atmosphere no more than 9.3 grams of VOC per tire sprayed with an outside green tire spray for each month.

6. For each green tire spraying operation where only organic solvent-based sprays are used:

a. Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the following levels, depending upon the duration of the compliance period:

1) 3,220 kilograms of VOC per 28 days,

2) 3,340 kilograms of VOC per 29 days,

3) 3,450 kilograms of VOC per 30 days,

4) 3,570 kilograms of VOC per 31 days, or

5) 4,030 kilograms of VOC per 35 days.

7. For each green tire spraying operation where both water-based and organic solvent-based sprays are used:

a. Discharge into the atmosphere no more than 1.2 grams of VOC per tire sprayed with a water-based inside green tire spray for each month; and

b. Discharge into the atmosphere no more than 9.3 grams of VOC per tire sprayed with a water-based outside green tire spray for each month; and either

c. Discharge into the atmosphere no more than 25% of the VOC used in the organic solvent-based green tire sprays (75% emission reduction) for each month; or

d. Maintain total (uncontrolled) VOC use for all organic solvent-based green tire sprays less than or equal to the levels specified under subd. 6. b.

8. For each Michelin-A operation:

a. Discharge into the atmosphere no more than 35% of the VOC used (65% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the following levels, depending upon the duration of the compliance period:

1) 1,570 kilograms of VOC per 28 days,

2) 1,630 kilograms of VOC per 29 days,

3) 1,690 kilograms of VOC per 30 days,

4) 1,740 kilograms of VOC per 31 days,

5) 1,970 kilograms of VOC per 35 days.

9. For each Michelin-B operation:

a. Discharge into the atmosphere no more than 25% of the VOC used (75% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the levels specified below, depending upon the duration of the compliance period:

1) 1,310 kilograms of VOC per 28 days,

2) 1,360 kilograms of VOC per 29 days,

3) 1,400 kilograms of VOC per 30 days,

4) 1,450 kilograms of VOC per 31 days, or

5) 1,640 kilograms of VOC per 35 days.

10. For each Michelin-C automatic operation:

a. Discharge into the atmosphere no more than 35% of the VOC used (65% emission reduction) for each month; or

b. Maintain total (uncontrolled) VOC use less than or equal to the levels specified under par. (a) 8. b.

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) does not apply to the monthly performance test procedures required by this section. Section NR 440.08 (4) does apply to initial performance tests and to the performance tests specified under par. (b) 2. and 3. Section NR 440.08 (6) does not apply when Method 24 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, is used.

(b) Performance tests shall be conducted as follows:

1. The owner or operator of an affected facility shall conduct an initial performance test, as required under s. NR 440.08 (1), except as described under par. (j). The owner or operator of an affected facility shall thereafter conduct a performance test each month except as described under pars. (g) 1. and (j). Initial and monthly performance tests shall be conducted according to the procedures in this subsection.

2. The owner or operator of an affected facility who elects to use a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator), as described under pars. (f) and (g), shall repeat the performance test when directed by the department or when the owner or operator elects to operate the capture system or control device at conditions different from the most recent determination of

overall reduction efficiency. The performance test shall be conducted in accordance with the procedures described under par. (f) 2. a. to c.

3. The owner or operator of an affected facility who seeks to comply with the equipment design and performance specifications, as described under par. (j), shall repeat the performance test when directed by the department or when the owner or operator elects to operate the capture system or control device at conditions different from the most recent determination of control device efficiency or measurement of capture system retention time or face velocity. The performance test shall be conducted in accordance with the procedures described under par. (f) 2. b.

(c) For each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation where organic solvent-based sprays are used, each Michelin-A operation, each Michelin-B operation, and each Michelin-C automatic operation where the owner or operator seeks to comply with the uncontrolled monthly VOC use (kg/mo) limits, the owner or operator shall use the following procedure to determine compliance with the applicable (depending upon duration of compliance period) uncontrolled monthly VOC use limit specified under sub. (3) (a) 1. b., 2. b., 6. b., 7. d., 8. b., 9. b. and 10. b. If both undertread cementing and sidewall cementing are performed at the same affected facility during a month, then the kg/mo limit specified under sub. (3) (a) 1. b. shall apply for that month.

1. Determine the density and weight fraction VOC (including dilution VOC) of each cement or green tire spray from its formulation or by analysis of the cement of green tire spray using Method 24 of Appendix A of 40 C.F.R. part 60, incorporated by reference in s. NR 440.17. If a dispute arises, the department may require an owner or operator who used formulation data to analyze the cement or green tire spray using Method 24 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17.

2. Calculate the total mass of VOC used at the affected facility for the month (M_o) by the following procedure:

a. For each affected facility for which cement or green tire spray is delivered in batch or via a distribution system that serves only the affected facility:

$$M_o = \sum_{i=1}^{a} L_{ci} D_{ci} W_{oi}$$

where "a" equals the number of different cements or green tire sprays used during the month that are delivered in batch or via a distribution system that serves only a single affected facility.

b. For each affected facility for which cement or green tire spray is delivered via a common distribution system that also serves other affected or existing facilities:

1) Calculate the total mass of VOC used for all of the facilities served by the common distribution system for the month (M):

$$M = \sum_{i=1}^{b} L_{ci} D_{ci} W_{oi}$$

where "b" equals the number of different cements or green tire sprays used during the month that are delivered via a common distribution system that also serves other affected or existing facilities.

2) Determine the fraction (F_o) of M used at the affected facility by comparing the production records and process specifications for the material cemented or sprayed at the affected facility for the month to the production records and process specifications for the material cemented or sprayed at all other facilities served by the common distribution system for the month or by another procedure acceptable to the administrator.

3) Calculate the total monthly mass of VOC used at the affected facility for the month (M_o):

$$M_o = MF_o$$

3. Determine the time duration of the monthly compliance period (T_d).

(d) For each tread end cementing operation and each green tire spraying operation where water-based sprays are used (inside or outside) that do not use a VOC emission reduction system, the owner or operator shall use the following procedure to determine compliance with the g/tire limit specified under sub. (3) (a) 3., 5. a. and b., and 7. a. and b.

1. Determine the density and weight fraction VOC as specified under par. (c) 1.

2. Calculate the total mass of VOC used at the affected facility for the month (M_o) as specified under par. (c) 2.

3. Determine the total number of tires cemented or sprayed at the affected facility for the month (T_o) by the following procedure:

a. For a tread end cementing operation, T_o equals the number of tread or combined tread/sidewall components that receive an application of tread end cement for the month.

b. For a green tire spraying operation that uses water-based inside green tire sprays, T_o equals the number of green tires that receive an application of water-based inside green tire spray for the month.

c. For a green tire spraying operation that uses water-based outside green tire sprays, T_o equals the number of green tires that receive an application of water-based outside green tire spray for the month.

4. Calculate the mass of VOC used per tire cemented or sprayed at the affected facility for the month (G):

$$G = \frac{M_o}{T_o}$$

5. Calculate the mass of VOC emitted per tire cemented or sprayed at the affected facility for the month (N):

$N = G$

(e) For each bead cementing operation that does not use a VOC emission reduction system, the owner or operator shall use the following procedure to determine compliance with the g/bead limit specified under sub. (3) (a) 4.

1. Determine the density and weight fraction of VOC as specified under par. (c) 1.

2. Calculate the total mass of VOC used at the affected facility for the month (M_o) as specified under par. (c) 2.

3. Determine the number of beads cemented at the affected facility during the month (B_o) using production records; B_o equals the number of beads that receive an application of cement for the month.

4. Calculate the mass of VOC used per bead cemented at the affected facility for the month (G_b):

$$G = \frac{M_o}{B_o}$$

5. Calculate the mass of VOC emitted per bead cemented at the affected facility for the month (N_b):

$N_b = G_b$

(f) For each tread end cementing operation and each bead cementing operation that use a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator), the owner or operator shall use the following procedure to determine compliance with the emission limit specified under sub. (3) (a) 3. and 4.

1. Calculate the mass of VOC used per tire cemented at the affected facility for the month (G), as specified under par. (e) 1. to 4., or mass of VOC used per bead cemented at the affected facility for the month (G_b), as specified under par. (e) 1. to 4.

2. Calculate the mass of VOC emitted per tire cemented at the affected facility for the month (N) or mass of VOC emitted per bead cemented for the affected facility for the month (N_b):

$N = G(1\text{-}R)$

$N_b = G_b(1\text{-}R)$

For the initial performance test, the overall reduction efficiency (R) shall be determined as prescribed under par. (f) 2. a. to c. In subsequent months, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test except during conditions described under par. (b) 2.

a. The owner or operator of an affected facility shall construct a temporary enclosure around the application and drying areas during he performance test for the purpose of capturing fugitive VOC emissions. The enclosure shall be maintained at a negative pressure to ensure that all evaporated VOC are measurable. Determine the fraction (F_c) of total VOC used at the affected facility that enter the control device:

$$F_c = \frac{\sum_{i=1}^{m} C_{b_i} \quad Q_{b_i}}{\sum_{i=1}^{m} C_{b_i} \quad Q_{b_i} \quad + \sum_{i=1}^{n} C_{f_i} \quad Q_{f_i}}$$

where:

"m" is the number of vents from the affected facility to the control device

"n" is the number of vents from the affected facility to the atmosphere and form the temporary enclosure

b. Determine the destruction efficiency of the control device (E) by 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 control device:

$$E = \frac{\sum_{i=1}^{m} C_{b_i} \quad Q_{b_i} \quad - \sum_{i=1}^{p} C_{a_i} \quad Q_{a_i}}{\sum_{i=1}^{m} C_{b_i} \quad Q_{b_i}}$$

where:

"m" is the number of vents from the affected facility to the control device

"p" is the number of vents after the control device

c. Determine the overall reduction efficiency (R):

$R = EF_c$

(g) For each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation where organic solvent-based sprays are used, each Michelin-A operation, each Michelin-B operation, and each Michelin-C-automatic operation that use a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator), the owner or operator shall use the following procedure to determine compliance with the percent emission reduction requirement specified under sub. (3) (a) 1. a., 2. a., 6. a., 7. c., 8. a., 9. a. and 10. a. For the initial performance test, the overall reduction efficiency (R) shall be determined as prescribed under par. (f) 2. a. to c. The performance test shall be repeated during conditions described under par. (b) 2. No monthly performance tests are required.

(h) For each tread end cementing operation and each bead cementing operation that uses a VOC emission reduction system with a control device that recovers VOC (e.g., carbon adsorber), the owner or operator shall use the following procedure to determine compliance with the emission limit specified under sub. (3) (a) 3. and 4.

1. Calculate the mass of VOC used per tire cemented at the affected facility for the month (G), as specified under par. (d) 1. to 4., or the mass of VOC used per bead cemented at the affected facility for the month (G_b) as specified under par. (e) 1. to 4.

2. Calculate the total mass of VOC recovered from the affected facility for the month (M_r):

$$M_r = L_r D_r$$

3. Calculate the overall reduction efficiency for the VOC emission reduction system (R) for the month:

$$R = \frac{M_r}{M_o}$$

4. Calculate the mass of VOC emitted per tire cemented at the affected facility for the month (N) or mass of VOC emitted per bead cemented at the affected facility for the month (N_b):

$$N = G(1\text{-}R)$$

$$N_b = G_b(1\text{-}R)$$

(i) For each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation where organic solvent-based sprays are used, each Michelin-A operation, each Michelin-B operation, and each Michelin-C-automatic operation that use a VOC emission reduction system with a control device that recovers VOC (e.g., carbon adsorber), the owner or operator shall use the following procedure to determine compliance with the percent reduction requirement specified under sub. (3) (a) 1. a., 2. a., 6. a., 7. c., 8. a., 9. a. and 10. a.

1. Determine the density and weight fraction VOC as specified under par. (c) 1.

2. Calculate the total mass of VOC used at the affected facility for the month (M_o) as described under par. (c) 2.

3. Calculate the total mass of VOC recovered from the affected facility for the month (M_r) as described under par. (h) 2.

4. Calculate the overall reduction efficiency for the VOC emission reduction system (R) for the month as described under par. (h) 3.

(j) Rather than seeking to demonstrate compliance with the provisions of sub. (3) (a) 1. a., 2. a., 6. a., 7. c. or 9. a. using the performance test procedures described under pars. (g) and (i), an owner or operator of an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent-based sprays are used, or Michelin-B operation that use a VOC emission reduction system, may seek to demonstrate compliance by meeting the equipment design and performance specifications listed under par. (j) 1., 2., and 4. to 6. or under par. (j) 1. and 3. to 6. and by conducting a control device efficiency performance test to determine compliance as describe under par. (j) 7. The owner or operator shall conduct this performance test of the control device efficiency no later than 180 days after initial startup of the affected facility, as specified under s. NR 440.08 (1). Meeting the capture system design and performance specifications, in conjunction with operating a 95% efficient control device, is an acceptable means of demonstrating compliance with the standard. Therefore, the requirement for the initial performance test on the enclosure, as specified under s. NR 440.08 (1), is waived. No monthly performance tests are required.

1. For each undertread cementing operation, each sidewall cementing operation, and each Michelin-B operation, the cement application and drying area shall be contained in an enclosure that meets the criteria specified under par. (j) 2., 4. and 5. For each green tire spraying operation where organic solvent-based sprays are used, the spray application and drying area shall be contained in an enclosure that meets the criteria specified under par. (j) 3., 4. and 5.

2. The drying area shall be enclosed between the application area and the water bath or to the extent necessary to contain all tire components for at least 30 seconds after cement application, whichever distance is less.

3. Sprayed green tires shall remain in the enclosure for a minimum of 30 seconds after spray application.

4. A minimum face velocity of 100 feet per minute shall be maintained continuously through each permanent opening into the enclosure when all temporary enclosure openings are closed. The cross-sectional area of each permanent opening shall be divided into at least 12 equal areas, and a velocity measurement shall be performed at the centroid of each equal area with an anemometer or similar velocity monitoring device; the face velocity of each permanent opening is the average value of the velocity measurements taken. The monitoring device shall be calibrated and operated according to the manufacturer's instructions. Temporary enclosure openings shall remain closed at all time except when worker access is necessary.

5. The total area of all permanent openings into the enclosure may not exceed the area that would be necessary to maintain the VOC concentration of the exhaust gas stream at 25% of the lower explosive limit (LEL) under the following conditions:

a. The facility is operating at the maximum solvent use rate;

b. The face velocity through each permanent opening is 100 feet per minute; and

c. All temporary openings are closed.

6. All captured VOC are ducted to a VOC emission control device that is operated on a continuous basis and that achieves at least a 95% destruction or recovery efficiency.

7. The efficiency of the control device (E) for the initial performance test shall be determined by 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 control device as described under par. (f) 2. b. The control device efficiency shall be redetermined during conditions specified under par. (b) 3.

(k) Each owner or operator of an affected facility who initially elected to be subject to the applicable percent emission reduction requirement specified under sub. (3) (a) 1. a., 2. a., 6. a., 7. c., 8. a., 9. a. or 10. a. and who later seeks to comply with the applicable total (uncontrolled) monthly VOC use limit specified under sub. (3) (a) 1. b., 2. b., 6. b., 7. d., 8. b., 9. b. or 10. b. shall demonstrate, using the procedures described under par. (c), that the total VOC use at the affected facility has not exceeded the applicable total (uncontrolled) monthly VOC use limit during each of the last 6 months of operation. The owner or operator shall be subject to the applicable percent emission reduction requirement until the conditions of this paragraph and sub. (7) (h) are satisfied.

(l) In determining compliance for each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation, each Michelin-A operation, each Michelin-B operation, and each Michelin-C-automatic operation, the owner or operator shall include all the VOC used, recovered, or destroyed from cements and organic solvent-based green tire sprays including those cements or sprays used for tires other than those defined under sub. (2) (a).

(m) In determining compliance for each tread end cementing operation, each bead cementing operation, and each green tire spraying operation, the owner or operator shall include only those tires defined under sub. (2) (a) when determining T_o and B_o.

(5) MONITORING OF OPERATIONS. (a) Each owner or operator subject to the provisions of this section shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment, unless alternative monitoring procedures or requirements are approved for that facility by the department.

1. Where a thermal incinerator is used for VOC emission reduction, a temperature monitoring device equipped with a continuous recorder for the temperature of the gas stream in the combustion zone of the incinerator. The temperature monitoring device shall have an accuracy of 1% of the temperature being measured in °C or ± 0.5 °C, whichever is greater.

2. Where a catalytic incinerator is used for VOC emission reduction, temperature monitoring devices, each equipped with a continuous recorder, for the temperature in the gas stream immediately before and after the catalyst bed of the incinerator. The temperature monitoring devices shall have an accuracy of 1% of the temperature being measured in °C or ± 0.5 °C, whichever is greater. For an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent-based sprays are used or Michelin-B operation where a carbon adsorber is used to meet the performance requirements specified under sub. (4) (j) 6., an organics monitoring device used to indicate the concentration level or organic compounds based on a detection principle such as infrared, photoionization, or thermal conductivity, equipped with a continuous recorder, for the outlet of the carbon bed.

(b) An owner or operator of an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent-based sprays are used, or Michelin-B operation where a VOC recovery device other than a carbon adsorber is used to meet the performance requirement specified under sub. (4) (j) 6. shall provide to the department information describing the operation of the control device and the process parameters which would indicate proper operation and maintenance of the device. The department may request further information and shall specify appropriate monitoring procedures or requirements.

(6) RECORDKEEPING REQUIREMENTS. (a) Each owner or operator of an affected facility that uses a thermal incinerator shall maintain continuous records of the temperature of the gas stream in the combustion zone of the incinerator and records of all 3-hour periods of operation for which the average temperature of the gas stream in the combustion zone was more than 28 °C (50 °F) below the combustion zone temperature measured during the most recent determination of the destruction efficiency of the thermal incinerator that demonstrated that the affected facility was in compliance.

(b) Each owner or operator of an affected facility that uses a catalytic incinerator shall maintain:

1. Continuous records of the temperature of the gas stream both upstream and downstream of the catalyst bed of the incinerator,

2. Records of all 3-hour periods of operation of which the average temperature measured before the catalyst bed is more than 28 °C below the gas stream temperature measured before the catalyst bed during the most recent determination of destruction efficiency of the catalytic incinerator that demonstrated that the affected facility was in compliance, and

3. Records of all 3-hour periods for which the average temperature difference across the catalyst bed is less than 80% of the temperature difference measured during the most recent determination of the destruction efficiency of the catalytic incinerator that demonstrated that the affected facility was in compliance.

(c) Each owner or operator of an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent-based sprays are used, or Michelin-B operation that uses a carbon adsorber to meet the requirements specified under sub. (4) (j) 6. shall maintain continuous records of all 3-hour periods of operation during which the average VOC concentration level or reading of organics in the exhaust gases is more than 20% greater than the exhaust gas concentration level or reading measured by the organics monitoring device during the most recent determination of the recovery efficiency of the carbon adsorber that demonstrated that the affected facility was in compliance.

(d) Each owner or operator of an undertread cementing operation, sidewall cementing operation, green tires spraying operation where organic solvent-based sprays are used, Michelin-A operation, Michelin-B operation, or Michelin-C-automatic operation who seeks to comply with a specified kg/mo uncontrolled VOC use limit shall maintain records of monthly VOC use and the number of days in each compliance period.

(e) Each owner or operator that is required to conduct monthly performance tests, as specified under sub. (4) (b) 1., shall maintain records of the results of all monthly tests.

(7) REPORTING REQUIREMENTS. (a) Each owner or operator subject to the provisions of this section, at the time of notification of the anticipated initial startup of an affected facility pursuant to s. NR 440.07 (1) (b), shall provide a written report to the department declaring for each undertread cementing operation, each sidewall cementing operation, each green tire spraying operation where organic solvent-based spray are used, each Michelin-A operation, each Michelin-B operation, and each Michelin-C-automatic operation the emission limit the owner or operator intends to comply with and the compliance method, where sub. (4) (j) is applicable, to be employed.

(b) Each owner or operator subject to the provisions of this section, at the time of notification of the anticipated initial startup of an affected facility pursuant to s. NR 440.07 (1) (b), shall specify the monthly schedule (each calendar month or a 4-4-5-week schedule) to be used in making compliance determinations.

(c) Each owner or operator subject to the provision of this section shall report the results of all initial performance tests, as required under s. NR 440.08 (1), and the results of the performance test required under sub. (4) (b) 2. and 3. The following data shall be included in the report for each of the performance tests:

1. For each affected facility for which the owner or operator seeks to comply with a kg/mo uncontrolled VOC use limit specified under sub. (3) (a): the monthly mass of VOC used (M_o) and the number days in the compliance period (T_d).

2. For each affected facility that seeks to comply with a g/tire or g/bead limit specified under sub. (3) (a) without the use of a VOC emission reduction system: the mass of VOC used (M_o), the number of tires cemented or sprayed (T_o), the mass of VOC emitted per tire cemented or sprayed (N), the number of beads cemented (B_o), and the mass of VOC emitted per bead cemented (N_b).

3. For each affected facility that uses a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator) to comply with a g/tire or g/bead limit specified under sub. (3) (a): the mass of VOC used (M_o), the number of tires cemented or sprayed (T_o), the mass of VOC emitted per tire cemented or sprayed (N), the number of beads cemented (B_o), the mass of VOC emitted per bead cemented (N_b), the mass of VOC used per tire cemented or sprayed (G), the mass of VOC per bead cemented (G_b), the emission control device efficiency (E), the capture system efficiency (F_c), the face velocity through each permanent opening for the capture system with the temporary openings closed, and the overall system emission reduction (R).

4. For each affected facility that uses a VOC emission reduction system with a control device that destroys VOC (e.g., incinerator) to comply with a percent emission reduction requirement specified under sub. (3) (a): the emission control device efficiency (E), the capture system efficiency (F_o), the face velocity through each permanent opening in the computer system with the temporary openings closed, and the overall system emission reduction (R).

5. For each affected facility that uses a carbon adsorber to comply with a g/tire or g/bead limit specified under sub. (3) (a): the mass of VOC used (M_o), the number of tires cemented or sprayed (T_o), the

mass of VOC used per tire cemented or sprayed (G), the number of beads cemented (B_o), the mass of VOC used per bead (G_b), the mass of VOC recovered (M_r), the overall system emission reduction (R), the mass of VOC emitted per tire cemented or sprayed (N), and the mass of VOC emitted per bead cemented (N_b).

6. For each affected facility that uses a VOC emission reduction system with a control device that recovers VOC (e.g., carbon adsorber) to comply with a percent emission reduction requirement specified under sub. (3) (a): the mass of VOC used (M_o), the mass of VOC recovered (M_r), and the overall system emission reduction (R).

(d) Each owner or operator of an undertread cementing operation, sidewall cementing operation, green tire spraying operation where organic solvent-based sprays are used, or Michelin-B operation who seeks to comply with the requirements described under sub. (4) (j) shall include in the initial compliance report a statement specifying, in detail, how each of the equipment design and performance specifications has been met. The initial compliance report also shall include the following data: the emission control device efficiency (E), the face velocity through each permanent enclosure opening with all temporary enclosure openings closed, the total area of all permanent enclosure openings, the total area of all temporary enclosure openings, the maximum solvent use rate (kg/hr), the types of VOC used, the lower explosive limit (LEL) for each VOC used, and the length of time each component is enclosed after application of cement or spray material.

(e) Each owner or operator of an affected facility shall include the following data measured by the required monitoring devices, as applicable, in the report for each performance test specified under par. (c):

1. The average combustion temperature measured at least every 15 minutes and averaged over the performance test period of incinerator destruction efficiency for each thermal incinerator.

2. The average temperature before and after the catalyst bed measured at least every 15 minutes and averaged over the performance test period of incinerator destruction efficiency for each catalytic incinerator.

3. The concentration level or reading indicated by the organics monitoring device at the outlet of the adsorber, measured at least every 15 minutes and averaged over the performance test period of carbon adsorber recovery efficiency while the vent stream is normally routed and constituted.

4. The appropriate data to be specified by the department where a VOC recovery device other than a carbon adsorber is used.

(f) Once every 6 months each owner or operator subject to the provisions of sub. (6) shall report, as applicable:

1. Each monthly average VOC emission rate that exceeds the g/tire or g/bead limit specified under sub. (3) (a), as applicable for the affected facility.

2. Each monthly average VOC use rate that exceeds the kg/mo VOC use limit specified under sub. (3) (a) as applicable for the affected facility.

3. Each monthly average VOC emission reduction efficiency for a VOC recovery device (e.g., carbon adsorber) less than the percent efficiency limit specified under sub. (3) (a) as applicable for the affected facility.

4. Each 3-hour period of operation for which the average temperature of the gas stream in the combustion zone of a thermal incinerator, as measured by the temperature monitoring device, is more than 28 °C (50 °F) below the combustion zone temperature measured during the most recent determination of the destruction efficiency of the thermal incinerator that demonstrated that the affected facility was in compliance.

5. Each 3-hour period of operation for which the average temperature of the gas stream immediately before the catalyst bed of a catalytic incinerator, as measured by the temperature monitoring device, is more than 28 °C (50 °F) below the gas stream temperature measured before the catalyst bed during the most recent determination of the destruction efficiency of the catalyst incinerator that demonstrated that the affected facility was in compliance, and any 3-hour period of which the average temperature difference across the catalyst bed (i.e., the difference between the temperatures of the gas stream immediately before and after the catalyst bed), as measured by the temperature monitoring device, is less than 80% of the temperature difference measured during the most recent determination of the destruction efficiency of the catalytic incinerator that demonstrated that the affected facility was in compliance.

6. Each 3-hour period of operation during which the average concentration level or reading of VOCs in the exhaust gases from a carbon adsorber is more than 20% greater than the exhaust gas concentration level or reading measured by the organics monitoring device during the most recent determination of the recovery efficiency of the carbon adsorber that demonstrated that the affected facility was in compliance.

(g) Each owner or operator of an affected facility who initially elected to be subject to the applicable percent emission reduction requirement specified under sub. (3) (a) and who later seeks to comply with the applicable total (uncontrolled) monthly VOC use limits specified under sub. (3) (a) and who has satisfied the provision specified under sub. (4) (k) shall furnish the department written notification no less than 30 days in advance of the date when the owner or operator intends to be subject to the applicable VOC use limit instead of the applicable percent emission reduction requirement.

(8) TEST METHODS AND PROCEDURES. (a) The test methods in Appendix A, of 40 C.F.R. part 60, 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 24 or formulation data for the determination of the VOC content of cements or green tire spray materials. In the event of dispute, Method 24 shall be the reference method. For Method 24, the cement or green tire spray sample shall be a 1-liter sample collected in a 1-liter container at a point where the sample will be representative of the material as applied in the affected facility.

2. Method 25 as the reference method for the determination of VOC concentrations in each stack, both entering and leaving an emission control device. The owner or operator shall notify the department 30 days in advance of any test by Method 25. For Method 25, the sampling time for each of 3 runs shall be at least one hour. Method 1 shall be used to select the sampling site, and the sampling point shall be the centroid of the duct or at a point no closer to the walls than one meter. The minimum sample volume shall be 0.003 dry standard cubic meter (dscm) except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the department.

3. Method 2, 2A, 2C, or 2D, as appropriate, as the reference method for determination of the flow rate of the stack gas. The measurement site shall be the same as the Method 25 sampling. A velocity traverse shall be made once per run within the hour that the Method 25 sample is taken.

4. Method 4 for determination of stack gas moisture.

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.65 Flexible vinyl and urethane coating and printing. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each rotogravure printing line used to print or coat flexible vinyl or urethane products.

(b) This section applies to any affected facility which begins construction, modification, or reconstruction after January 18, 1983.

(c) For facilities controlled by a solvent recovery emission control device, the provisions of sub. (5) (a) requiring monitoring of operations will not apply until performance specifications are promulgated under 40 C.F.R. part 60, Appendix B, incorporated by reference in s. NR 440.17, for the continuous monitoring system. After the promulgation of performance specifications these provisions will apply to each affected facility under par. (b). Facilities controlled by a solvent recovery emission control device that become subject to the standard prior to promulgation of performance specifications must conduct performance tests in accordance with s. NR 440.13 (2) after performance specifications are promulgated.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this paragraph have the meanings given in s. NR 440.02.

1. "Emission control device" means any solvent recovery or solvent destruction device used to control volatile organic compounds (VOC) emissions from flexible vinyl and urethane rotogravure printing lines.

2. "Emission control system" means the combination of an emission control device and a vapor capture system for the purpose of reducing VOC emissions from flexible vinyl and urethane rotogravure printing lines.

3. "Flexible vinyl and urethane products" means those products, except for resilient floor coverings (1977 Standard Industry Code 3996) and flexible packaging, that are more than 50 micrometers (0.002 inches) thick and that consist of or contain a vinyl or urethane sheet or a vinyl or urethane coated web.

4. "Gravure cylinder" means a plated cylinder with a printing image consisting of minute cells or indentations specifically engraved or etched into the cylinder's surface to hold ink when continuously resolved through a fountain of ink.

5. "Ink" means any mixture of ink, coating solids, organic solvents including dilution solvent and water that is applied to the web of flexible vinyl or urethane on a rotogravure printing line.

6. "Ink solids" means the solids content of an ink as determined by Reference Method 24, ink manufacturer's formulation data, or plant blending records.

7. "Inventory system" means a method of physically accounting for the quantity of ink, solvent and solids used at one or more affected facilities during a time period. The system is based on plant purchase or inventory records.

8. "Plant blending records" means those records which document the weight fraction of organic solvents and solids used in the formulation or preparation of inks at the vinyl or urethane printing plant where they are used.

9. "Rotogravure print station" means any device designed to print or coat inks on one side of a continuous web or substrate using the intaglio printing process with a gravure cylinder.

10. "Rotogravure printing line" means any number of rotogravure print stations and associated dryers capable of printing or coating simultaneously on the same continuous vinyl or urethane web or substrate which is fed from a continuous roll.

11. "Vapor capture system" means any device or combination of devices designed to contain, collect and route organic solvent vapors emitted from the flexible vinyl or urethane rotogravure printing line.

(b) As used in this section, symbols not defined in this paragraph have the meanings given in s. NR 440.03.

1. "a" means the gas stream vents exiting the emission contol device.

2. "b" means the gas stream vents entering the emission control device.

3. "f" means the gas stream vents which are not directed to an emission control device.

4. "C_{aj}" means the concentration of VOC in each gas stream (j) for the time period exiting the emission control device, in parts per million by volume.

5. "C_{bi}" means the concentration of VOC in each gas stream (i) for the time period entering the emission control device, in parts per million by volume.

6. "C_{fk}" means the concentration of VOC in each gas stream (k) for the time period which is not directed to an emission control device, in parts per million by volume.

7. "G" means the weighted average mass of VOC per mass of ink solids applied, in kilograms per kilogram.

8. "M_{cj}" means the total mass of each dilution solvent (j) added at the print line in the time period determined from plant records, in kilograms.

10. "Q_{aj}" means the volumetric flow rate of each effluent gas stream (j) exiting the emission control device, in standard cubic meters per hour.

11. "Q_{bi}" means the volumetric flow rate of each effluent gas stream (i) entering the emission control device, in standard cubic meters per hour.

12. "Q_{fk}" means the volumetric flow rate of each effluent gas stream (k) not directed to an emission control device, in standard cubic meters per hour.

13. "E" means the VOC emission reduction efficiency (as a fraction) of the emission control device during performance testing.

14. "F" means the VOC emission capture efficiency (as a fraction) of the vapor capture system during performance testing.

15. "W_{oi}" means the weight fraction of VOC in each ink (i) used in the time period as determined by Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, manufacturer's formulation data, or plant blending records, in kilograms per kilogram.

16. "W_{si}" means the weight fraction of solids in each ink (i) used in the time period as determined from Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, manufacturer's formulation data, or plant blending records, in kilograms per kilogram.

17. "W_{oj}" means the weight fraction of VOC in each dilution solvent (j) added at the print line in the time period determined from Reference Method 24 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, manufacturer's formulation data, or plant blending records, in kilograms per kilogram.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. (a) On and after the date on which the performance test required by s. NR 440.08 has been completed each owner or operator subject to this section shall either:

1. Use inks with a weighted average VOC content less than 1.0 kilogram VOC per kilogram ink solids at each affected facility, or

2. Reduce VOC emissions to the atmoshphere by 85% from each affected facility.

(4) TEST METHODS AND PROCEDURES. (a) Reference Methods in 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, except as provided under 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 for analysis of inks. If nonphotochemically reactive solvents are used in the inks standard gas chromatographic techniques may be used to identify and quantify these solvents. The results of Ref-

erence method 24 may be adjusted to subtract these solvents from the measured VOC content.

2. Method 24A for VOC concentration (the calibration gas shall be propane);

3. Method 1 for sample and velocity traverses;

4. Method 2 for velocity and volumetric flow rates;

5. Method 3 for gas analysis;

6. Method 4 for stack gas moisture.

(b) To demonstrate compliance with sub. (3) (a) 1. the owner or operator of an affected facility shall determine the weighted average VOC content of the ink according to the following procedures:

1. Determine and record the VOC content and amount of each ink used at the print head, including the VOC content and amount of diluent solvent, for any time periods when VOC emission control equipment is not used.

2. Compute the weighted average VOC content by the following equation:

$$G = \frac{\sum_{i=1}^{n} (W_{oi}\, M_{ci}) + \sum_{j=1}^{m} (W_{oj}\, M_{dj})}{\sum_{i=1}^{n} (M_{ci}\, W_{si})}$$

3. The weighted average VOC content of the inks shall be calculated over a period that does not exceed one calendar month or four consecutive weeks. A facility that uses an accounting system based on quarters consisting of two 28 calendar day periods and one 35 calendar day period may use an averaging period of 35 calendar days four times per year, provided the use of such an accounting system is documented in the initial performance test.

4. Each determination of the weighted average VOC content shall constitute a performance test for any period when VOC emission control equipment is not used. Results of the initial performance test must be reported to the department. Reference Method 24 or ink manufacturers' formulation data along with plant blending records (if plant blending is done) may be used to determine VOC content. The department may require the use of Reference Method 24 if there is a question concerning the accuracy of the ink manufacturer's data or plant blending records.

5. If, during the time period when emission control equipment is not used, all inks used contain less than 1.0 kilogram VOC per kilogram ink solids the owner or operator is not required to calculate the weighted average VOC content but must verify and record the VOC content of each ink (including any added dilution solvent) used as determined by Reference Method 24, ink manufacturers' formulation data or plant blending records.

(c) To determine compliance with sub. (3) (a) 1. the owner or operator may determine the weighted average VOC content using an inventory system.

1. The inventory system shall accurately account to the nearest kilogram for the VOC content of all inks and dilution solvent used, recycled and discarded for each affected facility during the averaging period. Separate records must be kept for each affected facility.

2. To determine VOC content of inks and dilution solvent used or recycled Reference Method 24 or ink manufacturers' formulation data must be used in combination with plant blending records (if plant blending is done) or inventory records or purchase records for new inks or dilution solvent.

3. For inks to be discarded only Reference Method 24 shall be used to determine the VOC content. Inks to be discarded may be combined prior to measurement of volume or weight and tested by Reference Method 24.

4. The department may require the use of Reference Method 24 if there is a question concerning the accuracy of the ink manufacturer's data or plant records.

5. The department shall approve the inventory system of accounting for VOC content prior to the initial performance test.

(d) To demonstrate compliance with sub. (3) (a) 2. the owner or operator of an affected facility controlled by a solvent recovery emission control device or an incineration control device shall conduct a performance test to determine overall VOC emission control efficiency according to the following procedures:

1. The performance test shall consist of 3 runs. Each test run must last a minimum of 30 minutes and shall continue until the printing operation is interrupted or until 180 minutes of continuous operation occurs. During each test run the print line shall be printing continuously and operating normally. The VOC emission reduction efficiency achieved from each test run is averaged over the entire test run period.

2. VOC concentration values at each site shall be measured simultaneously.

3. The volumetric flow rate shall be determined from one Method 2 measurement for each test run conducted immediately prior to, during, or after that test run. Volumetric flow rates at each site do not need to be measured simultaneously.

4. In order to determine capture efficiency from an affected facility all fugitive VOC emissions from the affected facility shall be captured and vented through stacks suitable for measurement. During a performance test the owner or operator of an affected facility located in an area with other sources of VOC shall isolate the affected facility from other sources of VOC. These requirements shall be accomplished using one of the following methods:

a. Build a permanent enclosure around the affected facility;

b. Build a temporary enclosure around the affected facility and duplicate, to an extent that is reasonably feasible, the ventilation conditions that are in effect when the affected facility is not enclosed (one way to do this is to divide the room exhaust rate by the volume of the room and then duplicate that quotient or 20 air changes per hour, whichever is smaller, in the temporary enclosure); or

c. Shut down all other sources of VOC and continue to exhaust fugitive emissions from the affected facility through any building ventilation system and other room exhausts such as print line ovens and embossers.

5. For each affected facility compliance with sub. (3) (a) 2. has been demonstrated if the average value of the overall control efficiency (EF) for the 3 runs is equal to or greater than 85% . An overall control efficiency is calculated for each run as follows:

a. For efficiency of the emission control device.

$$E = \frac{\sum_{i=1}^{n} (Q_{bi} C_{bi}) - \sum_{j=1}^{m} (Q_{aj} C_{aj})}{\sum_{i=1}^{n} (Q_{bi} C_{bi})}$$

b. For efficiency of the vapor capture system.

$$F = \frac{\sum_{i=1}^{n} (Q_{bi} C_{bi})}{\sum_{i=1}^{n} (Q_{bi} C_{bi}) + \sum_{k=1}^{p} (Q_{fk} C_{fk})}$$

(5) MONITORING OF OPERATIONS AND RECORDKEEPING REQUIREMENTS. (a) The owner or operator of an affected facility controlled by a solvent recovery emission control device shall install, calibrate, operate and maintain a monitoring system which continuously measures and records the VOC concentration of the exhaust vent stream from the control device and shall comply with the following requirements:

1. The continuous monitoring system shall be installed in a location that is representative of the VOC concentration in the exhaust vent at least two equivalent stack diameters from the exhaust point and protected from interferences due to wind, weather, or other processes.

2. During the performance test the owner or operator shall determine and record the average exhaust vent VOC concentration in parts per million by volume. After the performance test the owner or operator shall determine and, in addition to the record made by the continuous monitoring device, record the average exhaust vent VOC concentration for each 3-hour clock period of printing operation when the average concentration is greater than 50 ppm and more than 20% greater than the average concentration value demonstrated during the most recent performance test.

(b) The owner or operator of an affected facility controlled by a thermal incineration emission control device shall install, calibrate, operate and maintain a monitoring device that continuously measures and records the temperature of the control device exhaust gases and shall comply with the following requirements:

1. The continuous monitoring device shall be calibrated annually and have an accuracy of $\pm 0.75\%$ of the temperature being measured or $\pm 2.5°C$, whichever is greater.

2. During the performance test the owner or operator shall determine and record the average temperature of the control device exhaust gases. After the performance test the owner or operator shall determine and record, in addition to the record made by the continuous monitoring device, the average temperature for each 3-hour clock period of printing operation when the average temperature of the exhaust gases is more than 28°C below the average temperature demonstrated during the most recent performance test.

(c) The owner or operator of an affected facility controlled by a catalytic incineration emission control device shall install, calibrate, operate and maintain monitoring devices that continuously measure and record the gas temperatures both upstream and downstream of the catalyst bed and shall comply with the following requirements:

1. Each continuous monitoring device shall be calibrated annually and have an accuracy of $\pm 0.75\%$ of the temperature being measured or $\pm 2.5°C$, whichever is greater.

2. During the performance test the owner or operator shall determine and record the average gas temperature both upstream and downstream of the catalyst bed. After the performance test the owner or operator shall determine and record, in addition to the record made by the continuous monitoring device, the average temperatures for each 3-hour clock period of printing operation when the average temperature of the gas stream before the catalyst bed is more than 28°C below the average temperature demonstrated during the most recent performance test or the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference of the device during the most recent performance test.

(d) The owner or operator of an affected facility shall record time periods of operation when an emission control device is not in use.

(6) REPORTING REQUIREMENTS. (a) For all affected facilities subject to compliance with sub. (3) the performance test data and results from the performance test shall be submitted to the department as specified in s. NR 440.08 (1).

(b) The owner or operator of each affected facility shall submit semiannual reports to the department of occurrences of the following:

1. Exceedances of the weighted average VOC content specified in sub. (3) (a) 1.;

2. Exceedances of the average value of the exhaust vent VOC concentration as defined under sub. (5) (a) 2.;

3. Drops in the incinerator temperature as defined under sub. (5) (b) 2.; and

4. Drops in the average temperature of the gas stream immediately before the catalyst bed or drops in the average temperature across the catalyst bed as defined under sub. (5) (c) 2.

(c) The reports required under par (b) shall be postmarked within 30 days following the end of the second and fourth calendar quarters.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; (2) (a) (intro.) and (b) (intro.), r. (6) (d), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.66 Equivalent leaks of voc in petroleum refineries. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) 1. The provisions of this section apply to affected facilities in petroleum refineries.

2. A compressor is an affected facility.

3. The group of all the equipment (defined in sub. (2)) within a process unit is an affected facility.

(b) Any affected facility under par. (a) that commences construction or modification after January 4, 1983, is subject to the requirements of this section.

(c) Addition or replacement of equipment (defined in sub. (2)) for the purpose of process improvement which is accomplished without a capital expenditure may not by itself be considered a modification under this section.

(d) Facilities subject to s. NR 440.62 or 440.68 are excluded from this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02 or 440.62.

(a) "Alaskan north slope" means the approximately 69,000 square mile area extending from the Brooks Range to the Arctic Ocean.

(b) "Equipment" means each valve, pump, pressure relief device, sampling connection system, open-ended valve or line and flange or other connector in VOC service. Compressors are considered equipment only for the purposes of recordkeeping and reporting.

(c) "In hydrogen service" means that a compressor contains a process fluid that meets the conditions in sub. (4) (b).

(d) "In light liquid service" means that the piece of equipment contains a liquid that meets the conditions specified in sub. (4) (c).

(e) "Petroleum refinery" means that facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through the distillation of petroleum or through the redistillation, cracking, or reforming of unfinished petroleum derivatives.

(f) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale and coal.

(g) "Process unit" means components assembled to produce intermediate or final products from petroleum, unfinished petroleum derivatives, or other intermediates; a process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product.

(3) STANDARDS. (a) Each owner or operator subject to the provisions of this section shall comply with the requirements of s. NR 440.62 (3) (a) to (j) as soon as practicable, but no later than 180 days after initial startup.

(b) An owner or operator may elect to comply with the requirements of s. NR 440.62 (4) (a) and (b).

(c) An owner or operator may apply to the administrator for a determination of equivalency for any means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to the reduction in emissions of VOC achieved by the controls required in this section under 40 C.F.R. s. 60.592 (c), incorporated by reference in s. NR 440.17. In doing so the owner or operator shall comply with requirements 40 C.F.R. s. 60.484, incorporated by reference in s. NR 440.17, and provide notice to the department of any determination of equivalency approved by the administrator.

(d) Each owner or operator subject to the provisions of this section shall comply with the provisions of s. NR 440.62 (6) except as provided in sub. (4).

(e) Each owner or operator subject to the provisions of this section shall comply with the provisions of s. NR 440.62 (7) and (8).

(4) EXCEPTIONS. (a) Each owner or operator subject to the provisions of this section may comply with the following exceptions to the provisions of s. NR 440.62.

(b) 1. Compressors in hydrogen service are exempt from the requirements of sub. (3) if an owner or operator demonstrates that a compressor is in hydrogen service.

2. Each compressor is presumed not to be in hydrogen service unless an owner or operator demonstrates that the piece of equipment is in hydrogen service. For a piece of equipment to be considered in hydrogen service it must be determined that the percent hydrogen content can be reasonably expected always to exceed 50% by volume. For purposes of determining the percent hydrogen content in the process fluid that is contained in or contacts a compressor procedures that conform to the general method described in ASTM E260-73, E168-67 or E169-63, incorporated by reference in s. NR 440.17, shall be used.

3. a. An owner or operator may use engineering judgment rather than procedures in subd. 2. to demonstrate that the percent content exceeds 50% by volume. When an owner or operator and the department do not agree on whether a piece of equipment is in hydrogen service however, the procedure in subd. 2. shall be used to resolve the disagreement.

b. If an owner or operator determines that a piece of equipment is in hydrogen service the determination can be revised only after following the procedures in subd. 2.

(c) Any existing reciprocating compressor that becomes an affected facility under provisions of s. NR 440.14 or 440.15 is exempt from s. NR 440.62 (3) (c) 1., 2., 3., 4., 5. and 8., provided the owner or operator demonstrates that recasting the distance piece or replacing the compressor are the only options available to bring the compressor into compliance with the provisions of s. NR 440.62 (3) (c) 1., 2., 3., 4., 5. and 8.

(d) An owner or operator may use the following provision in addition to s. NR 440.62 (6) (e): Equipment is in light liquid service if the percent evaporated is greater than 10% at 150°C as determined by ASTM Method D86-78, incorporated by reference in s. NR 440.17.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. (1) (c) (2) (intro.), (3) (c), (4) (b) 2. and (a), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.67 Synthetic fiber production facilities. (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 solvent-spun synthetic fiber process that produces more than 500 megagrams of fiber per year.

(b) The provisions of this section do not apply to any facility that uses the reaction spinning process to produce spandex fiber or the viscose process to produce rayon fiber.

(c) The provisions of this section apply to each facility as identified in par. (a) that commences construction or reconstruction after November 23, 1982. The provisions of this section do not apply to facilities that commence modification but not reconstruction after November 23, 1982.

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

(a) "Acrylic fiber" means a manufactured synthetic fiber in which the fiber-forming substance is any long-chain synthetic polymer composed of at least 85% by weight of acrylonitrile units.

(b) "Makeup solvent" means the solvent introduced into the affected facility that compensates for solvent lost from the affected facility during the manufacturing process.

(c) "Nongaseous losses" means the solvent that is not volatilized during fiber production and escapes the process and is unavailable for recovery or is in a form or concentration unsuitable for economical recovery.

(d) "Polymer" means any of the natural or synthetic compounds as usually high molecular weight that consist of many repeated links each link being a relatively light and simple molecule.

(e) "Precipitation bath" means the water, solvent, or other chemical bath into which the polymer or prepolymer (partially reacted material) solution is extruded and causes physical or chemical changes to occur in the extruded solution to result in a semihardened polymeric fiber.

(f) "Rayon fiber" means a manufactured fiber composed of regenerated cellulose as well as manufactured fibers composed of regenerated cellulose in which substituents have replaced not more than 5 percent of the hydrogens of the hydroxyl groups.

(g) "Reaction spinning process" means the fiber-forming process where a prepolymer is extruded into a fluid medium and solidification takes place by chemical reaction to form the final polymeric material.

(h) "Recovered solvent" means the solvent captured from liquid and gaseous process streams that is concentrated in a control device and that may be purified for reuse.

(i) "Solvent feed" means that the solvent introduced into the spinning solution preparation system or precipitation bath. This feed stream includes the combination of recovered solvent and makeup solvent.

(j) "Solvent inventory variation" means the normal changes in the total amount of solvent contained in the affected facility.

(k) "Solvent recovery system" means the equipment associated with capture, transportation, collection, concentration and purification of organic solvents. It may include enclosures, hoods, ducting, piping, scrubbers, condensers, carbon adsorbers, distillation equipment and associated storage vessels.

(l) "Solvent-spun synthetic fiber" means any synthetic fiber produced by a process that uses an organic solvent in the spinning solution, the precipitation bath, or processing of the spun fiber.

(m) "Solvent-spun synthetic fiber process" means the total of all equipment having a common spinning solution preparation system or a common solvent recovery system and is used in the manufacture of solvent-spun synthetic fiber. It includes spinning solution preparation, spinning, fiber processing and solvent recovery but does not include the polymer production equipment.

(n) "Spandex fiber" means a manufactured fiber in which the fiber-forming substance is a long chain synthetic polymer comprised of at least 85% of a segmented polyurethane.

(o) "Spinning solution" means the mixture of polymer, prepolymer, or copolymer and additives dissolved in solvent. The solution is prepared at a viscosity and solvent-to-polymer ratio that is suitable for extrusion into fibers.

(p) "Spinning solution preparation system" means the equipment used to prepare spinning solutions; the system includes equipment for mixing, filtering, blending and storage of the spinning solutions.

(q) "Synthetic fiber" means any fiber composed partially or entirely of materials made by chemical synthesis or made partially or entirely from chemically-modified naturally-occurring materials.

(r) "Viscose process" means the fiber forming process where cellulose and concentrated caustic soda are reacted to form soda or alkali cellulose. This reacts with carbon disulfide to form sodium cellulose xanthate which is then dissolved in a solution of caustic soda. The solution is spun into an acid coagulating bath after ripening. This precipitates the cellulose in the form of a regenerated cellulose filament.

(3) STANDARD FOR VOLATILE ORGANIC COMPOUNDS. (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 the discharge into the atmosphere from any affected facility that produces acrylic fibers VOC emissions that exceed 10 kilograms (kg) VOC per megagram (Mg) solvent feed to the spinning solution preparation system or precipitation bath. VOC emissions from affected facilities that produce both acrylic and nonacrylic fiber types may not exceed 10 kg VOC per Mg solvent feed. VOC emissions from affected facilities that produce only nonacrylic fi-

ber types may not exceed 17 kg VOC per Mg solvent feed. Compliance with the emission limitations is determined on a 6-month rolling average basis as described in sub. (4).

(4) PERFORMANCE TEST AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (6) does not apply to the performance test procedures required by this section.

(b) Each owner or operator of an affected facility shall determine compliance with the applicable standard in sub. (3) (a) by determining and recording monthly the VOC emissions per Mg solvent feed from each affected facility for the current and preceding 5 consecutive calendar months and using these values to calculate the 6-month average emissions. Each calculation is considered a performance test. The owner or operator of an affected facility shall use the following procedure to determine VOC emissions for each calendar month;

1. Install, calibrate, maintain, and operate monitoring devices that continuously measure and permanently record for each calendar month the amount of makeup solvent and solvent feed. These values shall be used in calculating VOC emissions according to subd. 2. All monitoring devices, meters and peripheral equipment shall be calibrated and any error recorded. Total compounded error of the flow measuring and recording devices may not exceed 1% accuracy over the operating range. As an alternative to measuring solvent feed the owner or operator may:

a. Measure the amount of recovered solvent returned to the solvent feed storage tanks and use the following equation to determine the amount of solvent feed:

Solvent Feed = Makeup Solvent + Recovered Solvent + Change in the Amount of Solvent Contained in the Solvent Feed Holding Tank.

b. Measure and record the amount of polymer introduced into the affected facility and the solvent-to-polymer ratio of the spinning solutions and use the following equation to determine the amount of solvent feed:

$$\text{Solvent Feed} = \sum_{i=1}^{n} (\text{Polymer Used})_i \times (\text{Solvent-to-Polymer Ratio})_i$$

where subscript "i" denotes each particular spinning solution used during the test period; values of "i" vary from one to the total number of spinning solutions, "n," used during the calendar month.

2. VOC emissions shall be determined each calendar month by use of the following equations:

$$E = \frac{M_W}{S_W} - N - I \text{ and } M_W = M_V S_P D,$$

$$S_W = \frac{S_V S_P D}{1000} \text{ and } I = \frac{I_E - I_S}{S_W}$$

where all values are for the calendar month only and where:

E = Emissions in kg per Mg solvent feed;

S_V = Measured or calculated volume of solvent feed in liters;

S_W = Weight of solvent feed in Mg;

M_V = Measured volume of makeup solvent in liters;

M_W = Weight of makeup in kg;

N = Allowance for nongaseous losses per Mg solvent feed; 13 kg per Mg solvent feed to the spinning solution preparation system and precipitation bath. This value shall be used in all cases unless an owner or operator demonstrates to the satisfaction of the department that greater nongaseous losses occur at the affected facility. In this case, the greater value may be substituted in the equation.

S_P = Fraction of measured volume that is actual solvent (excludes water);

D = Density of the solvent in kg/ liter;

I = Allowance for solvent inventory variation or changes in the amount of solvent contained in the affected facility per Mg solvent feed (may be positive or negative);

I_S = Amount in kg of solvent contained in the affected facility at the beginning of test period, as determined by owner or operator;

I_E = Amount in kg of solvent contained in the affected facility at the close of test period, as determined by owner or operator.

(5) REPORTING REQUIREMENTS. (a) The owner or operator of an affected facility shall submit a written report to the department of the following:

1. The results of the initial performance test; and

2. The results of subsequent performance tests that indicate that VOC emissions exceed the standards in sub. (3). These reports shall be submitted semiannually at six month intervals, after the initial performance test.

(b) Solvent-spun synthetic fiber producing facilities exempted from these standards in sub. (1) (a) (those producing less than 500 megagrams annually) shall report to the department within 30 days whenever extruded fiber for the preceding 12 calendar months exceeds 500 megagrams.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; renum. (2) (a) (intro.) and 1. to 18. to be (2) (intro.) and (a) to (r) and am. (2) (intro.), am. (3) (a), r. (5) (c), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.68 Petroleum dry cleaners. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section are applicable to the following affected facilities located at a petroleum dry cleaning plant with a total manufacturer's rated dryer capacity equal to or greater than 38 kilograms (84 pounds): Petroleum solvent dry cleaning dryers, washers, filters, stills and settling tanks.

1. When the affected facility is installed in an existing plant that is not expanding the manufacturer's rated capacity of its petroleum sol-

vent dryer(s) the total manufacturer's rated dryer capacity is the summation of the manufacturer's rated capacity for each existing petroleum solvent dryer.

2. When the affected facility is installed in a plant that is expanding the manufacturer's rated capacity of its petroleum solvent dryers the total manufacturer's rated dryer capacity is the summation of the manufacturer's rated dryer capacity for each existing and proposed new petroleum solvent dryer.

3. When the affected facility is installed in a new plant the total manufacturer's rated dryer capacity is the summation of the manufacturer's rated dryer capacity for each proposed new petroleum solvent dryer.

4. The petroleum solvent dryers considered in the determination of the total manufacturer's rated dryer capacity are those new and existing dryers in the plant that will be in service at any time after the proposed new source or modification commences operation.

(b) Any facility under par. (a) that commences construction or modification after December 14, 1982, is subject to the requirements of this section.

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

(a) "Cartridge filter" means a discrete filter unit containing both filter paper and activated carbon that traps and removes contaminants from petroleum solvent together with the piping and ductwork used in the installation of this device.

(b) "Dryer" means a machine used to remove petroleum solvent from articles of clothing or other textile or leather goods, after washing and removing of excess petroleum solvent, together with the piping and ductwork used in the installation of this device.

(c) "Manufacturer's rated dryer capacity" means the dryer's rated capacity of articles, in pounds or kilograms of clothing articles per load, dry basis, that is typically found on each dryer on the manufacturer's name-plate or in the manufacturer's equipment specifications.

(d) "Perceptible leaks" means any pertroleum solvent vapor or liquid leaks that are conspicuous from visual observation or that bubble after application of a soap solution such as pools or droplets of liquid, open containers or solvent, or solvent laden waste standing open to the atmosphere.

(e) "Petroleum dry cleaner" means a dry cleaning facility that uses petroleum solvent in a combination of washers, dryers, filters, stills and settling tanks.

(f) "Settling tank" means a container that gravimetrically separates oils, grease and dirt from petroleum solvent together with the piping and ductwork used in the installation of this device.

(g) "Solvent filter" means a discrete solvent filter unit containing a porous medium that traps and removes contaminants from petroleum solvent together with the piping and ductwork used in the installation of this device.

(h) "Solvent recovery dryer" means a class of dry cleaning dryers that employs a condenser to condense and recover solvent vapors evaporated in a closed-loop stream of heated air together with the piping and ductwork used in the installation of this device.

(i) "Still" means a device used to volatilize, separate and recover petroleum solvent from contaminated solvent together with the piping and ductwork used in the installation of this device.

(j) "Washer" means a machine which agitates fabric articles in a petroleum solvent bath and spins the articles to remove the solvent together with the piping and ductwork used in the installation of this device.

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) Each affected petroleum solvent dry cleaning dryer that is installed at a petroleum dry cleaning plant shall be a solvent recovery dryer. The solvent recovery dryers shall be properly installed, operated and maintained.

(b) Each affected petroleum solvent filter that is installed at a petroleum dry cleaning plant shall be a cartridge filter. Cartridge filters shall be drained in their sealed housings for at least 8 hours prior to their removal.

(c) Each manufacturer of an affected petroleum solvent dryer shall include leak inspection and leak repair cycle information in the operating manual and on a clearly visible label posted on each affected facility. Such information should state:

To protect against fire hazards, loss of valuable solvents and emissions of solvent to the atmosphere, periodic inspection of this equipment for evidence of leaks and prompt repair of any leaks is recommended. The Wisconsin Department of Natural Resources recommends that the equipment be inspected every 15 days and all vapor or liquid leaks be repaired within the subsequent 15 day period.

Note: The administrator may approve the use of equipment of procedures that have been demonstrated to be equivalent, in terms of reducing VOC emissions, to those prescribed for compliance in this section, under 40 C.F.R. s. 60.623.

(5) TEST METHODS AND PROCEDURES. Each owner or operator of an affected facility subject to the provisions of sub. (3) (a) shall perform an initial test to verify that the flow rate of recovered solvent from the solvent recovery dryer at the termination of the recovery cycle is no greater than 0.05 liters per minute. This test shall be conducted for a duration of no less than 2 weeks during which no less than 50% of the dryer loads shall be monitored for their final recovered solvent flow rate. The suggested point for measuring the flow rate of recovered solvent is from the outlet of the solvent-water separator. Near the end of the recovery cycle the entire flow of recovered solvent should be diverted to a graduated cylinder. As the recovered solvent collects in the graduated cylinder the elapsed time is monitored and recorded in periods of greater than or equal to 1 minute. At the same time the volume of solvent in the graduated cylinder is monitored and recorded to determine the volume of recovered solvent that is collected during each time period. The recovered solvent flow rate is calculated by dividing the volume of solvent collected per period by the length of time elapsed during the period and converting the result with appropriate factors into units of liters per minute. The recovery cycle and the monitoring

procedure should continue until the flow rate of solvent is less than or equal to 0.05 liter per minute. The type of articles cleaned and the total length of the cycle should then be recorded.

(6) RECORDKEEPING REQUIREMENTS. Each owner or operator of an affected facility subject to the provisions of this section shall maintain a record of the performance test required under sub. (5).

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. (2) Intro.), r. (4), Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.682 Equipment leaks of voc from onshore natural gas processing plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY: (a) 1. The provisions of this section apply to affected facilities in onshore natural gas processing plants.

2. A compressor in VOC service or in wet gas service is an affected facility.

3. The group of all equipment except compressors, as defined in sub. (2), within a process unit is an affected facility.

(b) Any affected facility under par. (a) that commences construction, reconstruction or modification after January 20, 1984 is subject to the requirements of this section.

(c) Addition or replacement of equipment, as defined in sub. (2), for the purpose of process improvement that is accomplished without a capital expenditure may not by itself be considered a modification under this section.

(d) Facilities covered by s. NR 440.62 or 440.66 are excluded from this section.

(e) A compressor station, dehydration unit, sweetening unit, underground storage tank, field gas gathering system, or liquified natural gas unit is covered by this section if it is located at an onshore natural gas processing plant. If the unit is not located at the plant site, then it is exempt from the provisions of this section.

(2) DEFINITIONS. As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02 or 440.62.

(a) "Alaskan north slope" means the approximately 69,000 square-mile area extending from the Brooks Range to the Arctic Ocean.

(b) "Equipment" means each pump, pressure relief device, open-ended valve or line, valve, compressor, and flange or other connector that is in VOC service or in wet gas service and any device or system required by this section.

(c) "Field gas" means feedstock gas entering the natural gas processing plant.

(d) "In light liquid service" means that the piece of equipment contains a liquid that meets the conditions specified in s. NR 440.62 (6) (e) or sub. (4) (h) 2.

(e) "In wet gas service" means that a piece of equipment contains or contacts the field gas before the extraction step in the process.

(f) "Natural gas liquids" means the hydrocarbons, such as ethane, propane, butane and pentane, that are extracted from field gas.

(g) "Natural gas processing plant" or "gas plant" means any processing site engaged in the extraction of natural gas liquids from field gas fractionation of mixed natural gas liquids to natural gas products, or both.

(h) "Nonfractionating plant" means any gas plant that does not fractionate mixed natural gas liquids into natural gas products.

(i) "Onshore" means all facilities except those that are located in the territorial seas or on the outer continental shelf.

(j) "Process unit" means equipment assembled for the extraction of natural gas liquids from field gas, the fractionation of the liquids into natural gas products, or other operations associated with the processing of natural gas products. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the products.

(k) "Reciprocating compressor" means a piece of equipment that increases the pressure of a process gas by positive displacement employing linear movement of the driveshaft.

(3) STANDARDS. (a) Each owner or operator subject to the provisions of this section shall comply with the requirements of s. NR 440.62 (3) (a) 1., 2. and 4., and (b) to (j), except as provided in sub. (4), as soon as practicable, but no later than 180 days after initial startup.

(b) An owner or operator may elect to comply with the requirements of s. NR 440.62(4) (a) and (b).

(c) An owner or operator may apply to the department for permission to use an alternative means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to that achieved by the controls required in this section. In doing so, the owner or operator shall comply with requirements of sub. (5).

(d) Each owner or operator subject to the provisions of this section shall comply with the provisions of s. NR 440.62(6) except as provided in sub. (4) (f).

(e) Each owner or operator subject to the provisions of this section shall comply with the provisions of s. NR 440.62 (7) and (8) except as provided in subs. (4), (6) and (7).

(f) An owner or operator shall use the following provisions instead of s. NR 440.62 (6) (d) 1. Each piece of equipment is presumed to be in VOC service or in wet gas service unless an owner or operator demonstrates that the piece of equipment is not in VOC service or in wet gas service. For a piece of equipment to be considered not in VOC service, it shall be determined that the percent VOC content can be reasonably expected never to exceed 10.0% by weight. For a piece of equipment to be considered in wet gas service, it shall be determined that it contains or contacts the field gas before the extraction step in the process. For purposes of determining the percent VOC content of the process fluid that is contained in or contacts a piece of equipment, procedures that conform to the methods described in ASTM Methods E169-63, E168-

67, or E260-73, incorporated by reference in s. NR 440.17, shall be used.

(4) EXCEPTIONS. (a) Each owner or operator subject to the provisions of this section may comply with the exceptions to the provisions of s. NR 440.62.

(b) 1. Each pressure relief device in gas/vapor service may be monitored quarterly and within 5 days after each pressure release to detect leaks by the methods specified in s. NR 440.62 (6) (b) except as provided in sub. (3) (c), subd. 4., and s. NR 440.62 (3) (d) 1. c.

2. If an instrument reading of 10,000 ppm or greater is measured, a leak is detected.

3.a. When a leak is detected, it shall be repaired as soon as practical, but no later than 15 calendar days after it is detected except as provided in s. NR 440.62 (3) (i).

b. A first attempt at repair shall be made no later then 5 calendar days after each leak is detected.

4. a. Any pressure relief device that is located in a nonfractionating plant that is monitored only by nonplant personnel may be monitored after a pressure release the next time the monitoring personnel are on site, instead of within 5 days as specified in subd. 1. and s. NR 440.62 (3) (d) 2. a.

b. No pressure relief device described in subpar. a. may be allowed to operate for more than 30 days after a pressure release without monitoring.

(c) Sampling connection systems are exempt from the requirements of s. NR 440.62 (3) (e).

(d) Pumps in light liquid service, valves in gas/vapor and light liquid service and pressure relief devices in gas vapor service that are located at a nonfractionating plant that does not have the design capacity to process 283,000 standard cubic meters per day (scmd) (10 million scf/day) or more of field gas are exempt from the routine monitoring requirements of s. NR 440.62 (3) (b) 1. a. and (5) (g) 1. and par. (b) 1.

(e) Pumps in light liquid service, valves in gas/vapor and light liquid service, and pressure relief devices in gas/vapor service within a process unit that is located in the Alaskan North Slope are exempt from the routine monitoring requirements of ss. NR 440.62 (3) (b) 1. a., and (3) (g) 1. and par. (b) 1.

(f) Reciprocating compressors in wet gas service are exempt from the compressor control requirements of s. NR 440.62 (3) (c).

(g) Flares used to comply with this section shall comply with requirements of s. NR 440.18.

(h) An owner or operator may use the following provisions instead of s. NR 440.62(6) (e).

1. Equipment is in heavy liquid service if the weight percent evaporated is 10% or less at 150°C as determined by ASTM Method D86-78, incorporated by reference in s. NR 440.17.

2. Equipment is in light liquid service if the weight percent evaporated is greater than 10% at 150°C as determined by ASTM Method D86-78, incorporated by reference in s. NR 440.17.

(5) ALTERNATIVE MEANS OF EMISSION LIMITATION. (a) If, in the administrator's judgement, an alternative means of emission limitation will achieve a reduction in VOC emissions at least equivalent to the reduction in VOC emissions achieved under any design, equipment, work practice or operational standard, the administrator will publish, in the federal register, a notice permitting the use of that alternative means for the purpose of compliance with that standard. The notice may condition permission on requirements related to the operation and maintenance of the alternative means.

(b) Any notice under par. (a) shall be published only after notice and an opportunity for a public hearing.

(c) The administrator will consider applications under this subsection from either owners or operators of affected facilities, or manufacturers of control equipment.

(d) The administrator will treat applications under this subsection according to the following criteria, except in cases where he or she concludes that other criteria are appropriate:

1. The applicant shall collect, verify and submit test data, covering a period of at least 12 months, necessary to support the finding in par. (a).

2. If the applicant is an owner or operator of an affected facility, he or she shall commit in writing to operate and maintain the alternative means so as to achieve a reduction in VOC emissions at least equivalent to the reduction in VOC emissions achieved under the design, equipment, work practice or operational standard.

(6) RECORDKEEPING REQUIREMENTS. (a) Each owner or operator subject to the provisions of this section shall comply with the requirements of pars. (b) and (c) in addition to the requirements of s. NR 440.62 (7).

(b) The following recordkeeping requirements shall apply to pressure relief devices subject to the requirements of sub. (4) (b) 1.:

1. When each leak is detected as specified in sub. (4) (b) 2., a weatherproof and readily visible identification, marked with the equipment identification number, shall be attached to the leaking equipment. The identification on the pressure relief device may be removed after it has been repaired.

2. When each leak is detected as specified in sub. (4) (b) 2., the following information shall be recorded in a log and shall be kept for 2 years in a readily accessible location:

a. The instrument and operator identification numbers and the equipment identification number.

b. The date the leak was detected and the dates of each attempt to repair the leak.

c. Repair methods applied in each attempt to repair the leak.

d. "Above 10,000 ppm" if the maximum instrument reading measured by the methods specified in after each repair attempt is 10,000 ppm or greater.

e. "Repair delayed" and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak.

f. The signature of the owner or operator (or designate) whose decision it was that repair could not be effected without a process shutdown.

g. The expected date of successful repair of the leak if a leak is not repaired within 15 days.

h. Dates of process unit shutdowns that occur while the equipment is unrepaired.

i. The date of successful repair of the leak.

j. A list of identification numbers for equipment that are designated for no detectable emissions under the provisions of s. NR 440.62 (3) (d) 1. The designation of equipment subject to the provisions of s. NR 440.62 (3) (d) 1. signed by the owner or operator.

(c) An owner or operator shall comply with the following requirement in addition to the requirement of s. NR 440.62(10): Information and data used to demonstrate that a reciprocating compressor is in wet gas service to apply for the exemption in sub. (4) (f) shall be recorded in a log that is kept in a readily accessible location.

(7) REPORTING REQUIREMENTS. (a) Each owner or operator subject to the provisions of this section shall comply with the requirements of pars. (b) and (c) in addition to the requirements of s. NR 440.62 (8).

(b) An owner or operator shall include the following information in the initial semiannual report in addition to the information required in s. NR 440.62(8) (b)1. to 4: number of pressure relief devices subject to the requirements of sub. (4) (b) except for those pressure relief devices designated for no detectable emission under the provision of s. NR 440.62 (3) (d) 1. and those pressure relief devices complying with s. NR 440.62 (3) (d) 3.

(c) An owner or operator shall include the following information in all semiannual reports in addition to the information required in s. NR 440.62 (8) (c) 2. a. to f.:

1. Number of pressure relief devices for which leaks were detected as required in sub. (4) (b) 2. and

2. Number of pressure relief devices for which leaks were not repaired as required in sub. (4) (b) 3.

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.684 Onshore natural gas processing: so_2 emissions. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITIES. (a) The provisions of this section are applicable to the following affected facilities that process natural gas: each sweetening unit, and each sweetening unit followed by a sulfur recovery unit.

(b) Facilities that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H_2S) in the acid gas (expressed as sulfur) are required to comply with sub. (8) (c) but are not required to comply with subs. (3) to (7).

(c) The provisions of this section are applicable to facilities located on land and include facilities located onshore which process natural gas produced from either onshore or offshore wells.

(d) The provisions of this section apply to each affected facility identified in par. (a) which commences construction or modification after January 20, 1984.

(e) The provisions of this section do not apply to sweetening facilities producing acid gas that is completely reinjected into oil-or-gas-bearing geologic strata or that is otherwise not released to the atmosphere.

(2) DEFINITIONS AND SYMBOLS. (a) As used in this section, terms not defined in this subsection have the meanings given in s. NR 440.02.

1. "Acid gas" means a gas stream of hydrogen sulfide (H_2S) and carbon dioxide (CO_2) that has been separated from sour natural gas by a sweetening unit.

2. "Natural gas" means a naturally occurring mixture of a hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth's surface. The principal hydrocarbon constituent is methane.

3. "Onshore" means all facilities except those that are located in the territorial seas or on the outercontinental shelf.

4. "Reduced sulfur compounds" means H_2S, carbonyl sulfide (COS), and carbon disulfide (CS_2).

5. "Sulfur production rate" means the rate of liquid sulfur accumulation from the sulfur recovery unit.

6. "Sulfur recovery unit" means a process device that recovers element sulfur from acid gas.

7. "Sweetening unit" means a process device that separates the H_2S and CO_2 contents from the sour natural gas stream.

8. "Total SO_2 equivalents" means the sum of volumetric or mass concentrations of the sulfur compounds obtained by adding the quantity existing as SO_2 to the quantity of SO_2 that would be obtained if all reduced sulfur compounds were converted to SO_2 (ppmv or kg/DSCM).

(b) As used in this section, all symbols not defined in this subsection have the meanings given them in s. NR 440.03.

1. "E" = the sulfur emission rate expressed as elemental sulfur, kilograms per hour (kg/hr) rounded to one decimal place.

2. "P" = the sulfur emission reduction efficiency achieved in percent carried to one decimal place.

3. "S" = the sulfur production rate in kilograms per hour (kg/hr) rounded to one decimal place.

4. "X" = the sulfur feed rate, i.e., the H_2S in the acid gas (expressed as sulfur) from the sweetening unit, expressed in long tons per day (LT/D) of sulfur rounded to one decimal place.

5. "Y" = the sulfur content of the acid gas from the sweetening unit, expressed as mole percent H_2S (dry basis) rounded to one decimal place.

6. "Z" = the minimum required sulfur dioxide (SO_2) emission reduction efficiency, expressed as percent carried to one decimal place. Z_i refers to the reduction efficiency required at the initial performance test. Z_c refers to the reduction efficiency required on a continual basis after compliance with Z_i has been demonstrated.

(3) STANDARDS FOR SULFUL DIOXIDE. (a) During the initial performance test required by s. NR 440.08(2), each owner or operator shall achieve, at a minimum, an SO_2 emission reduction efficiency (Z_i) to be determined from Table 1 based on the sulfur feed rate (X) and the sulfur content of the acid gas (Y) of the affected facility.

(b) After demonstrating compliance with the provisions of par. (a), the owner or operator shall achieve, at a minimum, an SO_2 emission reduction efficiency (Z_c) to be determined from Table 2 based on the sulfur feed rate (X) and the sulfur content of the acid gas (Y) of the affected facility.

(4) COMPLIANCE PROVISIONS. (a) 1. To determine compliance with the standards for sulfur dioxide specified in sub. (3) (a), during the initial performance test as required by s. NR 440.08, the minimum required sulfur dioxide emissions reduction efficiency (Z) is compared to the emission reduction efficiency (R) achieved by the sulfur recovery technology.

a. If R is greater than or equal to Z_i, the affected facility is in compliance.

b. If R is less than Z_i, the affected facility is not in compliance.

2. Following the initial determination of compliance as required by s. NR 440.08, any subsequent compliance determinations that may be required by the department shall compare R to Z_c.

(b) The emission reduction efficiency (R) achieved by the sulfur recovery technology is calculated by using the equation:

$$R = \frac{S}{S + E} \times 100$$

"S" and "E" are determined using the procedures and test methods specified in subs. (5) and (6).

Table 1. REQUIRED MINIMUM INITIAL SO_2 EMISSION REDUCTION EFFICIENCY (Z_i)

H_2S content of acid gas (Y), %	Sulfur feed rate (X), LT/D			
	$2.0 \leq X \leq 5.0$	$5.0 < X \leq 15.0$	$15.0 < X \leq 300.0$	$X > 300.0$
$Y \geq 50$	79.0	. . . $88.51\ X^{0.0101} Y^{0.0125}$ or 99.8, whichever is smaller		
$20 \leq Y < 50$	79.0	. . . . $88.51\ X^{0.0101}\ Y^{0.0125}$ . . . . or 97.9, whichever is smaller		97.9
$10 \leq Y < 20$	79.0	$88.51\ X^{0.0101}\ Y^{0.0125}$ or 93.5, whichever is smaller		93.5
$Y < 10$	79.0	79.0	79.0	79.0

Table 2. REQUIRED MINIMUM SO_2 EMISSION REDUCTION EFFICIENCY (2_c)

H_2S content of acid gas (Y), %	Sulfur feed rate (X), LT/D			
	$2.0 \leq X \leq 5.0$	$5.0 < X \leq 15.0$	$15.0 < X \leq 300.0$	$X > 300.0$
$Y \geq 50$	74.0	. . . $85.35\ X^{0.0144} Y^{0.0128}$ or 99.8, whichever is smaller		
$20 \leq Y < 50$	74.0	. . . . $85.35\ X^{0.0144}\ Y^{0.0128}$ . . . . or 97.5, whichever is smaller		97.5
$10 \leq Y < 20$	74.0	$85.35\ X^{0.0144}\ Y^{0.0128}$ or 90.8, whichever is smaller	90.8	90.8
$Y < 10$	74.0	74.0	74.0	74.0

(5) PERFORMANCE TEST PROCEDURES. (a) During a performance test required by s. NR 440.08, the minimum required sulfur dioxide emission reduction efficiency (Z_c) required by sub. (3) (b) shall be determined as follows:

1. Collect and analyze at least one sample per hour (at equally spaced intervals during the performance test) of the acid gas from the sweetening unit using the method specified in sub. (6) (a) 8. The units of the result from the Tutwiler procedure can be converted to volume percent using the following equation.

$$Y = (1.62 \times 10^{-3}) \times (\text{grains}/100\ \text{scf})$$

where:

Y = H_2S concentration, volume percent

1.62×10^{-3} = volume percent per grains/100 scf

grains/100 scf = Tutwiler result basis

2. Calculate the arithmetic mean of all samples to determine the average H_2S concentration (Y) in mole percent (dry basis) in the acid gas.

3. Determine the average volumetric flow rate of the acid gas from the sweetening unit by continuous measurements made with the process flow meter. Express the results as dry standard cubic feet per day (dscf/day).

4. Calculate the average sulfur feed rate (X) in long tons per day of elemental sulfur from the average volumetric flow rate and the average H 2 S content, from sub. (5) (a), by the equation:

$$X = \frac{\text{(average volumetric acid gas flow, dscf/day) (Y/100) (32 lb/lb mole)}}{\text{(385.36 standard cubic feet/lb mole) (2,240 lb/long ton)}}$$

5. Determine the minimum required SO_2 removal efficiency (Z_i or Z_c) in accordance with the provisions of the standards in sub. (3) (a) or (b) as appropriate.

(b) The actual sulfur emission reduction efficiency (R) achieved by the control technology during the performance test shall be determined as follows:

1. Measure the liquid sulfur accumulation rate in the product storage tanks using level indicators or manual soundings. Record the level reading at the beginning and end of each test run. Convert the level readings to mass (kilograms) of sulfur in the storage tanks using the tank geometry and the sulfur density at the temperature of storage. Divide the change in mass by the test duration (hours and fractions of hours) to determine the sulfur production rate in kilograms per hour for each run.

2. Calculate the arithmetic means of the rate for each run to determine the average sulfur production rate (S) to use in sub. (4) (b).

3. Measure the concentrations of sulfur dioxide and total reduced sulfur compounds in the incinerator (or other final processing unit) exhaust gas using the methods specified in sub. (6) (a) 5. to 7. The minimum sampling time for each run shall be 4 hours. For each run the SO_2 and TRS concentrations shall be combined to calculate the total SO_2 equivalent concentration as follows:

Total SO_2 equivalent, (kg/dscm)

= 0.001 (SO_2 concentration mg/dscm from Method 6)

− 2.704 × 10^{-6} (SO_2 equivalents in ppmv, dry, from Method 15

or from Method 16A)

(Methods 6, 15 and 16A of 40 C.F.R. part 60, Appendix A, are incorporated by reference in s. NR 440.17)

4. Measure the incinerator (or other final processing unit) exhaust gas velocity, molecular weight, and moisture content using the methods specified in sub. (6) (a) 1. to 4. Calculate the volumetric flow rate of the exhaust gas at dry standard conditions using equation 2-10 in Method 2, 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17.

5. Calculate the equivalent sulfur emission rate as elemental sulfur for each run as follows:

Sulfur emission rate
= (total SO_2 equivalent kg/dscm) (gas flow rate, dscm/hr) (0.50)

Calculate the arithmetic means of the sulfur emmission rate (E) to use in sub. (4) (b).

(6) PERFORMANCE TEST METHODS. (a) For the purpose of determining compliance with sub. (3) (a) or (b), the following reference methods, contained in 40 C.F.R part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used:

1. Method 1 for velocity traverse points selection.

2. Method 2 for determination of stack gas velocity and calculation of the volumetric flow rate.

3. Method 3 for determination of stack gas molecular weight.

4. Method 4 for determination of the stack gas moisture content.

5. Method 6 for determination of SO 2 concentration.

6. Method 15 for determination of the TRS concentration from reduction-type devices or where the oxygen content of the stack gas is less than 1.0% by volume.

7. Method 16A for determination of the TRS concentration from oxidation-type devices or where the oxygen content of the stack gas is greater than 1.0% by volume.

8. The Tutwiler procedure in sub. (9) or a chromatograph procedure following ASTM E260-73, which is incorporated by reference in s. NR 440.17, for determination of the H_2S concentration in the acid gas feed from the sweetening unit.

(b) The sampling location for Methods 3, 4, 6, 15, and 16A shall be the same as that used for velocity measurement by Method 2. The sampling point in the duct shall be at the centroid of the cross-section if the area is less than 5 m^2 (54 ft^2) or at a point no closer to the walls than 1 m (30 inches) if the cross-sectional area is 5 m^2 or more and the centroid is more than one meter from the wall. For Methods 3, 4, 6, and 16A, the sample shall be extracted at a rate proportional to the gas velocity at the sampling point. For Method 15, the minimum sampling rate shall be 3 liters/minute (0.1 ft^3/minute) to insure minimum residence time in the sample line.

(c) For Methods 6 and 16A, the minimum sampling time for each run shall be 4 hours. Either one sample or a number of separate samples may be collected for each run so long as the total sample time is 4 hours. Where more than one sample is collected per run, the average result for the run is calculated by:

$$C_s = \sum_{i=1}^{n} (C_{si}) \frac{t_{si}}{T}$$

where:

C_s = time-weighted average SO_2 or TRS concentration for the run, (mg/dscm or ppmv, dry)

n = number of samples collected during the run

C_{si} = SO_2 or TRS concentration for sample i, (mg/dscm or ppmv, dry)

t_{si} = sampling time for sample i (minutes)

T = total sampling time for all samples in the run (minutes)

(d) For Method 15, each run shall consist of 16 samples taken over a minimum of 4 hours. The equivalent SO_2 concentration for each run shall be calculated as the arithmetic average of the SO_2 equivalent for each sample.

(e) For method 2, a velocity traverse shall be conducted at the beginning and end of each run. The arithmetic average of the two measurments shall be used to calculate the volumetric flow rate for each run.

(f) For Method 3, a single sample in may be integrated over the 4-hour run interval and analysis, or grab samples at 1-hour intervals may be calculated, analyzed, and averaged to determine the stack gas composition.

(g) For Method 4, each run shall consist of 2 samples, one collected at the beginning of the 4-hour test period, and one near the end of the period. For each sample the minimum sample volume shall be 0.1 dscm (0.35 dscf) and the minimum sample time shall be 10 minutes.

(7) MONITORING OF EMISSIONS AND OPERATIONS. (a) The owner or operator subject to the provisions of sub. (3) (a) or (b) shall install, calibrate, maintain and operate monitoring devices or perform measurments to determine the following operations information on a daily basis:

1. The accumulation of sulfur product over each 24-hour period: The monitoring method may incorporate the use of an instrument to measure and record the liquid sulfur production rate, or may be a procedure for measuring and recording the sulfur liquid levels in the storage tanks with a level indicator or by manual soundings with subsequent calculation of the sulfur production rate based on the tank geometry, stored sulfur density, and elapsed time between readings. The method shall be designed to be accurate with ± 2% of the 24-hour sulfur accumulation.

2. The H_2S concentration in the acid gas from the sweetening unit for each 24-hour period: At least one sample per 24-hour period shall be collected and analyzed using the method specified in sub. (6) (a) 8. The department may require the owner or operator to demonstrate that the H_2S concentration obtained from one or more samples over a 24-hour period is within ± 20% of the average of 12 samples collected at equally spaced intervals during the 24-hour period. In instances where the H_2S concentration of a single sample is not within ± 20% of the average of the 12 equally spaced samples, the department may require a more frequent sampling schedule.

3. The average acid gas flow rate from the sweetening unit: The owner or operator shall install and operate a monitoring device to continuously measure the flow rate of acid gas. The monitoring device reading shall be recorded at least once per hour during each 24-hour period. The average acid gas flow rate shall be computed from the individual readings.

4. The sulfur feed rate (X): For each 24-hour period, X shall be computed using the equation in sub. (5) (a) 4.

5. The required sulfur dioxide emission reduction efficiency for the 24-hour period. The sulfur feed rate and the H_2S concentration in the acid gas for the 24-hour period as applicable, shall be used to determine the required efficiency in accordance with the provisions of sub. (3) (b).

(b) Where compliance is achieved through the use of an oxidation control system or a reduction control system followed by a continually operated incineration device, the owner or operator shall install, calibrate, maintain, and operate monitoring devices and continuous emission monitors as follows:

1. A continuous monitoring system to measure the total sulfur emission rate (E) of SO_2 in the gases discharged to the atmosphere. The SO_2 emission rate shall be expressed in terms of equivalent sulfur mass flow rates (kg/hr). The span of this monitoring system shall be set so that the equivalent emission limit of sub. (3) (b) will be between 30% and 70% of the measurement range of the instrument system.

2. Except as provided in subd. 3.: A monitoring device to measure the temperature of the gas leaving the combustion zone of the incinerator, if compliance with sub. (3) (a) is achieved through the use of an oxidation control system or a reduction control system followed by a continually operated incineration device. The monitoring device shall be certified by the manufacturer to be accurate to within ± 1% of the temperature being measured. When performance tests are conducted under the provision of s. NR 440.08 to demonstrate compliance with the standards under sub. (3), the temperature of the gas leaving the incinerator combustion zone shall be determined using the monitoring device. If the volumetric ratio of sulfur dioxide to sulfur dioxide plus total reduced sulfur (expressed as SO_2) in the gas leaving the incinerator is $>$ 0.98, then temperature monitoring may be used to demonstrate that sulfur dioxide emission monitoring is sufficient to determine total sulfur emissions. At all times during the operation of the facility, the owner or operator shall maintain the average temperature of the gas leaving the combustion zone of the incinerator at or above the appropriate level determined during the most recent performance test to ensure the sulfur compound oxidation criteria are met. Operation at lower average temperatures may be considered by the department to be unacceptable operation and maintenance of the affected facility. The owner or operator may request that the minimum incinerator temperature be reestablished by conducting new performance tests under s. NR 440.08.

3. Upon promulgation of a performance specification of continuous monitoring systems for total reduced sulfur compounds at sulfur recovery plants, the owner or operator may, as an alternative to subd. 2., install, calibrate, maintain, and operate a continuous emission monitoring system for total reduced sulfur compounds as required in par. (d) in addition to a sulfur dioxide emission monitoring system. The sum of the equivalent sulfur mass emission rates from the 2 monitoring systems shall be used to compute the total sulfur emission rate (E).

(c) Where compliance is achieved through the use of a reduction control system not followed by a continually operated incineration device, the owner or operator shall install, calibrate, maintain, and operate a continuous monitoring system to measure the emission rate of reduced sulfur compounds as SO_2 equivalent in the gases discharged to the atmosphere. The SO_2 equivalent compound emission rate shall be expressed in terms of equivalent sulfur mass flow rates (kg/hr). The span of this monitoring system shall be set so that the equivalent emission limit of sub. (3) (b) will be between 30 and 70% of the measurement range of the system. This requirement becomes effective upon promulgation of a performance specification for continuous monitoring systems for total reduced sulfur compounds at sulfur recovery plants.

(d) For those sources required to comply with pars. (b) and (c), the average sulfur emission reduction efficiency achieved (R) shall be calculated for each 24-hour clock interval. The 24-hour interval may begin and end at any selected clock time but shall be consistent. The 24-hour average reduction efficiency (R) shall be computed based on the 24-hour average sulfur production rate (S) and sulfur emission rate (E) using the equation in sub. (4) (b).

1. Data obtained from the sulfur production rate monitoring device specified in par. (a) shall be used to determine S.

2. Data obtained form the sulfur emission rate monitoring systems specified in par. (b) or (c) shall be used to calculate a 24-hour average for the sulfur emission rate (E). The monitoring system shall provide at least one data point in each successive 15-minute interval. At least 2 data points shall be used to calculate each 1-hour average. A minimum of 18 1-hour averages shall be used to compute each 24-hour average.

(e) In lieu of complying with par. (b) or (c), those sources with a design capacity of less than 150 LT/D of H_2S expressed as sulfur may calculate the sulfur emission reduction efficiency achieved for each 24-hour period by:

$$R = \frac{0.0236\ S}{X}\ (100\%)$$

where:

R = the sulfur dioxide removal efficiency achieved during the 24-hour period, percent

S = The sulfur production rate during the 24-hour period, kg/hr

X = the sulfur feed rate in the acid gas LT/D

0.0236 = conversion factor, LT/D per kg/hr

(f) The monitoring devices required in sub. (7) (b) 1., (b) 3., and (c) shall be calibrated at least annually according to the manufacturer's specifications as required by s. NR 440.13 (2).

(g) The continuous emission monitoring systsms required in sub. (7) (b) 1., (b) 3., and (c) shall be subject to the emission monitoring requirements of s. NR 440.13. For conducting the continuous emission monitoring system performance evaluation required by s. NR 440.13 (3), Performance Specification 2 of 40 C.F.R. part 60, Appendix B, incorporated by reference in s. NR 440.17, shall apply, and Method 6 of 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, shall be used for systems required by par. (b).

(8) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) Records of the calculations and measurements required in subs. (3) (a) and (b) and (7) (a) to (g) shall be retained for at least 2 years following the date of the measurements by owners and operators subject to this section. This requirement is included under s. NR 440.07 (4).

(b) Each owner or operator shall submit a written report of excess emissions to the department semiannually. For the purpose of these reports, excess emissions are defined as:

1. Any 24-hour period (at consistent intervals) during which the average sulfur emission reduction efficiency (R) is less than the minimum required efficiency (Z).

2. For any affected facility electing to comply with the provisions of sub. (7) (b) 2., any 24-hour period during which the average temperature of the gases leaving the combustion zone of an incinerator is less than the appropriate operating temperatures determined during the most recent performance test in accordance with the provisions of sub. (7) (b) 2. Each 24-hour period shall consist of at least 96 temperature measurements equally spaced over the 24 hours.

(c) To certify that a facility is exempt from the control requirements of these standards, each owner or operator of a facility with a design capacity less than 2 LT/D of H_2S in the acid gas (expressed as sulfur) shall keep, for the life of the facility, an analysis demonstrating that the facility's deisgn capacity is less than 2 LT/D of H_2S expressed as sulfur.

(d) Each owner or operator who elects to comply with sub. (7) (e) shall keep, for the life of the facility, a record demonstrating that the facility's design capacity is less than 150 LT/D of H_2S expressed as sulfur.

(9) OPTIONAL PROCEDURE FOR MEASURING HYDROGEN SULFIDE IN ACID GAS-TUTWILER PROCEDURE. (a) *General.* The Tutwiler procedure may be used to measure hydrogen sulfide in acid gas in accordance with the Gas Engineer's Handbook, first edition, second printing, Fuel Gas Engineering Practices, page 6/25, incorporated by reference in s. NR 440.17. When an instantaneous sample is desired and H_2S concentration is 10 grains per 1000 cubic foot or more, a 100 ml Tutwiler burette is used. For concentrations less than 10 grains, a 500 ml Tutwiler burette and more dilute solutions are used. In principle this method consists of titrating hydrogen sulfide in a gas sample directly with a standard solution of iodine.

(b) *Apparatus.* (See Figure 1.) A 100 or 500 ml capacity Tutwiler burette with 2-way glass stopcock at the bottom and 3-way stopcock at the top is connected either with inlet tubulature or a glass-stoppered cylinder, 10 ml capacity, graduated in 0.1 ml subdivisons, with rubber tubing connecting the burette with a leveling bottle.

(c) *Reagents.* 1. Iodine stock solution, 0.1N. Weigh out 12.7 g of iodine and 20 to 25 g cp potassium iodide for each liter of solution. Dissolve the KI in as little water as necessary and then dissolve the iodine in the concentrated KI solution, make up to proper volume, and store in a glass-stoppered brown glass bottle.

2. Standard iodine solution, 1 ml = 0.001771 g I. Transfer 33.7 ml of the 0.1N stock solution into a 250 ml volumetric flask, add water to the

mark and mix well. Then, for a 100 ml sample of gas, 1 ml of standard iodine solution is equivalent to 100 grains of H_2S per cubic foot of gas.

Starch solution. Rub into a thin paste about one teaspoonful of wheat starch with a little water, pour it into about a pint of boiling water and stir. After it has cooled, decant off the clear solution. Make fresh solution every few days.

(d) *Procedure.* Fill the leveling bulb with starch solution. Raise (L), open cock (G), open (F) to (A), and close (F) when the solution starts to run out of the gas inlet. Close (G). Purge the gas sampling line and connect it with (A). Lower (L) and open (F) and (G). When the liquid level is several ml past the 100 ml mark, close (G) and (F), and disconnect the sampling tube. Open (G) and bring the starch solution to the 100 ml mark by raising (L), then close (G). Open (F) momentarily, to bring the gas in the burette to atmospheric pressure, and close (F). Open (G) and bring the liquid level down to the 10 ml mark by lowering (L). Close (G), clamp the rubber tubing near (E) and disconnect it from the burette. Rinse the graduated cylinder with a standard iodine solution (0.00171 g I per ml), fill the cylinder and record the reading. Introduce successive small amounts of iodine thru (F), shaking well after each addition, and continue until a faint permanent blue color is obtained. Record the reading, subtract it from the previous reading and call the difference D.

(e) *Reagent test.* With every fresh stock of starch solution, perform a blank test as follows: introduce fresh starch solution into the burette up to the 100 ml mark. Close (F) and (G). Lower (L) and open (G). When the liquid level reaches the 10 ml mark, close (G). With air in the burette titrate as during a test and up to the same end point. Call the ml of iodine used C. Then,

$$\text{Grains } H_2S \text{ per 100 cubic foot of gas} = 100\,(D-C)$$

(f) *Sensitivity enhancement.* Greater sensitivity can be attained if a 500 ml capacity Tutwiller burette is used with a more dilute (0.001N) iodine solution. Concentrations less than 1.0 grains per 100 cubic foot can be determined in this way. Usually the starch-iodine end point is much less distinct and a blank determination of end point, with H_2S-free gas or air, is required.

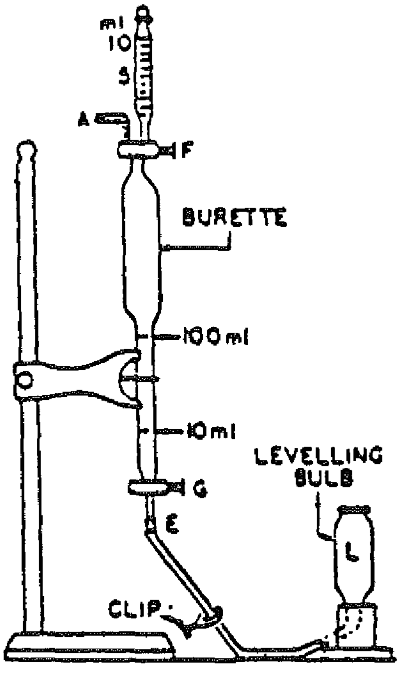

Figure 1. Tutwiler burette (lettered items mentioned in text).

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.688 Nonmetallic mineral processing plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) Except as provided in pars. (b) to (d), the provisions of this section are applicable to the following affected facilities in fixed or portable nonmetallic mineral processing plants; each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station.

(b) An affected facility that is subject to the provisions of s. NR 440.22 or 440.25 or that follows in the plant process any facility subject to the provisions of s. NR 440.22 or 440.25 is not subject to the provisions of this section.

(c) Facilities at the following plants are not subject to the provision of this section.

1. Fixed sand and gravel plants and crushed stone plants with capacities, as defined in sub. (2), of 23 megagrams per hour (25 tons per hour) or less;

2. Portable sand and gravel plants and crushed stone plants with capacities, as defined in sub. (2), of 136 megagrams per hour (150 tons per hour) or less; and

3. Common clay plants and pumice plants with capacities, as defined in sub. (2), of 9 megagrams per hour (10 tons per hour) or less.

(d) 1. When an existing facility is replaced by a piece of equipment of equal or smaller size, as defined in sub. (2) having the same function as the existing facility, the new facility is exempt from the provisions of subs. (3), (5) and (6) except as provided for in par. (d) 3.

2. An owner or operator seeking to comply with this paragraph shall comply with the reporting requirements of sub. (7) (a) and (b).

3. An owner or operator replacing all existing facilities in a production line with new facilities does not qualify for the exemption described in subd. 1. and shall comply with the provisions of subs. (3), (5) and (6).

(e) An affected facility under par. (a) that commences construction, reconstruction, or modification after August 31, 1983 is subject to the requirements of this section.

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

(a) "Bagging operation" means the mechanical process by which bags are filled with nonmetallic minerals.

(b) "Belt conveyor" means a conveying device that transports material from one location to another by means of an endless belt that is carried on a series of idlers and routed around a pulley at each end.

(c) "Bucket elevator" means a conveying deice of nonmentallic minerals consisting of a head and foot assembly which supports and drives an enless single or double strand chain or belt to which buckets are attached.

(d) "Building" means any frame structure with a roof.

(e) "Capacity" means the cumulative rated capacity of all initial crushers that are part of the plant.

(f) "Capture system" means the equipment (including enclosures, hoods, ducts, fans, dampers, etc.) used to capture and transport particulate matter generated by one or more process operations to a control device.

(g) "Control device" means the air pollution control equipment used to reduce particulate matter emissions released to the atmosphere from one or more process operations at a nonmetallic mineral processing plant.

(h) "Conveying system" means a device for transporting materials from one piece of equipment or location to another location within a plant. Conveying systems include but are not limited to the following: Feeders, belt conveyors, bucket elevators and pneumatic systems.

(i) "Crusher" means a machine used to crush any nonmetallic minerals, and includes, but is not limited to the following types: jaw, gyratory, cone, roll, rod mill, hammermill, and impactor.

(j) "Enclosed truck or railcar loading station" means that portion of a nonmetallic mineral processing plant were nonmetallic minerals are loaded by an enclosed conveying system into enclosed trucks or railcars.

(k) "Fixed plant" means any nonmetallic mineral processing plant at which the processing equipment specified in sub. (1) (a) is attached by a cable, chain, turnbuckle, bolt or other means (except electrical connections) to any anchor, slab, or structure including bedrock.

(l) "Fugitive emission" means particulate matter that is not collected by a capture system and is released to the atmosphere at the point of generation.

(m) "Grinding mill" means a machine used for the wet or dry fine crushing of any nonmetallic mineral. Grinding mills include, but are not limited to, the following types: hammer, roller, rod, pebble and ball, and fluid energy. The grinding mill includes the air conveying system, air separator, or air classifier, where such systems are used.

(n) "Initial crusher" means any crusher into which nonmetallic minerals can be fed without prior crushing in the plant.

(o) "Nonmetallic mineral" means any of the following minerals or any mixture of which the majority is any of the following minerals:

1. Crushed and broken stone, including limestone, dolomite, granite, traprock, sandstone, quartz, quartzite, marl, marble, slate, shale, oil shale, and shell.

2. Sand and gravel.

3. Clay including kaolin, fireclay, bentonite, Fuller's earth, Ball clay, and common clay.

4. Rock salt.

5. Gypsum.

6. Sodium compounds, including sodium carbonate, sodium chloride, and sodium sulfate.

7. Pumice.

8. Gilsonite.

9. Talc and pyrophyllite.

10. Boron, including borax, kernite, and colemanite.

11. Barite.

12. Fluorospar.

13. Feldspar.

14. Diatomite.

15. Perlite.

16. Vermiculite.

17. Mica.

18. Kyanite, including andalusite, sillimanite, topaz, and dumortierite.

(p) "Nonmetallic mineral processing plant" means any combination of equipment that is used to crush or grind any nonmetallic mineral wherever located including lime plants, power plants, steel mills, asphalt concrete plants, portland cement plants, or any other facility processing nonmetallic minerals except as provided in sub. (1) (b) and (c).

(q) "Portable plant" means any nonmetallic mineral processing plant that is mounted on any chassis or skids and may be moved by the application of a lifting or pulling force. In addition, there may be no cable, chain, turnbuckle, bolt or other means (except electrical connections) by which any piece of equipment is attached or clamped to any anchor, slab, or structure, including bedrock, that must be removed prior to the application of a lifting or pulling force for the purpose of transporting the unit.

(r) "Production line" means all affected facilities (crushers, grinding mills, screening operations, bucket elevators, belt conveyors, bagging operations, storage bins, and enclosed truck and railcar loading stations) which are directly connected or are connected together by a conveying system.

(s) "Screening operation" means a device for separating material according to size by passing undersize material through one or more mesh surfaces (screens) in series, and retaining oversize material on the mesh surfaces (screens).

(t) "Size" means the rated capacity in tons per hour of a crusher, grinding mill, bucket elevator, bagging operation, or enclosed truck or railcar loading station; the total surface area of the top screen of a screening operation; the width of a conveyor belt; and the rated capacity in tons of a storage bin.

(u) "Stack emissions" means the particulate matter that is released to the atmosphere from a capture system.

(v) "Storage bin" means a facility for storage, including surge bins, for nonmetallic minerals prior to further processing or loading.

(w) "Transfer point" means a point in a conveying operation where the nonmetallic mineral is transferred to or from a belt conveyor except where the nonmetallic mineral is being transferred to a stockpile.

(x) "Truck dumping" means the unloading of nonmetallic minerals from movable vehicles designed to transport nonmetallic minerals from one location to another. Movable vehicles include but are not limited to: trucks, front end loaders, skip hoists, and railcars.

(y) "Vent" means an opening through which there is mechanically induced air flow for the purpose of exhausting from a building air carrying particulate matter emissions from one or more affected facilities.

(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 transfer point on belt conveyors or from any other affected facility any stack emissions which:

1. Contain particulate matter in excess of 0.05 g/dscm, or

2. Exhibit greater than 7% opacity, unless the stack emissions are discharged from an affected facility using a wet scrubbing control device. Facilities using a wet scrubber shall comply with the reporting provisions of sub. (7) (c) to (e).

(b) On and after the sixtieth day after achieving the maximum production rate at which the affected facility will be operated, but not 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 from any transfer point on belt conveyors or from any other affected facility any fugitive emissions which exhibit greater than 10% opacity except as provided in pars. (c) to (e).

(c) On and after the sixtieth day after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup, no owner or operator may cause to be discharged into the atmosphere from any crusher, at which a capture system is not used, fugitive emissions which exhibit greater than 15% opacity.

(d) Truck dumping of nonmetallic minerals into any screening operation, feed hopper, or crusher is exempt from the requirements of this section.

(e) If any transfer point on a conveyor belt or any other affected facility is enclosed in a building then each enclosed affected facility shall comply with the following emission limits:

1. No owner or operator may cause to be discharged into the atmosphere from any building enclosing any transfer point on a conveyor belt or any other affected facility any visible fugitive emissions except emissions from a vent as defined in sub. (2).

2. No owner or operator may cause to be discharged into the atmosphere from any vent of any building enclosing any transfer point on a conveyor belt or any other affected facility emissions which exceed the stack emissions limits in par. (a).

(4) RECONSTRUCTION. (a) The cost of replacement of ore-contact surfaces on processing equipment may not be considered in calculating either the "fixed capital cost of the new components" or the "fixed capital cost that would be required to contruct a comparable new facility" under s. NR 440.15. Ore-contact surfaces are crushing surfaces; screen meshes, bars, and plates; conveyor belts; and elevator buckets.

(b) Under s. NR 440.15, the "fixed capital cost of the new components" includes the fixed capital cost of all depreciable components (except components specified in par. (a)) which are or will be replaced pursuant to all continuous programs of component replacement commenced within any 2-year period following August 31, 1983.

(5) MONITORING OF OPERATIONS. The owner or operator of any affected facility subject to the provisions of this section which uses a wet scrubber to control emissions shall install, calibrate, maintain and operate the following monitoring devices:

(a) A 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 ± 250 pascals (± 1 inch water) gauge pressure and shall be calibrated on an annual basis in accordance with manufacturer's instructions.

(b) A device for the continuous measurement of the scrubbing liquid flow rate to the wet scrubber. The monitoring device shall be certified by the manufacturer to be accurate within ± 5% of design scrubbing liquid flow rate and shall be calibrated on an annual basis in accordance with manufacturer's instructions.

(6) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. part 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 in sub. (3) as follows:

1. Method 5 or 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;

5. Method 9 for measuring opacity from stack emissions and process fugitive emissions and emissions from building vents;

6. Method 22 for measurement of visible fugitive emissions when determining compliance with the standard prescribed in sub. (3) (e).

(b) For Method 5 the following stipulations shall apply:

1. The sampling probe and holder may be operated without heaters if the gas stream being sampled is at ambient temperature;

2. For gas streams above ambient temperature the sampling train shall be operated with a probe and filter temperature high enough to prevent water condensation on the filter but not higher than 121°C (250°F);

3. The minimum sample volume shall be 1.7 dscm (60 dscf).

(c) When determining compliance with the standard prescribed under sub. (3) (b) and (c) the department shall adhere to the following stipulations in addition to those listed in Method 9:

1. The minimum distance between the observer and the emission source shall be 4.57 meters (15 feet).

2. The observer shall, when possible, select a position that minimizes interference from other fugitive emission sources (e.g. road dust). Note that the required observer position relative to the sun (Method 9, Section 2.1) shall be followed.

3. For affected facilities utilizing wet dust suppression for particulate matter control, a visible mist is sometimes generated by the spray. The water mist must not be confused with particulate matter emissions and is not to be considered a visible emission. When a water mist of this nature is present, the observation of the emissions is to be made at a point in the plume where the mist is no longer visible.

4. If emissions from 2 or more facilities continuously interfere so that the opacity of fugitive emissions from an individual affected facility

cannot be read, the owner or operator may show compliance with the fugitive opacity standards in sub. (3) (b) and (c) by:

a. Causing the opacity of the combined emission stream from the facilities to meet the highest fugitive opacity standard applicable to any of the individual affected facilities contributing to the emissions stream, or

b. Separating emissions so that the opacity of emissions from each affected facility can be read to determine compliance with the applicable fugitive opacity limits specified for each facility in sub. (3) (b) and (c).

(d) When determining compliance with the standard prescribed under sub. (3) (b) and (c) using Method 9, each performance test shall consist of a minimum of 30 sets of 24 consecutive observations recorded at 15-second intervals, as described in Method 9 at sections 2.4 and 2.5.

(e) When determining compliance with the standard prescribed under sub. (3) (e), using Method 22, the minimum total observation period for each building shall be 75 minutes and each side of the building and the roof shall be observed for a minimum of 15 minutes. Performance tests shall be conducted while all affected facilities inside the building are operating.

(7) REPORTING AND RECORDKEEPING. (a) Each owner or operator seeking to comply with sub. (1) (d) shall submit to the department the following information about the existing facility being replaced and the replacement price of equipment.

1. For a crusher, grinding mill, bucket elevator, bagging operation, or enclosed truck or railcar loading station:

a. The rated capacity in tons per hour of the existing facility being replaced, and

b. The rated capacity in tons per hour of the replacement equipment.

2. For a screening operation:

a. The total surface area of the top screen of the existing screening operation being replaced, and

b. The total surface area of the top screen of the replacement screening operation.

3. For a conveyor belt:

a. The width of the existing belt being replaced and

b. The width of the replacement conveyor belt.

4. For a storage bin:

a. The rated capacity in tons of the existing storage bin being replaced, and

b. The rated capacity in tons of replacement storage bins.

(b) Each owner or operater seeking to comply with sub. (1) (d) shall submit the following data to the Director of the Emission Standards and Engineering Division, (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711:

1. The information described in par. (a).

2. A description of the control device used to reduce particulate matter emissions from the existing facility and a list of all other pieces of equipment controlled by the same control device; and

3. The estimated age of the existing facility.

(c) During the initial performance test of a wet scrubber, and daily thereafter, the owner or operator shall record the measurement of both the change in pressure of the gas stream across the scrubber and the scrubbing liquid flow rate.

(d) After the initial performance test of a wet scrubber, the owner or operator shall submit semiannual reports to the department of occurrences when the measurements of the scrubber pressure loss (or gain) and liquid flow rate differ by more than ± 30% for those measurements recorded during the most recent performance test.

(e) The reports required under par. (d) shall be postmarked within 30 days following end of the second and fourth calendar quarters.

(f) The owner or operator of any affected facility shall submit written reports of the results of all performance test conducted to demonstrate compliance with the standards set forth in sub. (3) including reports of opacity observations made using Method 9, 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, to demonstrate compliance with sub. (3) (b) and (c) and reports of observations using Method 22, 40 C.F.R. part 60, Appendix A, incorporated by reference in s. NR 440.17, to demonstrate compliance with sub. (3) (e).

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.

NR 440.69 Wool fiberglass insulation manufacturing plants. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The affected facility to which the provisions of this section apply is each rotary spin wool fiberglass insulation manufacturing line.

(b) The owner or operator of any facility under par. (a) that commences construction, modification, or reconstruction after February 7, 1984, is subject to the requirements of this section.

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

(a) "Glass pull rate" means the mass of molten glass utilized in the manufacture of wool fiberglass insulation at a single manufacturing line in a specified time period.

(b) "Manufacturing line" means the manufacturing equipment comprising the forming section, where molten glass is fiberized and a fiberglass mat is formed; the curing section, where the binder resin in the mat is thermally "set"; and the cooling section, where the mat is cooled.

(c) "Rotary spin" means a process used to produce a wool fiberglass insulation by forcing molten glass through numerous small orifices in the side wall of a spinner to form continuous glass fibers that are then broken into discrete lengths by high velocity air flow.

(d) "Wool fiberglass insulation" means a thermal insulation material composed of glass fibers and made from glass produced or melted at the same facility where the manufacturing line is located.

(3) STANDARD FOR PARTICULATE MATTER. On and after the date on which the performance test required to be conducted by s. NR 440.18 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 5.5 kg per Mg (11.0 lb/ton) of glass pulled.

(4) MONITORING OPERATIONS. (a) Any owner or operator subject to the provisions of this section who uses a wet scrubbing control device to comply with the mass emission standard shall install, calibrate, maintain and operate monitoring devices that measure the gas pressure drop across each scrubber and the scubbing liquid flow rate to each scrubber. The pressure drop monitor is to be certified by its manufacturer to be accurate within plus or minus 250 pascals (± 1 inch water gauge) over its operating range and the flow rate monitor is to be certified by its manufacturer to be accurate within plus or minus 5% over its operating range.

(b) An owner or operator subject to the provisions of this section who uses a wet electrostatic precipitator control device to comply with the mass emission standard shall install, calibrate, maintain and operate monitoring devices that measure the primary and secondary current (amperes) and voltage in each electrical field and the inlet water flow rate. In addition the owner or operator shall determine the total residue (total solids) content of the water entering the control device once per day using Method 209A, "Total Residue Dried at 103-105°C," in Standard Methods for the Examination of Water and Wastewater, 15th Edition, 1980, incorporated by reference in s. NR 440.17. Total residue shall be reported as percent by weight. All monitoring devices required under this paragraph are to be certified by their manufacturers to be accurate within ± 5% over their operating range.

(c) All monitoring devices required under this subsection are to be recalibrated quarterly in accordance with procedures under s. NR 440.13 (2).

(5) RECORDKEEPING AND REPORTING REQUIREMENTS. (a) At 30-minute intervals during each 2-hour test run of each performance test of a wet scrubber control device, and at least once every 4 hours thereafter, the owner or operator shall record the measurements required by sub. (4) (a).

(b) At 30-minute intervals during each 2-hour test run of each performance test of a wet electrostatic precipitator control device, and at least once every 4 hours thereafter, the owner or operator shall record the measurements required by sub. (4) (b), except that the concentration of total residue in the water shall be recorded once during each performance test and once per day thereafter.

(c) Records of the measurements required in pars. (a) and (b) must be retained for at least 2 years.

(d) Each owner or operator shall submit written semi-annual reports of exceedances of control device operating parameters required to be monitored by pars. (a) and (b) and written documentation of, and a report of corrective maintenance required as a result of, quarterly calibrations of the monitoring devices required in sub. (4) (c). For the purpose of these reports exceedances are defined as any monitoring data that are less than 70 percent of the lowest values or greater than 130% of the highest value of each operating parameter recorded during the most recent performance test.

(6) TEST METHODS AND PROCEDURES. (a) Reference methods in 40 C.F.R. part 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 stack gas velocity and volumetric flow rate;

3. Method 3 for stack gas dry molecular weight;

4. Method 4 for stack gas moisture content; and

5. Method 5E for the measurement of particulate emissions.

(b) The sampling time for each test run shall be at least 2 hours and the minimum volume of gas sampled shall be 2.55 dscm.

(c) The performance test shall be conducted while the product with the highest loss on ignition (LOI) expected to be produced by the affected facility is being manufactured.

(d) For each test run the particulate mass emission rate, R, shall be computed as follows:

$$R = C_t \times Q_{std} \times 6 \times 10^{-5} \frac{(\text{min-kg})}{(\text{hr-mg})}$$

where:

R = mass emission rate (kg/hr).

C_t = particulate concentration as determined by Reference Method C.F.R. 5E (mg/dscm) in 40 C.F.R., part 60, Appendix A, incorporated by reference in s. NR 440.17.

Q_{std} = stack gas volumetric flow rate as determined by Method 2 C.F.R. (dscm/min.) in 40 C.F.R., part 60, Appendix A, incorporated by reference in s. NR 440.17.

(e) The glass pull rate, P, for the manufacturing line shall be computed as follows:

$$P = L_s \times W_m \times M \times \frac{100\text{-LOI}}{100} \times 6 \times 10^{-5} \frac{(\text{min-Mg})}{(\text{hr-g})}$$

where:

P = glass pull rate (Mg/hr)

L_s = line speed (m/min)

W_m = trimmed mat width (m)

M = mat gram weight (g/m^2)

LOI = loss on ignition (weight percent), as determined by ASTM Standard Test Method D2584-68 (Reapproved 1979), "Ignition Loss of Cured Reinforced Resins," incorporated by reference in s. NR 440.17

For each 2-hour test run the average glass pull rate shall be computed from at least 3 glass pull rates determined at intervals of at least 30 minutes during the test run.

(f) For each test run the particulate mass emission level, E, shall be computed as follows:

$$E = \frac{R}{P_{avg}}$$

where:

E = mass emission level (kg/Mg).

R = mass emission rate (kg/hr).

P_{avg} = average glass pull rate (Mg/hr).

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86.

NR 440.72 Industrial surface coating: surface coating of plastic parts for business machines. (1) APPLICABILITY AND DESIGNATION OF AFFECTED FACILITY. (a) The provisions of this section apply to each spray booth in which plastic parts for use in the manufacture of business machines receive prime coats, color coats, texture coats, or touch-up coats.

(b) This section applies to any affected facility for which construction, modification, or reconstruction begins after January 8, 1986.

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

1. "Business machine" means a device that uses electronic or mechanical methods of process information, perform calculations, print or copy information, or convert sound into electrical impulses for transmission, such as:

a. Products classified as typewriters under SIC Code 3572;

b. Products classified as electronic computing devices under SIC Code 3573;

c. Products classified as calculating and accounting machines under SIC Code 3574;

d. Products classified as telephone and telegraph equipment under SIC Code 3661;

e. Products classified as office machines, not elsewhere classified, under SIC Code 3579; and

f. Photocopy machines, a subcategory of products classifed as photographic equipment under SIC Code 3861.

2. "Coating operation" means the use of a spray booth for the application of a single type of coating (e.g., prime coat); the use of the same spray booth for the application of another type of coating (e.g., texture coat) constitutes a separate coating operation for which compliance determinations are performed separately.

3. "Coating solids applied" means the coating solids that adhere to the surface of the plastic business machine part being coated.

4. "Color coat" means the coat applied to a part that affects the color and gloss of the part, not including the prime coat or texture coat. This definition includes fog coating.

5. "Conductive sensitizer" means a coating applied to a plastic substrate to render it conductive for purposes of electrostatic application of subsequent prime, color, texture, or touch-up coats.

6. "Fog coating" (also known as mist coating and uniforming) means a thin coating applied to plastic parts that have molded-in color or texture or both to improve color uniformity.

7. "Nominal 1-month period" means either a calendar month, 30-day month, accounting month, or similar monthly time period that is established prior to the performance test (i.e., in a statement submitted with notification of anticipated actual startup pursuant to s. NR 440.07 (1) (b)).

8. "Plastic parts" means panels, housings, bases, covers, and other business machine components formed of synthetic polymers.

9. "Prime coat" means the initial coat applied to a part when more than one coating is applied, not including conductive sensitizers or electromagnetic interference/radio frequency interference shielding coatings.

10. "Spray booth" meeans the structure housing automatic or manual spray application equipment where a coating is applied to plastic parts for business machines.

11. "Texture coat" means the rough coat that is characterized by discrete, raised spots on the exterior surface of the part.

12. "Touch-up coat" means the coat applied to correct any imperfections in the finish after color or texture coats have been applied.

13. "Transfer efficiency" means the ratio of the amount of coating solids deposited onto the surface of a plastic business machine part to the total amount of coating solids used.

14. "VOC emissions" means the mass of VOCs emitted from the surface coating of plastic parts for business machines expressed as kilograms of VOCs per liter of coating solids applied (i.e., depostited on the surface).

(b) As used in this section, all symbols not defined in this subsection have the meanings given them in s. NR 440.03.

D_c = density of each coating as received (kilograms per liter)

D_d = density of each diluent VOC (kilograms per liter)

L_c = the volume to each coating consumed, as received (liters)

L_d = the volume of each diluent VOC added to coatings (liters)

L_s = the volume of coating solids consumed (liters)

M_d = the mass of diluent VOCs consumed (kilograms)

M_o = the mass of VOCs in coatings consumed, as received (kilograms)

N = the volume-weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter)

T = the transfer efficiency for each type of application equipment used at a coating operation (fraction)

T_{avg} = the volume weighted average transfer efficiency for a coating operation (fraction)

V_s = the proportion of solids in each coating, as received (fraction by volume)

W_o = the proportion of VOCs in each coating, as received (fraction by weight)

(3) STANDARDS FOR VOLATILE ORGANIC COMPOUNDS. (a) Each owner or operator of any affected facility which is subject to the requirements of this section shall comply with the emission limitations set forth in this subsection on and after the date on which the initial performance test, required by s. NR 440.08 and sub. (4) is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after the initial startup, which ever date comes first. No affected facility may cause the discharge into the atmosphere in excess of:

1. 1.5 kilograms of VOCs per liter of coating solids applied from prime coating of plastic parts for business machines.

2. 1.5 kilograms of VOCs per liter of coating solids applied from color coating of plastic parts for business machines.

3. 2.3 kilograms of VOCs per liter of coating solids applied from texture coating of plastic parts for business machines.

4. 2.3 kilograms of VOCs per liter of coatings solids applied from touch-up coating of plastic parts for business machines.

(b) All VOC emissions that are caused by coating applied in each affected facility, regardless of the actual point of discharge of emissions into the atmosphere, shall be included in determining compliance with the emission limits in par. (a).

(4) PERFORMANCE TESTS AND COMPLIANCE PROVISIONS. (a) Section NR 440.08 (4) and (5) does 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 as required under s. NR 440.08 (1) and thereafter a performance test each nominal 1-month period for each affected facility according to the procedures in this subsection.

1. The owner or operator shall determine the composition of coatings by analysis of each coating, as received, using Reference Method 24 of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, from data that have been determined by the coating manufacturer using Reference Method 24, or by other methods approved by the administrator.

2. The owner or operator shall determine the volume of coating and the mass of VOC used for dilution of coatings from compnay records during each nominal 1-month period. If a common coating distribution system serves more than one affected facility or serves both affected and nonaffected spray booths, the owner or operator shall estimate the volume of coatings used at each facility by using procedures approved by the department.

a. The owner or operator shall calculate the volume-weighted average mass of VOCs in coatings emitted per unit volume of coating solids applied (N) at each coating operation (i.e., for each type of coating used, prime, color, texture, or touch-up) during each nominal 1-month period for each affectd facility. Each 1-month calculation is considered a performance test. Except as provided in subpar. c., N will be determined by the following procedures:

1) Calculate the mass of VOCs used ($M_o + M_d$) for each coating operation during each nominal 1-month period for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

where n is the number of coatings of each type used during each nominal 1-month period and m is the number of different diluent VOCs used during each nominal 1-month period. ($\eta L_{dj} D_{dj}$ will be 0 if no VOCs are added to the coatings, as received.)

2) Calculate the total volume of coating solids consumed (L_s) in each nominal 1-month period for each coating operation for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci} \quad V_{si}$$

where n is the number of coatings of each type used during each nominal 1-month period.

3) Select the appropriate transfer efficiency (T) from Table 1 for each type of coating applications equipment used at each coating operation. If the owner or operator can demonstrate to the satisfaction of the administrator that transfer efficiencies other than those shown are appropriate, the administrator may approve their use on a case-by-case basis. Transfer efficiency values for application methods not listed below may be approved by the administrator on a case-by-case basis. An owner or operator shall submit sufficient data for the administrator to judge the validity of the transfer efficiency claims.

4) Where more than one application method is used within a single coating operation, the owner or operator shall determine the volume of each coating applied by each method through a means acceptable to the

department and compute the volume-weighted average transfer efficiency by the following equation:

$$T_{avg} = \frac{\sum_{i=1}^{n} \sum_{i=1}^{p} L_{cik} \quad V_{sik} \quad T_k}{L_s}$$

TABLE 1. - TRANSFER EFFICIENCIES

Application methods	Transfer efficiency	Type of coating
Air atomized spray	0.25	Prime, color, texture, touch-up, and fog coats.
Air assisted airless spray	0.40	Prime and color coats.
Electrostatic air spray	0.40	Prime and color coats.

where n is the number of coatings of each type used and p is the number of application methods used.

5) Calculate the volume-weighted average mass of VOCs emitted per unit volume of coating solids applied (N) during each nominal 1-month period for each coating operation for each affected facility by the following equation:

$$N = \frac{M_o + M_d}{L_s T_{avg}}$$

(T_{avg} = T when only one type of coating operation occurs).

b. Where the volume-weighted average mass of VOCs emitted to the atmosphere per unit volume of coating solids applied (N) is less than or equal to 1.5 kilograms per liter for prime coats, is less than or equal to 1.5 kilograms per liter for color coats, is less than or equal to 2.3 kilograms per liter for texture coats, and is less than or equal to 2.3 kilograms per liter for touch-up coats, the affected facility is in compliance.

c. If each individual coating used by an affected facility has a VOC content (kg VOC/l of solids), as received, which when divided by the lowest transfer efficiency at which the coating is applied for each coating operation results in a value equal to or less than 1.5 kilograms per liter for prime and color coats and equal to or less than 2.3 kilograms per liter for texture and touch-up coats, the affected facility is in compliance provided that no VOCs are added to the coatings during distribution or application.

d. If an affected facility uses add-on controls to control VOC emissions and if the owner or operator can demonstrate to the administrator that the volume-weighted average mass of VOCs emitted to the atmosphere during each nominal 1-month period per unit volume of coating solids applied (N) is within each of the applicable limits expressed in subpar. b. because of this equipment, the affected facility is in compliance. In such cases, compliance will be determined by the administrator on a case-by-case basis.

(5) REPORTING AND RECORDKEEPING REQUIREMENTS. (a) The reporting requirements of s. NR 440.08 (1) apply nly 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 for in subd. 2., the volume-weighted average mass of VOCs emitted to the atmosphere per volume of applied coating solids (N) for the initial nominal 1-month period for each coating operation from each affected facility.

2. For each affected facility where compliance is determined under the provisions of sub. (4) (b) 2. c., a list of the coatings used during the initial nominal 1-month period, the VOC content of each coating calculated from data determined using Reference Method 24, of Appendix A, 40 C.F.R. part 60, incorporated by reference in s. NR 440.17, and the lowest transfer efficiency at which each coating is applied during the initial nominal 1-month period.

(b) Following the initial report, each owner or operator shall:

1. Report the volume-weighted average mass of VOCs per unit volume of coating solids applied for each coating operation for each affected facility during each nominal 1-month period in which the facility is not in compliance with the applicable emission limits specified in sub. (3). Reports of noncompliance shall be submitted on a quarterly basis, occurring every 3 months following the initial report; and

2. Submit statements that each affected facility has been in compliance with the applicable emission limits specified in sub. (3) during each nominal 1-month period. Statements of compliance shall be submitted on a semiannual basis.

(c) These reports shall be postmarked not later than 10 days after the end of the periods specified in par. (b).

(d) 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 coating operation for each affected facility as specified in s. NR 440.07 (4).

(e) Reporting and recordkeeping requirements for facilities using add-on controls will be determined by the administrator on a case-by-case basis.

(6) TEST METHODS AND PROCEDURES. (a) The reference methods in Appendix A, of 40 C.F.R. part 60, 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 for determination of VOC content of each coating as received.

2. For Method 24, the sample shalll be at least a 1-liter sample in a 1-liter container.

(b) Other methods may be used to determine the VOC content of each coating if approved by the administrator before testing.

History: Cr. Register, September, 1990, No. 417, eff. 10-1-90.